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King Faisal University

The Proceeding of 6th Conference of the
International Society of Camelid Research and Development

| ISOCARD-2023 |

"The Role of Camel in Food Security and Economic Development"



الجمعية الطبية البيطرية السعودية
Saudi Veterinary Medical Society



جامعة الملك فيصل
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المجعية الطبية البيطرية السعودية
Saudi Veterinaray Medical Society



Organized by:

Saudi Veterinary Medical Society (SVMS)
Camel Research Center



King Faisal University

THE 6th Conference of the International Society of Camelid Research and Development



المجتمعة الطبية البيطرية السعودية
Saudi Veterinary Medical Society



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"The Role of Camel in Food Security and Economic Development"

Conference Scientific Committee	
1	Prof Dr. Salah Abdulaziz AL-Shami Chairman of Scientific Committee President of SVMS
2	Dr. Faisal Bin Saleh Almathen College of Veterinary Medicine, King Faisal University, Vice President of the Conference.
3	Prof. Dr. Wael Mohamed El-Deeb College of Veterinary Medicine, King Faisal University, Member.
4	Prof. Dr. Mohamed Karam Zabady College of Veterinary Medicine, King Faisal University, Member.
5	Prof. Dr. Mahmoud Hassanain Ahmed College of Veterinary Medicine, King Faisal University, Member.
6	Prof. Dr. Mohamed Abdulmohsen Mohamed College of Veterinary Medicine, King Faisal University, Member.
7	Prof. Dr. Sherief M. Abdel-Raheem College of Veterinary Medicine, King Faisal University, Member.
8	Prof. Dr. Ahmed I. El Sheikh College of Veterinary Medicine, King Faisal University, Member.
9	Prof. Dr. Hesham A. Ismail College of Veterinary Medicine, King Faisal University, Member.
10	Dr. Mohamed Abdel Aziz Al-Fattah Camel Research Center, King Faisal University, Member
11	Dr. Ahmed Majzoub Khaled Ali College of Veterinary Medicine, King Faisal University, Member
12	Dr. Abdullah Sheikh Camel Research Center ,King Faisal University, Member

THE 6th

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المتحدثين Speakers

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الجمعية السعودية للطب البيطري
Saudi Veterinary Medical Society



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Prof. Dr. Salah Abdulaziz AL-Shami,
Chairman of Scientific Committee, - President of the Saudi Veterinary Medical Association Saudi Arabia



Faye Bernard PhD
CIRAD-France,
Emeritus expert France



Prof. Dr. Marzouq Al-Aknah
Professor of animal reproduction
College of Veterinary Medicine , King Faisal University, Saudi Arabia



Professor Rafat Al Jassim,
BSc, MSc, PhD
Nutrition Biochemist & Gut Microbiologist
The university of Queensland, Australia



Prof. Dr. Wael M. El-Deeb
Professor of Veterinary Medicine,
College of Veterinary Medicine - King Faisal University, Saudi Arabia



Gaukhar Konuspayeva PhD
Professor
Al-Farabi University
Kazakhstan



Dr. Faisal Saleh Almathen
DVM, MSc, PhD
Director of the Camel Research Center at King Faisal University, Saudi Arabia



Abd al-Malik Ibrahim Fadl al-Mawla
A microbiologist expert
Abu Dhabi Authority for Agriculture and Food Safety
UAE

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Peter Pal Nagy, PhD
EICMP, Dubai
Head of department
Hungaria



Pamela Anna Burger
Priv.-Doz. Dr.med.vet.
Senior Researcher
Vetmeduni Vienna
Austria



Dr. Ahmed Jaafar Al-Jazzar
DVM, MSc, PhD
College of Veterinary
Medicine, King Faisal
University, Saudi Arabia



Barbara Padalino
Associate Professor,
University of
Bologna
Italy



Mohamed Esmat Moustafa
Prof. of infectious
diseases
Salam veterinary
group
Saudi Arabia



Nisar Ahmad Wani
BVSc & AH, MVSc, PhD
Reprobiotech.ae
Scientific Director
India



Carlos Pastrana
BVSc, MSc,
Predoctoral researcher
University of Cordoba,
Spain



Elena Ciani
PhD Associate
Professor
University of Bari
Italy



Taher K. Osman
Research and
development Manager
(Biotechnology)
Salam veterinary
group
Saudi Arabia



Ming Liang
PhD Inner Mongolia
Agricultural
University
China



Davide Monaco
PhD Assistant Professor
University of Bari Aldo
Moro
Italy



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1st
DAY



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CONFERENCE PROGRAM

1ST DAY

SUNDAY, 12nd March 2023

برنامج المؤتمر

Time	Event/Location	
08:00 AM	Registration (Great Ballroom)	التسجيل (بقاعة الاحتفالات الكبرى)
10:00 - 11:00	Opening Ceremony and accompanying exhibition- Coffee Break	الافتتاح الرسمي للمؤتمر والمعرض المصاحب واستراحة للحضور
11:00-11:30	Dr. Rafat Al Jassim, BSc, MSc, PhD The University of Queensland, Australia "Current knowledge of the nutrient requirements of the Arabian camel" (Great Ballroom)	أ.د. رأفت الجاسم جامعة كوينزلاند أستراليا المعرفة الحالية بالمتطلبات الغذائية للإبل العربي (قاعة الاحتفالات الكبرى)
11:30-12:00	Prof. Marzook Al-Eknh College of Veterinary Medicine King Faisal University "Problem-Oriented Diagnosis Of Large Female Camelid Infertility" (Great Ballroom)	أ.د. مرزوق العكنة جامعة الملك فيصل كلية الطب البيطري التشخيص الموجه نحو مشكلة العقم عند الإناث في النوق الكبيرة (قاعة الاحتفالات الكبرى)
12:00 - 12:30	Coffee Break and Zuhr Prayer	صلاة الظهر
12:30 - 01:00 PM	Dr. Nisar Ahmad Wani (BVSc & AH, MVSc, PhD) Scientific Director, Reproductive Biotechnology Centre Dubai, United Arab Emirates Reproductive Biotechnology Techniques in Camelids: Current knowledge and future challenges" (Great Ballroom)	أ.د. نزار أحمد واني المدير العلمي لمركز التكنولوجيا الحيوية والتكاثر دبي-الإمارات العربية المتحدة تقنيات التكنولوجيا الحيوية الإنجابية في الإبل: المعرفة الحالية وتحديات المستقبل (بقاعة الاحتفالات الكبرى)
01:00 - 02:30	Exhibition Visit and lunch break- Posters PPT.	زيارة للمعرض والملصقات واستراحة الغذاء



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Scientific Sessions, Sunday, 12nd March 2023

	HALL 1 <u>(At the theater of the Deanship of Student Affairs)</u> Section: Biology of Camelids Chair: Dr. Said Al-Ramadan Moderator: Dr. Isam Al-Jalli	HALL 2 <u>(Training Hall)</u> Section: Camel production and products Chair: Prof. Dr. Ahmed El-Sheikh Moderator: Abulrahman Hereba	HALL 3 <u>Al Fars Hall (Al Fars Hall, College of Business Administration)</u> Section: Camelids Health and Diseases Chair: Dr. Ahmed Al-jazar Moderator: Dr. Mahmoud Gamil	HALL 4 <u>(Sports Hall)</u> Section: Camelids and Environment Chair: Dr. Mohamed Abdelmohsen Moderator Dr. Ahmed Meligi
02:30 - 02:50 (PM)	The α -lactalbumin in domestic camelids: identification of new polymorphisms at the LALBA gene Pauciullo A., Versace C., Miretti S., Giambra I.J., Cosenza G.	Impact of supplemental urea nitrogen on performance, digestion coefficients of nutrients and some biochemical parameters in camels Sayed, A.N, Abdel-Raheem, S. M	Prevalence of anti-Toxoplasma gondii antibodies in the sera of camels (Camelus dromedarius) owned by nomadic population from tribal areas of Pakistan Muhammad Mudasser Nazir, Jamal Muhammad	The effects of supplementation on performance and forage utilization by grazing camels during the drought season Ahmed R. Askar*, Khalid Z. Kewan, Sami Abo Ragab
02:50-03:10	The CSN1S2 gene (α s2-casein) in the Bactrian camel: genetic diversity discovery and bioinformatics analysis Versace C., Gaspa G., Cosenza G., Pauciullo A.	Preventive Effect and Mechanism of Camel Whey Protein on Liver Injury Induced by Heat Stress Donghua Du, Surong Hasi	Outbreaks of epidemic respiratory complex (Al Nahaz) in Arabian camels in Al Muthanna province/ Iraq karima Al-Salihi*	Effect of Production System on Macro Element contents In Camel Blood, Milk and Meat in Sudan. El-rasheed,M.Y. & Adam,Y.S.I.

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Scientific Sessions, Sunday, 12nd March 2023

03:10-03:30	<p>The Illumina® Agricultural Greater Good Initiative: development of a medium-density SNP chip for camels.</p> <p>Bruno, S; Senczuk, G; Landi, V; Di Civita, M; Brooks, S; Almathen, F; Faye, B; Gaouar, SBS; Piro, M; Kim, K-S; Dadi, H; Iglesias Pastrana, C; Al-Haddad, H; Al-Abri, M; David, X; Eggen, A; Burger, P; Ciani, E.</p>	<p>Nanobody based indirect competitive ELISA for Aflatoxin M1 in dairy products</p> <p>Yili, Haiyuan Liu, Yingda Liu, Jirimutu*</p>	<p>Cystic echinococcosis in dromedary camels and their potential role in the epidemiology of Echinococcus spp. in some regions of Algeria and Egypt: Genotyping and phylogenetic study</p> <p>Mohammed Mebarek BIA*, Said Amer, Seongjun Choe, Dongmin Lee, Hansol Park, Mohammed Hocine BENAÏSSA, Ki-Jeong Na, Keeseon S. Eom</p>	<p>Chemical Composition Determination of Leaves of Some Fodder Trees Preferred by Camel, Sudan.</p> <p>Alsadig. H 1*, Elsamni. O2, Seazar. K3.</p>
03:30-03:50	<p>Investigation of the role of gd T cells in dromedaries using 3D comparative modeling approaches</p> <p>Salvatrice Ciccacese, Giovanna Linguiti, Vincenzo Tragni, Elena Ciani, Ciro Leonardo Pierri</p>	<p>Serum minerals profile and feeds nutritional value of stall feeding and browsing camels in Egypt</p> <p>Hassan A. M. Abdel-Raheem</p>	<p>Colloid goiter and thyroid gland carcinoma in camelus dromedaries in Sudan</p> <p>Abeer A.M, Musa M.Z, Zakia A.M Muna A.E and Jameel A.A</p>	<p>Analysis on the Fusion of Different Religions and Cultures Based on the Plastic Arts of Bactrian Camels</p> <p>H. Wurihan, T. Batsaikhan*</p>

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03:50-04:10	<p>Apparent digestibility of major minerals in camels (<i>Camelus dromedarius</i>)</p> <p>Seddik Mabrouk Mouldi *, Saifi Ali, Dbara Mohamed, Jarray Naceur, Hammadi Mohamed And Khorchani Touhami</p>	<p>Importance of liner design and milking machine settings for optimal milking performance and welfare in camels</p> <p>S. Kaskous</p>	<p>Investigation of endemic and imported camel diseases in Libya</p> <p>Fouziyah Alghanay</p>	<p>Effect of preslaughter stress simultaneously induced by high loading density, thermo-hygrometric parameters and waiting period on the status of oxidative stress indices and vitamin D in liver and kidney in the Arabian camel</p> <p>El Khasmi Mohammed*, Moussahil Abderrahim, Farh Mohamed, Iddar Abdelghani</p>
04:10-04:30	<p>Fractionation of pepsin-hydrolyzed camel and cow lactoferrin : Investigation of antibacterial activity</p> <p>Jrad Zeineb, El-Hatmi Halima, Adt Isabelle, Degraeve Pascal, Oulahal Nadia and Khorchani Touhami</p>	<p>Quantitative determination of D and L lactates in raw and fermented camel milk in Kazakhstan</p> <p>Zauresh Bilal, Assem Issayeva, Shynar Akhmetsadykova, Gaukhar Konuspayeva, Helene Tormo</p>	<p>Isolation and molecular identification of E. coli on 157:H7 in dromedary camels</p> <p>Ali kadhim Altaee, Afaf Abdulrahman Yousif</p>	<p>Protective Effect of Black Cumin Oil Against the Heat-Induced Oxidative Stress in Camel Meat</p> <p>FARH Mohamed, Moussahil Abderrahim, IDDAR Abdelghani and El KHASMI Mohammed</p>
04:30-04:50	<p>Pharmacokinetic of tetracycline antibiotic in camel milk</p> <p>F. Amutova, Z. Bilal, A. Akhatzhanova, A. Issayeva, N.Akhmetsadykov, S.Akhmetsadykova, G.Konuspayeva</p>	<p>Use of artichoke (<i>Cynara scolymus</i>) flower extract as a substitute To rennet in the manufacture of camel milk cheese</p> <p>Imen Fguiri, Moufida atigui, Amel sboui, samira arroum, Mohamed Dbara, Mohamed Hammadi, Touhami Khorchani</p>	<p>The non-DNA sequence variations of experimentally camel-derived <i>Trichinella spiralis</i> in domestic cats</p> <p>Hussein Mohamed Omar</p>	<p>A comparative study of the mineral status of camels in El Oued region: gender, age, and season effects</p> <p>Titaouine Mohammed</p>

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04:50-05:10	<p>Dromedary urine impacts on human tumour and non-tumour renal cell lines viability in serum-reduced media</p> <p>Maria Noemi Sgobba, Carlos Iglesias Pastrana, Nikola Schlosserová, Francisco Javier Navas González, Juan Vicente Delgado Bermejo, Taher Kamal Sayed Osman, Lorenzo Guerra and Elena Ciani</p>	<p>Cheese making from camel milk: Usefulness of Cynara cardunculus flower extract as substitute to rennet</p> <p>Amel Sboui, Mahassen Naouel, Mohamed Hammadi, Touhami Khorchani</p>	<p>Anatomopathological Profile, Microscopic And Molecular Diagnosis of Paratuberculosis/ John's Disease in Naturally Infected Dromedary Camels (Camelus Dromedaries)</p> <p>El Tigani Ahmed El Tigani-Asil, Ghada Ahmed El Derdir, Abdelnasir Mohammed Adam Terab, Hassan Zackaria, Nasareldien Altaib, Hussein Khalil, El Hadi Ahmed Mohamed Abdu, Zhaya Jaber Mohammed Al Marri, Abd Elmalik Ibrahim Khalafallah Fadel Elmola and Asma Mohamed Shah</p>	
05:10-05:30		<p>Effect of the enzymatic hydrolysis on anti-oxidant and anti-obesity activities of camel whey proteins compared to cow, goat, ewe and equine species</p> <p>Ben Yagoub Meriem*, Jrad Zeineb, Oussaief Olfa, Azabou Samia, El-Hatmi Halima.</p>	<p>Sarcoptic mange outbreak in a herd of Bactrian camels (Camelus bactrianus) in Sweden</p> <p>Bornstein S, Bergvall K, Vest G, Erlingsson B, Karlstam E, SeligssonD.</p>	



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05:30-05:50	Preservation of camel meat using different maturation stages of date extracts Saleh*, F. A. Otaibi, M. M.	Rift Valley Fever in Sudanese Camels Nahid. A .M. Ibrahim,Tamador. M.A.Elhassan, Mohammed. E. A. Mansour.,Awatif.A. Ahmed, Manal. A.Abdalla	
05:50-06:10	Influence of Gum Arabic (Acacia senegal) Powder on Quality Characteristics and Stability during Frozen Storage of Camel Meatballs Ikhlas Ahmed Nour and Mohamed Hassan Elbadawi	The efficiency of MERS-CoV MVA vaccine in Camels: A systematic review Ahmed Alsaleem, Mahmoud Kandeel*	



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2nd
DAY



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CONFERENCE PROGRAM

2nd DAY

MONDAY, 13rd March 2023

Time	Event/Location
	<p>ورشة عمل تحاليل الجينوم في الإبل تحليل التنوع والصفات الوراثية للإبل العربي باستخدام بيانات تسلسل الجينوم الكامل قاعة الفارس (كلية إدارة الاعمال)</p> <p>Workshop on Camel Genome "Analysis of dromedary genetic diversity and structure using whole-genome sequence data" (Al Fars Hall, College of Business Administration)</p>
8:00 – 09:00	<p>Dr. Faisal Almathen Director Of Camel Research Center, King Faisal University, KSA</p> <p>Priv.-Doz. Dr. Pamela Burger Research Institute of Wildlife Ecology Vienna, Austria</p> <p>Dr. Elena Ciani Università degli Studi di Bari Aldo Moro Italy</p> <p>د. فيصل بن صالح المذن مدير مركز أبحاث الإبل، جامعة الملك فيصل</p> <p>د. بامبلا برجر معهد بحوث بيئة الحياة البرية فيينا، النمسا</p> <p>د. إيلينا سياني جامعة ديغلي ستودي دي باري ألدو مورو إيطاليا</p>
9:00 – 09:25	<p>Dr. Abdelmalik Ibrahim Khalafalla Animal Wealth, Veterinary laboratories, UAE Zoonotic Diseases Transmitted from Dromedary Camels and the One Health Approach (Al Fars Hall, College of Business Administration)</p> <p>د. عبد الملك خلف الله الثروة الحيوانية، المختبرات البيطرية، الإمارات العربية المتحدة الامراض المشتركة في الإبل ومفهوم الصحة الواحدة قاعة الفارس (كلية إدارة الاعمال)</p>
09:25 – 09:45	<p>Prof. Gaukhar Konuspayeva Al-Farabi Kazakh National University Evolution of processing for new camel milk products (Al Fars Hall, College of Business Administration)</p> <p>بروفيسور. جواهر كونسبايفا جامعة الفارابي الكازاخستانية الوطنية تطور التصنيع لمنتجات ألبان الإبل الجديدة قاعة الفارس (كلية إدارة الاعمال)</p>
09:45 – 10:05	<p>Coffee Break</p> <p>استراحة</p>

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Time	Event/Location	
10:05 - 10:25	Dr. Bernard Faye A technico-ecomomic modelling to assess the profitability of dairy camel farming (Al Fars Hall, College of Business Administration)	د. برنارد فاي مستشار بمختبرات سي راد بفرنسا نمذجة تقنية بيئية لتقييم ربحية تربية الإبل قاعة الفارس (كلية إدارة الاعمال)
10:25 - 10:45	Dr. Davide Monaco Effect of different sperm washing procedures on motility and kinetic parameters of dromedary camel spermatozoa DVM, PhD, Researcher Università degli Studi di Bari Aldo Moro Dipartimento di Medicina Veterinaria (DiMeV) Sezione di Clinica Ostetrica, Italy (At the theater of the Deanship of Student Affairs)	د. ديفيد موناكو جامعة ديجلي ستودي دي باري ألدو مورو إيطاليا تأثير إجراءات غسل الحيوانات المنوية المختلفة على الحركة والبارامترات الحركية للحيوانات المنوية من الجمل العربي قاعة الفارس (كلية إدارة الاعمال)
10:45 - 11:05	Dr. Carlos Iglesias Pastrana University of Cordoba, Spain Multiple phenotype collection in dromedary camels: zoometrics, kinetics and behavior' (Al Fars Hall, College of Business Administration)	د. كارلوس باسترانا جامعة قرطبة-اسبانيا مجموعة النمط الظاهري المتعددة في الإبل العربية: علم الزوميتريكس ، الحركية والسلوك قاعة الفارس (كلية إدارة الاعمال)
11:05 - 11:25	Dr. Peter Nagy Head of Department, Site FST leader Intensive milk production in dromedaries. What makes it intensive (Al Fars Hall, College of Business Administration)	د. بيتر ناجي شركة الامارات لتصنيع البان ومنتجات الإبل- الامارات العربية المتحدة إنتاج الحليب المكثف في الإبل قاعة الفارس (كلية إدارة الاعمال)
11:25 - 11:45	Barbara Padalino DVM, PhD, DipECAWBM(AWSEL) University of Bologna, Italy The First Protocol for Assessing Welfare of Dromedary Camels (Great Ballroom)	د. بربرا بادالينو جامعة بولونا ايطاليا البروتوكول الأول لتقييم راحة الإبل العربية قاعة الفارس (كلية إدارة الاعمال)
11:45- 12:15	Zuhr Prayer and coffee break	استراحة وصلاة الظهر
12:15 - 01:30	ICCGIC (Al Fars Hall, College of Business Administration)	اجتماع وانتخابات الاتحاد الدولي لتحسين الإبل وراثياً قاعة الفارس (كلية إدارة الاعمال)
01:30-03:30	Lunch Break and Exhibition visits-Posters PPT.	استراحة وغداء وزيارة المعرض والملصقات

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Scientific Sessions (MONDAY, 13rd March 2023)

	HALL 1	HALL 2	HALL3	HALL 4
	<p><u>(At the theater of the Deanship of Student Affairs)</u></p> <p>Section : Camelids Biology</p> <p>Chair: Dr. Al Thunian Ali Thunaian</p> <p>Moderator : Abdelazeem Munir</p>	<p><u>(Training Hall)</u></p> <p>Camel production and products</p> <p>Chair: Dr. Samer Alhegelli</p> <p>Moderator: Hisham Abdelmoez</p>	<p><u>Al Fars Hall(Al Fars Hall, College of Business Administration)</u></p> <p>Section: Camelids Reproduction</p> <p>Chair: Dr. Abdelrahman Al-Haider</p> <p>Moderator: Dr. Magdy Wahid</p>	<p><u>(Sports Hall)</u></p> <p>Section: Special Session</p> <p>Chair: Dr. Mohamed Ali</p> <p>Moderator: Dr. Ahmed Magzob</p>
03:30-03:45 pm	<p>Biodiversity of dromedary and hybrid camels in Kazakhstan</p> <p>Akhmetsadykova Sh., E.Shertai, G.Konuspayeva, Dosybayev K., Kantay A., Talzhonov T., Baisaparov A. B.Faye</p>	<p>Camel milk as a nutraceutical adjuvant in Autistic children</p> <p>Artabandhu Sahoo¹, Raghavendra Singh, Pritpal Singh</p>	<p>Evaluation of reproductive performance by using hormonal treatment in anestrus Iraqi camel (<i>Camelus dromedarius</i>).</p> <p>Al-Hamedawi, T. M.; Alyasiri, E. A. and Al-Fatlawy, A.K.</p>	<p>The importance of camels and the legal & therapeutic philosophy of camel milk and urine</p> <p>Manahil Eltigani</p>
03:45-04:00	<p>Toll-like receptor 2 gene variations in lassi and mareecha camel populations of Pakistan</p> <p>Tanveer Hussain, Shahbaz Haider, Masroor Ellahi Babar, Abdul Wajid, Ayesha Mohiuddin, Goher Ayub, Muhammad Amjad Awan</p>	<p>Influence of feeding different levels of energy and protein supplements on milk yield and composition in early lactating Lassi camels</p> <p>Illahi Bakhsh Marghazani, Baboo Saleem, Gulfam Ali Mughal, Farman Ali Sial, Asim Faraz, Ressmi Amina</p>	<p>Effect of management system on reproductive performance, hormonal and blood biochemical changes in non-pregnant Sudanese dromedary camels</p> <p>Eglal E.S., Abdoon A.S., Makkawi A., Sid-Ahmed S., Nesreen A. A.</p>	<p>Camel Ownership as a Passage to Adulthood in Omani Bedouin Culture</p> <p>Ibtisam ALwahaibi, Victoria Daulitova, Harry Wels</p>

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04:00-04:15	<p>Phenotypic and genotypic characterization of Kazakhstani Bactrian camels</p> <p>Akhmetsadykova Sh., E.Skertay, G. Konuspaveva, A. Torekhanov, K. Dossybayev, A. Kantay, E. Talzhanov, N. Alibayev, B. Faye.</p>	<p>Assessment the variation factors of milk production and composition of camels in Kazakhstan</p> <p>Shertai E., G.Konuspaveva, B. Faye, Baisaparov A., Sh. Akhmetsadykova.</p>	<p>Induction of Estrus and Ovulation in Dromedary Camels (Camelus Dromedarius) in Sudan.</p> <p>Ashwag E. Musaad*, Husna M. Elbasheir, Duriya F. and Salih O. Adam</p>	<p>Developing the Knowledge Between the Field/Specialist and the Future Veterinarian/ Medical Students"</p> <p>Noura Abdelmajeed Alzarooni Abudhabi</p>
04:15-04:30	<p>Influence of oversized follicles on Behavior, hormonal concentrations and fertility of camels (Camelus dromedarius)</p> <p>M.M. Waheed, I.M. Ghoneim, M.M. Hasseeb, F.M. Al-Muhasen</p>	<p>Comparative Study between Nisin extracted From Camel, Caw and Goat Milk</p> <p>Suzan Aziz Awla, and Hanan Mohawia Ibrahim</p>	<p>Impact Of Glycine Betaine On Cooled Camel Semen Quality And Fertility Rate</p> <p>Zeidan, A.E. B. ; *A.M.Amer ; Dalia,S.A.Al-Tahan and Liza A. Abdel-Rafaa</p>	<p>Towards a genomic future for camels in pakistan; enhancing camel potentials using new approaches</p> <p>Masroor Ellahi Babar, Tanveer Hussain, Qurat ul Ain Ali Hira</p>
04:30-04:45	<p>Prediction of gestational age in dromedary camels</p> <p>Ahmed Ali,* , Refaat Derar Derar, Fahd A. Al-Sobyil, Omar El-Tookhy</p>	<p>A novel camel yoghurt process using camel gelatin as a texturizing agent</p> <p>Imen Fguiri*, Salma Bessalah, Amel Sboui, Samira Arroum, Mohamed Dbara1, Mohamed Hammadi, Touhami Khorchani</p>	<p>Use of hormones and Ultrasonic for assessment of ovarian activity and uterine condition of she camels (Camelus dromedaries) during early pregnancy stages (non-breeding season)</p> <p>Nesreen Abd alrasoul</p>	<p>Reproduction Practices of Camel Wrestling Culture in Turkey</p> <p>Devrim ERTÜRK; Süleyman ŞANLI</p>



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04:45-05:00	<p>Anti-adhesive (MUC1) and adhesive (OPN) protein expression in the embryonic trophoctoderm of the dromedary camel during the peri-implantation period</p> <p>Mohammed Salem Moqbel *, Saeed Yaseen Al-Ramadan, Abdulraman Khalid Alhaider</p>	<p>Production Profile of Marecha Camelid (Camelus Dromedaries) in Desert Ecosystem of Pakistan</p> <p>Asim Faraz</p>	<p>Female dromedary camel infertility: insights into the causal link, diagnostics and management strategies</p> <p>Ahmed Ali*, Derar R. Derar, Tariq I. Almundarij</p>	<p>Measurements evaluated by camel in Kazakh society</p> <p>Nurseitova M., .Massanov Ye</p>
05:00-05:20	Coffee Break			
05:20-05:35	<p>Profile of Some Trace Elements in The Liver of Camels, Sheep, and Goats in the Sudan</p> <p>Mohamed Hussein</p>	<p>Breeding of dromedary camel heifers based on ultrasonographic detection of ≥ 9 mm follicle reduces the age of first service</p> <p>Sumant Vyas*, Rajesh Kumar Sawal, Mohammed Matin Ansari, Kashi Nath, Subroto Vyas, Govind Narayan Purohit</p>	<p>Male camel infertility: an overview of causes and diagnosis options</p> <p>Ahmed Ali*, Derar Refaat Derar, Tariq I. Almundarij</p>	<p>They Called Them All -Afghans</p> <p>Documentary film with Marie Bejah Williams, descendant of "Afghan" cameleer Bejah Dervish, discussing the history .of camels in Australia</p> <p>Douglas Baum</p>
05:35-05:50	<p>Comparison of the effect of 2 diet content of the concentrate on pH, VFA levels and buffering capacity in camels and sheep</p> <p>Touhami Khorchani, Mabrouk-Mouldi Seddik, Mohamed Hammadi, Mongi *Sghaier</p>	<p>Effect of habituation to milking parlour on camel's behavioural response during training to machine milking</p> <p>Chayma CHAOUCH AOUN1*, Marwa BRAHMI, Moufida ATIGUI, Houcine KHEDIRI, Wiem BEN SALEM, Mohamed HAMMADI</p>	<p>Physical and physiological changes of dromedary camels as parturition approaches under semi-intensive system</p> <p>Imen Hammadi*; Mouldi-Mabrouk Seddik, Wiem Ben Selem, Mohamed Hammadi</p>	<p>Camel Middle East Network (CAMENET): A genuine step towards maximizing camels' impacts & roles in the region</p> <p>Mohamed Ali AlHosa</p>

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05:50-06:05	Physicochemical, antioxidant and antihypertensive properties of fermented camel milk: A comparative study with fermented cow milk Olfa OUSSAIEF, Zeineb Jrad, Touhami Khorchani & Halima El Hatmi	Therapeutic properties of camel colostrum Taherah Mohammad abadi	Effect of Exogenous Progesterone on Implantation after Embryo Transfer in Dromedary Camel Ayman A Swelum, Hani A Ba-Awadh, Isiaka O Olarinre, Abdullah N Alowaimer	Camels on the Walls of Arabian Peninsula Ashraf Sobhy Mohamad Saber
06:05-06:20	Genetic polymorphisms of lipoprotein lipase (LPL) gene and their associations with camel (Camelus dromedarius) milk fatty acids composition Latifa Chamekha,b, Jorge Hugo Calvoc, Touhami Khorchania, Mohamed Habib Yahyaouia	Effect of Indirect and Direct Boiling on the physicochemical Properties of Camel Milk Sabah Ahmed and Abdelmaged Mohammed	Ovulation induction in dromedary she – camels by using two different protocols during non-breeding season A.aziz Makkawi, Nesreen Abd alrasoul, Dr. Duria Alhag, Tsabeh Hussien Hashem	Camel's milk Products and Food Security Najeeb Al-zoreky & Faisal S. Al-Mathe



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06:20-06:35	<p>Effect of concentrate proportion in diet on intake, digestibility and variations of rumen pH and temperature in fattening camel</p> <p>Mohamed Hammadi, Fatma Abdelkebir, Andreia Castro-Costa, Mabrouk-Mouldi ,Seddik</p> <p>Mohamed Dbara, Touhami Khorchani, Gerardo Caja</p>	<p>Seasonal Effect on Camel Milk Microbiota</p> <p>Abdulaziz Al-Ateeqi*, Abrar Akbar, Husam Alomirah, Mohamed Kishk, Anisha Shajan, Rita Rahmeh</p>	<p>Survivability of the cooled camel spermatozoa added with glycine betaine during storage at 5oc</p> <p>Zeidan, A.E. B ; A.M.Amer; Dalia,S.A.Al-Tahan and Liza A. Abdel-Rafaa</p>	<p>The Camel - a Core of Food security</p> <p>Asim Faraz</p>
06:35-06:50	<p>Oxytocin release during machine milking of dromedary camels: Importance of the milking environmental surroundings</p> <p>Atigui M, Marnet P.G., Brahmi M., Barmat A., .Hammadi M</p>	<p>High hydrostatic pressure preservation treatment of camel's milk</p> <p>Siddig H Hamad, Salah M Aleid & Fahad M Aljassas2</p>	<p>Ultrasonic assessment of ovarian activity and uterine condition of she camels (Cameuls dromedarius) during .early pregnancy</p> <p>A.Aziz makkawi, Nesreen Abd alrasoul, Duria Alhag, Jehan Abdalla Mohammed</p>	<p>The uniqueness of camels</p> <p>Hams AL Mohammad</p>



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3rd BDAY



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CONFERENCE PROGRAM

3rd DAY

TUESDAY, 14th March 2023

Time	Event/Location	
08:00- 08:30	<p>Dr. Ming Liang (Online session) College of Food Science and Engineering, Inner Mongolia Agricultural University Inner Mongolia, P. R. China From Genome to Functional Products: A Research Status of Bactrian Camel <u>(Al Fars Hall, College of Business Administration)</u></p>	<p>محاضرة علمية عبر الإنترنت د. مينج يانج : كلية علوم وهندسة الأغذية، جامعة الزراعة منغوليا الداخلية، جمهورية الصين الشعبية "من الجينوم إلى المنتجات الوظيفية: حالة بحثية للإبل مزدوج السنام" (قاعة الفارس ، كلية إدارة الأعمال)</p>
08:30-09:00	<p>Dr. Taher Mohammad The effect of flaxseed on milk quality and unsaturated fatty acids of dairy camels Salam Veterinary Company <u>(Al Fars Hall, College of Business Administration)</u></p>	<p>د. طاهر محمد مجموعة سلام البيطرية محاضرة بعنوان: تأثير بذور الكتان على جودة الحليب والأحماض الدهنية غير المشبعة في ألبان الإبل شركة السلام البيطرية (قاعة الفارس ، كلية إدارة الأعمال)</p>
	<p>ورشة عمل بعنوان: الأمراض الطفيلية في الإبل والأغنام: التحديات و الفرص Workshop on " Parasitic diseases in Camels and Sheep: Challenges and Opportinitie</p>	
09:00-12:00	<p>" Prof. Dr. Wael El-Deeb College of Veterinary Medicine King Faisal University, KSA Dr. Ahmed Hamdy Ceva Ruminants Marketing Manager, ME& Egypt <u>(At the theater of the Deanship of Student Affairs)</u></p>	<p>أد. وائل الديب كلية الطب البيطري-جامعة الملك فيصل د. احمد حمدي شركة سيفا العالمية-مدير قطاع المجترات بالشرق الأوسط ومصر (مسرح عمادة شؤون الطلاب)</p>

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Time	Event/Location
	ورشة عمل حول أمراض الإبل المعدية والإدارة الصحية Workshop on Camel Infectious diseases and Health Management
09:00- 10:00	Dr. Ahmed Al-Gazar College of Veterinary Medicine King Faisal University, KSA Prof. Mohamed Esmat and Dr. Hamad Al-Hameed Salam Veterinary Group, KSA Hall 2 (Training Hall) د. أحمد الجزار كلية الطب البيطري-جامعه الملك فيصل أ.د محمد عصمت د. حماد الحماد مجموعة سلام البيطرية (قاعة 2: قاعة التدريب)
	ورشة عمل حول تطورات جراحات الإبل Workshop on Camel Infectious diseases and Health Management
10:00- 11:00	Dr. Saed El-Shafae and Vet Rayan Al-Harbi Salam Veterinary Group, KSA Hall 2 (Training Hall) د. سيد الشافعي د. ريان الحربي مجموعة سلام البيطرية قاعة التدريب (قاعة 2)
	ورشة عمل عن تغذية الإبل ورعاية حديثي الولادة Workshop on Advances in Camel surgical procedures
11:00- 12:00	Prof. Dr. Salah Al-Shami President of SVMS King Faisal University, KSA Dr. Mohamed Esmat, Dr. Ashraf Swedan and Vet. Ahmed Abdulraof Salam Veterinary Group, KSA (At the theater of the Deanship of Student Affairs) أ.د صلاح الشامي رئيس الجمعية الطبية البيطرية السعودية أ.د محمد عصمت د. اشرف سويدان د. احمد عبد الرؤوف مجموعة سلام البيطرية (مسرح عمادة شؤون الطلاب)
12.00 - 02:00	ISOCARD Assembly Meeting for Election and Closing Ceremony (At the theater of the Deanship of Student Affairs) اجتماع الجمعية العمومية للجمعية الدولية لأبحاث وتطوير الإبل
02:00-03:00	Lunch Break- Exhibition visits-Posters PPT. استراحة الغذاء وزيارة المعرض والملصقات

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	HALL 1 <u>(At the theater of the Deanship of Student Affairs)</u> Topic : Camelids Biology Chair: Dr. Abdhahai Rahmatullah Moderator: Dr. Abdulaziz Muhanna	HALL 2 <u>(Training Hall) Camel production and products</u> Chair: Dr. Abullah Al-Mubark Moderator Dr. Mohamed Al-Sabae	HALL 3 <u>Al Fars Hall (Al Fars Hall, College of Business Administration)</u> Camelids Health and Diseases Chair: Dr. Nasser Al-Hammam Moderator: Dr. Gamal Hussein	HALL 4 <u>(Sports Hall)</u> Sustainable develop. & camelid welfare Chair: Dr. Yhia Hussein Moderator: Dr. Nedal Hussein
03- 03:15	TYR variants are associated with light brown and black coat color of the dromedary Alshanbari Fahad Abdullah	Optimization and validation of a linear appraisal scoring system for physical fitness-linked zoometric traits in dromedary camels Carlos Iglesias Pastrana*, Francisco Javier Navas González, Elena Ciani and Juan Vicente Delgado Bermejo	About the first case of Camel in Prion Disease in Tunisia Abdelkader Amara, Kéfia Elmehetli, Michele Angelo Di Bari, Laura Pirisinu, Rihab Andolsi, Souhir Gachout, Boubaker Ben Smida, Meriem Handous, Heni Haj Ammar, Roukaya Khorchani, Malek Zrelli, Barbara Iulini, Lucia Florio, Maria Caramelli, Cristina Casalone, Laura De Antoniis, Geraldina Riccardi, Elena Esposito, Matteo Giovannelli, Claudia D'agostino, Barbara Chiappini, Romolo Nonno, Umberto Agrimi, Gabriele Vaccari	Knowledge and perception on animal welfare at the camel market in Egypt Barbara Padalino*, Beatrice Benedetti, Ziani Abdelali, Laura Menchetti

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03:15-03:30	<p>Histological and Immuno-histochemical Study on prenatal development of pancreatic islets of Langerhans of dromedary Camel with especial emphasis on β- cells.</p> <p>Abdelhay Mohamed Ali</p>	<p>Camel skin valorisation: From lab to market</p> <p>Salma Bessalah*, Touhami Khorchani, Mohamed Hammadi</p>	<p>Histopathological and Histochemical investigation of a case of prion disease in a female camel in Tunisia</p> <p>Abdelkader AMARA*, Kéfia ELMEHETLI, Michele Angelo DI BARI, Laura PIRISINU, Rihab ANDOLSI, SouhirGACHOUT, Boubaker BEN SMIDA, Meriem HANDOUS, Heni HAJ AMMAR, Roukaya KHORCHANI, Malek ZRELLI, Cristina CASALONE, Laura DE ANTONIIS, Barbara CHIAPPINI, Umberto AGRIMI, Gabriele VACCARI</p>	<p>Raising Camels in North America: The Struggles, the Needs and the Plan for the Future</p> <p>Valeri Crenshaw</p>
03:30-03:45	<p>Serum proteins capillary electrophoretic pattern during the transition period in camels (Camelus dromedarius)</p> <p>Nawal Mohamed Elkhair</p>	<p>Effect of heat treatment on the vitamins, proteins and amino acids composition of camel milk</p> <p>Amel Sboui*, Maha Hammouda, Abir Omrani, Mohamed Dbara, Touhami Khorchani</p>	<p>Isolation of Chlamydia abortus from bursal tissue and bursal fluid of female dromedary camels with ovarian hydrobursitis</p> <p>Ahmed Ali, Derar R. Derar, Hadia A. Mousa, Salama A. Osman, Walid Refaai, Tariq I. Almundarij, Musaad A. Al-dubaib, Sahar A. Allam</p>	<p>Assessment of Management Systems and Production Constraints of Camel Herds in North Darfur State, Sudan</p> <p>Amasaib E. O., and Mahala, A.G.</p>
03:45-04.00	<p>The impact of concentrate to roughage ratio on pH, VFA levels and buffering Capacity in camels and sheep</p> <p>Touhami KHORCHANI, Mabrouk-Mouldi SEDDIK, Mohamed HAMMADI, Mongi SGHAEIR *</p>	<p>Production of camel cheese using enzymatic extracts of plant origin</p> <p>Imen Fguiri, Amel sboui, samira arroum, Mohamed Dbara, Mohamed Hammadi, Touhami Khorchani</p>	<p>Serological Survey of some viral and bacterial pathogens Infection among Slaughtered camels in southern east of Algeria</p> <p>Mohammed Hocine Benaissa*, Nora Mimoune; Rachid Kaidi</p>	<p>To Cull or Cultivate: A Case Study of Australian Feral Camels (Camelus dromedarius)</p> <p>Zia Ur Rehman, Tanveer Hussain, Zonah Ali, Khawar Ali Shahzad, Saira Mehmood and Anum Yaseen</p>



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04:00 -04:15	<p>The effects of different energy levels on performance and forage utilization by grazing camels during the drought season</p> <p>Ahmed R. Askar, Khalid Z. Kewan, Sami Abo Ragab</p>	<p>A comparison of the effects of adding carob syrup and powder on the nutritional value and antioxidant capacity of yogurt made from camel milk</p> <p>Abir Omrani*, Amel Sboui, Maha Hamouda, Mohamed Dbara, Mohamed Hammadi, Touhami Khorchani</p>	<p>A Comparative Evaluation of PCR, c-ELISA, SAT and Rose Bengal Tests For Diagnosis of Camel Brucellosis in Khartoum State</p> <p>Ehsan Mansour, EL Sanousi Enaam, Dalia Mursi and G.E. Mohammed</p>	<p>First ethogram for evaluating dairy camel behaviour during training period to machine milking</p> <p>M. Brahmi, M. Atigui, P.G. Marnet, M. Hammadi</p>
04:15-04:30	<p>Three-Dimensional Structure of Camel Lipase Predicted by Homology Modelling Method.</p> <p>Hatem BELGUITH, Imen Glaied</p>	<p>Anovel Camel Yoghurt process using camel gelatin as a texturizing agent</p> <p>Imen Fguiri, Salma Bessalah, Amel sboui, samira arroum, Mohamed Dbara, Mohamed Hammadi, Touhami Khorchani</p>	<p>Genotypic detection of pathogenic genes in Escherichia coli (E. coli) isolated from diarrheic camel calves in Sudan</p> <p>Muna E Ahmed, Sabiel YA, Abeer AM, Manal H Salih, Marmar A El Siddig, Twasul M Mohammed, Abeer M Abass, El-gadal AA , Hind EA.</p>	<p>Suckling behaviour early after birth in housed dromedary camel</p> <p>Imen Hammadi, Mohamed Chniter, Moufida Atigui, Frédéric Lévy, Raymond Nowak, Mohamed Hammadi</p>
4:30-04:45	<p>Quality and antimicrobial activity of camel kefir</p> <p>Arroum S., Sboui A., Fguiri I., Dbara M., Hammadi M., Khorchani T.</p>	<p>Colour measurement of camel dromedary colostrum for estimation its protein composition</p> <p>El-Hatmi Halima, Oussaief Olfa, Hammadi Imen, Dbara Mohamed, Hammadi Mohamed, Khorchani Touhami and Jrad Zeineb</p>	<p>Risks of sub-clinical mastitis associated with teat tissue changes induced by milking clusters in dairy camels (Camelus dromedarius)</p> <p>Atigui M*, Brahmi M, Dahmani K., Seddik M.M., Khedheri H., Marnet P.G., Hammadi M.</p>	

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04:45-05:00	<p>Effect of Cam-β-NGF on mass motility and membrane integrity of camel sperm (<i>Camelus dromedarius</i>) after short storage at 4°C</p> <p>Lamia Doghbri , Imed Salhi, Meriem Fatnassi, Mohamed Dbara, Adriana Casao, Salma Bessalah, Rosaura Pérez-Pé and Mohamed Hammadi</p>	<p>Detection of Antibiotic Residue in Camel Meat, Khartoum, Sudan</p> <p>Abeer Abass Mohamed Adam*, Muna Ahmed Elkhalifa, Alshima Hamdoon Eisa</p>	<p>Epidemiological study on parasitic diseases of camels in Tunisia</p> <p>Mohamed Habib JEMLI1, Haykel KESSA, Wiem BEN SALEM, Hafed KHELIF4 and Talel Hamza.</p>
05:00-05:15		<p>The Effect of Supplementary Feeding and Farming System on Young Camel Daily Gain</p> <p>Sallam A. Bakheit*; Idriss A. Idriss; Jumaa B.Jadalla; Ali A. Hassabo and Ahmed O. Idriss</p>	<p>An outbreak of abortions and high perinatal mortality associated with an iatrogenically transmitted <i>Trypanosoma evansi</i> infection in a camel farm in the UAE.</p> <p>Mostafa Nasef , Aungshuman Das Gupta</p>
05:15-05:30		<p>Effect of drying period on quality characteristics of dehydrated camel meat</p> <p>Tyseer Zakaria Abdalla Abas, Ikhlas Ahmed Nour</p>	<p>Nanobodies-based system for High-Sensitivity detection of <i>Escherichia coli</i> in a diarrhea camel feces sample</p> <p>Asma Dhehibi*, Amal Raouafi, Mohammed Terrak, Nourddine Raouafi, Mohamed Hammadi and Imed Salhi</p>



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Scientific Sessions, 14th March 2023

05:30-05:45	Camel meat, an alternative for red meat in arid zone: Case of Merguez, a Tunisian traditional sausage K. Belguith, Z. Jrad, O. Ousseif, H. Elhatmi	Sandwich-Based Immunosensor for Detection of Pathogenic F17-Positive Escherichia coli Strains isolated from diarrheic camel calves Imed Salhi, Asma Dhehibi, Amal Rabti, Nouredine Raouafi and Mohamed Hammadi	
05:45-06:00	Prevalence Of The Major Camel Milk Borne Pathogens In Turkey Abderraouf Boughezala, Ahmet Güner	The impact of climate change on Bluetongue Disease in Camels (Camelus dromedarius) in Kassala State, Sudan.	
06:00-06:15	Launching the camel dairy industry in Tunisia: Challenges and opportunities Hammadi M, Atigui M, Brahmi M, Sboui A, Seddik Mm, Sghaier M , Khorchani T	Acaricidal activity of Cymbopogon schoenanthus Whole Plant Extracts against larvae and Engorged females of Hyalomma dromedarii (Acari:Ixodidae) under Laboratory Conditions Maha Ahmed Eltigani*, Omran Fadl Osman, Ilham Mohammed Osman, Sakina Mohamed Ahmed Yagi, Husna Mohammed Elbashier	
06:15-06:30	Design of the first milking parlour for dairy camels in Tunisia M. Brahmi, M. Atigui , M. M. Seddik, H. Khediri, F. Soussi, W. Ben Salem, P.G. Marnet, M.Hammadi		



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ISOCARD -2023

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Effect of Preslaughter Stress Simultaneously Induced By High Loading Density, Thermo-Hygrometric Parameters and Waiting Period on The Status of Oxidative Stress Indices and Vitamin D in Liver and Kidney in the Arabian Camel

El Khasmi Mohammed^{1*}, Moussahil Abderrahim¹, Farh Mohamed¹, Iddar Abdelghani²

¹Hassan II University of Casablanca, Ben M'Sick Faculty of Sciences, Physiopathology and Molecular Genetic Laboratory, Casablanca, Morocco

²Biotechnology and Biomolecules Engineering Unit, Life Sciences Division, National Center for Nuclear Energy, Science and Technology, Rabat, Morocco

* elkhasmimohammed@gmail.com

AIM:

This study was aimed to evaluate the status of oxidative stress biomarkers and vitamin D in liver and kidney following simultaneous exposure to several factors of preslaughter stress in camels (*Camelus dromedarius*).

INTRODUCTION:

Several preslaughter stress factors could result in an imbalance between the regeneration of reactive oxygen species and activities of the principle antioxidant enzymes, and therefore causing blood and tissular alterations by oxidation of lipids and proteins. Thus, we evaluated the simultaneous effect of high loading density (LD), ambient temperature (T_a) and relative humidity (RH) during road transport, and waiting duration (WD) in the stabling area before slaughter, by analyzing the levels of cortisol in serum and those of malondialdehyde (MDA), total glutathione (GSH), superoxide dismutase (SOD), catalase (CAT) and vitamin D in liver and kidney of camels.

METHODS:

The study was conducted on 12 healthy male camels who has been maintained under similar breeding conditions. They were divided into 2 groups of 6 animals according to the LD, T_a , RH and total WD (respectively 19-23°C, 73-84%, 98-135 cm²/kg BW and 13-16 hours for the Group I the least stressed, and respectively 29-37°C, 67-74%, 54-67 cm²/kg BW and 17-21 hours for the Group II the most stressed). Levels in serum and tissular homogenate were measured according to manufacturer's protocol using commercially available kits

RESULTS:

Serum levels of cortisol and hepatic and kidney levels of MDA and GSH were significantly ($P<0.05$) higher in Group II than those measured in Group I. However, activities of SOD and CAT in tissues were significantly ($P<0.05$) lower in Group II by comparison to Group I. Results showed no significant ($P>0.05$) variation of tissular levels of vitamin D in the two groups

CONCLUSION:

Combination of several preslaughter-stress factors could alter the composition of camel meat except for vitamin D.

KEYWORDS

Oxidant stress, vitamin D, blood, tissues, Morocco

CITATION

Mohammed, E., Abderrahim, M., Mohamed, F. and Abdelghani, L. (2023). Effect of preslaughter stress simultaneously induced by high loading density, thermo-hygrometric parameters and waiting period on the status of oxidative stress indices and vitamin d in liver and kidney in the arabian camel. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.



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Problem Oriented Diagnosis for the Large Camelid Infertility

Marzook M. Al-EknaH

Professor of Theriogenology, King Faisal University, Al-Ahsa, Saudi Arabia
eknahm@yahoo.com

AIM:

The aim of this diagnostic procedure was to equip the veterinarian and graduates with confidence to diagnose and solve familiar and unfamiliar camel infertility problems for fitness sustainability.

INTRODUCTION:

The proper diagnosis of infertility problems is an important step towards successful fertility of the naga (female) and jamal (male) camels. Camels are amazing creatures and one of the main challenges to save the camel reproductive future in various private clinics is the lack of evidence-based scientific data on diagnosis, treatment and outcome assessment. This includes iatrogenic traumatic injuries caused by the customer or veterinarian, which contribute to huge financial losses.

METHODS:

The procedure involves essential prerequisites, such as listening carefully to the customer, but not fully trust him/her; taking related information from the customer, such as pasture and feeding, and previous illnesses and breeding. Take precautions measures when dealing with the camels and customers.

RESULTS:

The study describes the proper physiological knowledge of the reproductive system, and the approach to the general and gynecological examination to assess the overall reproductive health. Non-return to oestrus does not always mean pregnancy success. Therefore, anyone should disclose very early pregnancy.

CONCLUSION:

This study concludes that the related Ministry of Environment, Water and Agriculture should provide remote clinics in the desert equipped with trained vets to diagnose and treatment camel illnesses, so that untrained hands dealing with camels are limited.

KEYWORDS

Camel, infertility, reproductive health, diagnosis, treatment

CITATION

Al-EknaH, M.M. (2023). Problem oriented diagnosis for the large camelid infertility. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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Influence of Oversized Follicles on Behavior, Hormonal Concentrations and Fertility of Camels (*Camelus Dromedarius*)

Waheed M.M.,^{1,2*} Ghoneim I.M.,^{1,2} Hasseeb M.M.³ and Al-Muhasen F.M.⁴

¹ Departments of Clinical Studies, Teaching Hospital, College of Veterinary Medicine, King Faisal University, PO Box 400, Al-Hufuf 31982, Kingdom of Saudi Arabia

² Department of Theriogenology, Faculty of Veterinary Medicine, Cairo University, Giza 12515, Egypt

³ Pathology, Teaching Hospital, College of Veterinary Medicine, King Faisal University, PO Box 400, Al-Hufuf 31982, Kingdom of Saudi Arabia

⁴ Veterinary, Teaching Hospital, College of Veterinary Medicine, King Faisal University, PO Box 400, Al-Hufuf 31982, Kingdom of Saudi Arabia

* mmwaheed@kfu.edu.sa

AIM:

The aim of this study is to investigate the effect of oversized follicles on the behavior, hormonal concentrations and fertility of female dromedaries.

INTRODUCTION:

Camels are induced ovulators and exhibit follicular cycles, with follicles developing and regressing successively and ovulation occurring only when mating takes place. In the absence of mating, the mature follicle may fade, either as atresia that disappear in the ovarian stroma or typically forming an ovarian cyst. In female dromedaries, the cystic ovaries were observed throughout the whole year.

METHODS:

The estrous pattern of twenty-six dromedaries with oversized follicles was recorded during the breeding season. Thirty-three ovarian pairs with preovulatory and oversized follicles were recovered and sectioned from slaughtered adult camels (n=33). Blood (10 ml) was collected from all females and follicular fluid from slaughtered females for estimation of reproductive hormones and nitric oxide (NO).

RESULTS:

Oversized follicles lead to infertility problems in dromedaries' such as repeat breeding, nymphomania and anestrus. Serum progesterone (P4) concentrations in repeat breeders with thin-wall oversized follicles (RB thin, n=10; 1411.50±93.39 pg/ml) and nymphomaniac with thin-wall oversized follicles (Nympho thin, n=8; 1710.00±107.74 pg/ml) were significantly (P<0.05) lower than that in anestrus animals with thick-wall oversized follicles (Anest thick, n=4; 2532.50±107.74 pg/ml). Serum estradiol (E2) concentration was significantly (P<0.05) higher in Nympho thin (0.97±0.31 pg/ml) than Anest thick (0.30±0.08 pg/ml) camels. In Nympho-thin camels, serum testosterone (T; 39.75±4.85 pg/ml) and prostaglandinF2α (PGF2α; 173.93±9.75 pg/ml) concentrations were significantly (P<0.05) higher than both T concentration (17.20 ± 3.63 pg/ml) in RB thin and PG F2α concentration (77.65±7.90 pg/ml) in RB thick camels (n=4).

CONCLUSION:

The oversized follicles lead to infertility problems in dromedaries, accompanied by changes in serum and follicular fluid reproductive hormones and NO concentrations.

KEYWORDS

Camel, Oversized follicles, Serum, Follicular fluid, Hormones

CITATION

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King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Knowledge and Perception on Animal Welfare at the Camel Market in Egypt

Barbara Padalino^{1*}, Beatrice Benedetti¹, Ziani Abdelali², Laura Menchetti³

¹ Department of Agricultural and Food Sciences, University of Bologna, Viale Fanin 44, 40127, Bologna, Italy.

² Animals' Angels, Rosserstrasse 8, D-60323, Frankfurt, Germany.

³ School of Biosciences and Veterinary Medicine, University of Camerino, via Gentile III da Varano, 62032 Camerino, Italy.

* barbara.padalino@unibo.it

AIM:

The study aimed at gaining information on camel caretakers' backgrounds, their perception on welfare and possible associations with camel health and behavioural problems.

INTRODUCTION:

Animal welfare depends on humane factors, including experience in animal handling and management, and knowledge of animal welfare.

METHODS:

The study was conducted at the camel market in the Greater Cairo, Egypt, interviewing 61 workers.

RESULTS:

The interviewees were young men (90.2% <50 years; $P < 0.001$), mainly from Egypt (96.7%; $P < 0.001$) who had started working there for more than 5 years (93.4%, $P < 0.001$). While the level of their education varied from no school to university ($p = 0.005$), they learned camel handling and management mainly from family and friends (78.7%; $P < 0.001$). Eight were owners, 34 were caretakers and 19 were part-time workers who helped with management and sales operations (e.g., unloading) only on market days. All camels travelled to the market, mainly from Sudan and Somalia, to be sold for slaughter (90.2%, $p < 0.001$) and remained there usually for less than one week (97.1%, $p < 0.001$). Most of the interviewees judged their ability in identifying a camel in distress/pain as “High” or “Very high” (62.3%; $p = 0.001$), reporting monitoring camel eyes (52.6%) or feeding behaviour (42.1%). The interviewees' understanding of animal welfare was, however, low, missing the overall meaning; animal welfare was indeed defined mainly referring to only two out of the four welfare principles (45.9%; $p < 0.001$). Good feeding and good health were often considered, while good housing and appropriate behaviour rarely. Moreover, 7 interviewees (11.5%) had no knowledge of the meaning of animal welfare. Behavioural problems (61.8%; e.g., biting) were reported less frequently than health problems (82.4%, e.g., diarrhoea, injuries, respiratory problems) and interviewees' age, experience and education level were associated with both.

CONCLUSION:

Education on camel behaviour and welfare is recommended for all people who handle and manage camels.

KEYWORDS

Handlers, Dromedary camel, Health, Management, Welfare

CITATION

Padalino, B., Benedetti, B., Abdelali, Z. and Menchetti, L. (2023). Knowledge and perception on animal welfare at the camel market in Egypt. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Impact of supplemental urea nitrogen on performance, digestion coefficients of nutrients and some biochemical parameters in camels

Sayed, A.N.^{1*} and Abdel-Raheem, S.M.²

¹ Department of Animal Nutrition and Clinical Nutrition, Faculty of Veterinary Medicine, Assiut University, Assiut, Egypt.

² Department of Public Health, College of Veterinary Medicine, King Faisal University, Al-Ahsa, Saudi Arabia.

* abdelbasetahmed1961@gmail.com

AIM:

The objective of the present study was to investigate the effects of urea nitrogen when partially substituted protein in the rations of camels on growth performance, digestion coefficients of nutrients and some biochemical parameters.

INTRODUCTION:

Urea is a common nonprotein nitrogen (NPN) source that is utilized in ruminant nutrition to boost the protein content of feed items and as a nitrogen source in the rumen to synthesize microbial protein.

METHODS:

Twelve camels with an average live body weight of 305.25 ± 2.15 kg were randomly assigned into four groups (3 camels/group): G1, camels were fed on urea free ration (T1) and considered as control, while G2, G3 and G4 were fed on rations substituted 33% (T2), 50% (T3) and 66% (T4) of the crude protein in rations by urea nitrogen, respectively. Parameters observed were camels body weight gains, feed intake, nutrient digestibility and some biochemical parameters.

RESULTS:

Camels group (G2) fed on the ration substituted 33% of crude protein by urea nitrogen gave higher weight gain and better feed conversion than other treated groups and control one. There were no significant ($P < 0.05$) differences between treated groups and the control one in the amount of feed intake. Digestion coefficient of dry matter (DM) was significantly ($P < 0.05$) higher in the G2 and G3 than in G4 and control one. Digestion coefficient of crude protein (CP) and crude fiber (CF) were significantly ($P < 0.05$) higher in camels groups fed on rations partially substituted protein by urea nitrogen than in control group. Ether extract (EE) digestibility was significantly ($P < 0.05$) increased in G2 compared with other treated groups and control one. For nitrogen free extract (NFE) digestibility, there was no significant difference between different treated groups and control one. The mean values of total protein and urea in the camel's serum were significantly ($P < 0.05$) higher in the G3 and G4 compared with G2 and control one.

CONCLUSION:

It could be concluded that urea nitrogen when substituted up to 33% of the ration's crude protein (1.4% Urea) for camels could positively improve growth performance, feed conversion efficiency and digestion coefficients of nutrients.

KEYWORDS

Urea nitrogen, Performance, Digestion coefficients of nutrients, Biochemical parameters, Camels

CITATION

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“The Role of Camel in Food Security and Economic Development”

Serum Minerals Profile and Feeds Nutritional Value of Stall Feeding and Browsing Camels in Egypt

Hassan A.M. Abdel-Raheem

Nutrition and Clinical Nutrition Dept., Fac. of Vet. Med., Assiut University, Assiut, Egypt

* habbas@aun.edu.eg

AIM:

The current study was carried out to spot light on serum mineral concentrations of the camels (*Camelus dromedarius*) in the Nile and New Valley areas in Egypt. The chemical composition and minerals content of the commonly used feeds and browsing plants of the two different areas were determined.

INTRODUCTION:

The camels of Nile Valley area were stall fed on commonly used feeds (concentrates and roughages) as corn, soybean, wheat bran, barley, berseem hay and wheat straw, while others in New Valley were browsed mainly on browsing plants such as German grass (*Haloxylon salicornicum*), berseem hegazi (*Medicago sativa*) and Asla (*Cyprus conglomerates*).

METHODS:

The dromedary camels (males and females) in Nile Valley (Assiut and Sohag) governorates and others in New Valley (Oases), Egypt were studied over three months in the summer 2021. About 30 apparently clinically healthy adult camels from Nile Valley and other 30 adult camels from New Valley (7 -15 years) were used in this study..Samples of camel feeds in Nile and New Valley areas were collected, dried, thoroughly mixed and analyzed for proximate chemical composition (DM, OM, CP, EE, CF, NFE and ash). Blood samples were collected from camels of both areas and sera were separated for determination of some macro and micro minerals. Health status, and reproductive performance of camels as well as feeding data were recorded.

RESULTS:

Of proximate chemical composition revealed that New Valley camel feeds contain high amount of protein, ash and low crude fiber and ether extract content in comparison with commonly used feeds in Nile Valley area. Mineral content of camel browsing plants in New Valley area were higher than that feeds used in Nile Valley specially Ca, Na, Fe and Mn. Statistical analytical results of minerals indicated that there were no significant differences in the serum P and Mg levels in New and Nile Valley areas. The mean values of serum sodium (Na) in New Valley camels were significantly lower than those found in Nile Valley (127.2 ± 10.0 & 1442.1 ± 9.3 $\mu\text{mol/L}$) while mean values of K were nearly similar. Zn and Cu concentrations were significantly higher in the serum of New Valley camels than those of Nile Valley (27.6 ± 3.5 , 22.9 ± 4.0 $\mu\text{mol/L}$ for Zn & 20.3 ± 2.95 , 18.4 ± 2.92 $\mu\text{mol/L}$ for Cu, respectively). Serum Mn values were nearly similar and no significant differences were observed.

CONCLUSION:

From the present study, it could be concluded that browsing camels in the New Valley area take their mineral requirements from natural browsing plants found in these area and don't need mineral supplements, but those in Nile Valley need mineral supplements in their feeds due to system of feeding of these camels is stall- fed system.

KEYWORDS

Camel feeds, Browsing plants, Chemical composition , Serum minerals

CITATION

Abdel-Raheem, H.A.M. (2023). Serum minerals profile and feeds nutritional value of stall feeding and browsing camels in Egypt. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Colloid Goiter and Thyroid Gland Carcinoma in Camelus Dromedaries in Sudan

Abeer A.M.¹, Musa M.Z.¹, Zakia A.M.¹, Muna A.E.¹ and Jameel A.A.²

¹ Central Veterinary Research laboratory, El-Amart P.O. Box8068, Khartoum, Sudan.

² Khartoum University, Department of Pathology

*abeertumbool@hotmail.com

AIM:

To investigate the thyroid gland affections of slaughtered camels.

INTRODUCTION:

The camel was found to be more sensitive to iodine deficiency than other domestic animals. Unusual circumstances of Migratory grazing cycle have played major role in the development of the condition. The thyroid gland plays an important role as endocrine organ.

METHODS:

After post-mortem the glands were weighed, outer and cut Surfaces observed and abnormal changes described, tissue samples Taken from lesions were fixed in 10% formal saline, then processed and stained with H&E.

RESULTS:

Out of 765 camels examined in one year, eight female camels, 7-15 years old having obvious swelling under the neck, slaughtered at Tumbol abattoir, Gezira State, Sudan. The camels were brought from Darfur State. Grossly, thyroids were variably, bilaterally enlarged and cystic, in two cases the enlargement was enormous and glands displayed large fluctuating cysts. The color varied from pale to brown; the texture from firm, others were spongy or soft, their cut surfaces exudates sticky clear fluid or translucent jelly-like. In one case the two lobes combined weight 850g, 1200g were brown color, multiple oval cysts 6-8cm diameter filled with colloid with thin transparent sheet. Diffuse hyperplastic goiter was described by displaying irregular follicles of variable shape and size containing variable amount of lightly eosinophilic colloid. The hyperplastic follicle cell forming inter and intrafollicular nests, the follicle cells and scarcely formed papillary luminal projection. In six cases thyroid sections revealed presence of follicles of various size and shape greatly distended by homogenous proteinous material (colloid), and lined by low cuboidal epithelial cells.

CONCLUSION:

Although colloid goitre and thyroid carcinoma were very rare but they diagnosed in slaughtered camels in Sudan with percentage 1.05%, 0.26% respectively.

KEYWORDS

Goiter, Camel, Sudan, Cancer, Pathology

CITATION

Abeer, A.M., Musa, M.Z., Zakia, A.M., Muna A.E. and Jameel, A.A. (2023). Colloid goiter and thyroid gland carcinoma in Camelus dromedaries in Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

The A-Lactalbumin In Domestic Camelids: Identification of New Polymorphisms at The LALBA Gene

Pauciullo A.^{1,2}, Versace C.¹, Miretti S.², Giambra I.J.³, Cosenza G.⁴

¹ University of Torino, Department of Agricultural, Forest and Food Science, Grugliasco (TO), Italy

² University of Torino, Department of Veterinary Medicine, Grugliasco (TO), Italy

³ Justus Liebig University of Giessen, Institute of Animal Breeding and Genetics, Giessen (Germany)

⁴ University of Napoli Federico II, Department of Agriculture, Portici (NA), Italy

* alfredo.pauciullo@unito.it

AIM:

Exploring the genetic diversity in domestic camelids to identify useful markers for selective breeding.

INTRODUCTION:

α -lactalbumin (α -La), encoded by LALBA gene, is a Ca²⁺ binding whey-protein. Key function of this protein is to facilitate lactose synthesis. However, other biological function have been demonstrated. It plays central roles in immune-modulation, cell-growth regulation, antimicrobial activity, etc. Gene promoters have transcription factor (TF) binding sites necessary for the gene expression regulation. Mutations in the promoters have been reported to modify the transcription rates or the mRNA stability, thus affecting the protein yield.

METHODS:

DNAs (10 from each species) were PCR amplified and sequenced to cover the LALBA gene and its regulatory regions. Multiple alignments and SNP discovery were accomplished by DNAsis. Transfact 7.0 was used for TF sites search. Three independent pGL3 gene reporter assays (GRA) were achieved to test luciferase expression in HEK293T cells. Data were elaborated by JASP ($p < 0.05$, student's t-test).

RESULTS:

The intra-species comparison of sequences showed 36 SNP, whereas the inter-species comparison showed 86 additional markers. Particularly interesting was the SNP g.112A>G detected at LALBA promoter in the South American Camelids (SAC) because it creates a putative Sp1 TF site. This motif is a well-known enhancer for the expression of many genes, including milk proteins. Eighty Alpacas and 45 lamas were genotyped by PCR-RFLP. MAF was 0.41 (G allele) in alpacas and 0.44 (A allele) in lamas. To assess the effect of this SNP on the promoter activity, we developed a specific pGL3 GRA. The G variant had an enhancement influence on the promoter ($p < 0.01$).

CONCLUSION:

LALBA gene is highly polymorphic. The SNP g.112A>G plays an effective role in the Sp1 binding to the promoter, thus modulating the expression of α -La in-vitro. The functional protein roles might be consequently affected in vivo, although a confirmation study is needed.

KEYWORDS

A-lactalbumin, LALBA gene, Promoter, Polymorphisms, Gene reporter assay

CITATION

Pauciullo, A., Versace, C., Miretti, S., Giambra I.J. and Cosenza G.. (2023). The A-lactalbumin in domestic camelids: Identification of new polymorphisms at the LALBA gene. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

The CSN1S2 Gene (As2-Casein) In The Bactrian Camel: Genetic Diversity Discovery and Bioinformatics Analysis

Versace C.¹, Gaspa G.¹, Cosenza G.², Pauciullo A.^{1*}

¹ Dipartimento di Scienze Agrarie, Forestali e Alimentari, University of Torino, Grugliasco (TO), Italy.

² University of Napoli Federico II, Department of Agriculture, Portici (NA), Italy.

* alfredo.pauciullo@unito.it

AIM:

Goals of this study were to discover the genetic diversity of the CSN1S2 gene in the bactrian camel and characterize the interspersed elements (INEs).

INTRODUCTION:

The α s2-casein (CN), encoded by the CSN1S2, is one of the three calcium-sensitive milk proteins together with the α s1- and β -CN. Limited information is available in the bactrian camel for this protein fraction and little is known about the genetic diversity of CSN1S2. Furthermore, caseins have been recognized as a powerful molecular model for evolutionary studies and INEs within casein genes might play a fundamental role in the understanding of species diversification.

METHODS:

DNAs from 5 bactrian camels were PCR amplified and sequenced to cover the whole CSN1S2 gene. Multiple alignments and SNP discovery were accomplished by DNAsis. Repeat elements were analyzed using RepeatMasker.

RESULTS:

Sequencing showed 12 SNP, all found at intron level and not affecting the splice-junctions. Repeat elements analysis revealed 9 INEs, four long interspersed elements (LINEs) found in introns 1, 6, 10 and 11 and five short interspersed elements (SINEs) in introns 8, 9, 14 and 16. Moreover, a hAT-Charlie-transposon was found in the intron 7. INEs covered the 7.72% of whole bactrian CSN1S2 gene sequence. Compared to other characterized casein genes in dromedars, the bactrian CSN1S2 has more INEs than CSN2 (5 INEs) and CSN3 (7 INEs). In addition, bactrian CSN1S2 revealed less INEs than the homologous bovine gene (12 INEs). However, these two species shared 2 SINEs in intron 12 and 16.

CONCLUSION:

The number of SNP found in the bactrian CSN1S2 is similar to findings reported for the CSN2 and CSN3 in dromedary, confirming the limited the genetic diversity compared to ruminants. Transposable elements are important factors of species diversification. Our results indicate that Tylopoda diverged from Ruminantia before additional retrotranspositions differentiated these suborders during their evolution.

KEYWORDS

α s2-casein, CSN1S2 gene, Interspersed elements, SNPs

CITATION

Versace, C., Gaspa, G., Cosenza, G. and Pauciullo, A. (2023). The CSN1S2 gene (α s2-casein) in the Bactrian camel: Genetic diversity discovery and bioinformatics analysis. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

The Sheep, Goats and Camelids Working Group at ICAR (International Committee of Animal Recording) and its Opportunities for Advanced Performance Recording

Pamela A. BURGER^{1*}, Elena CIANI², Carlos PASTRANA³, Hasan ALHADDAD⁴, Jean-Michel ASTRUC⁵

¹ Research Institute of Wildlife Ecology, University of Veterinary Medicine Vienna, Savoyenstrasse 1, 1160 Vienna, Austria

² Department of Biosciences, Biotechnology and Biopharmaceutics, University “Aldo Moro” of Bari, Piazza Umberto I, 70121 Bari, Italy

³ Department of Genetics, Faculty of Veterinary Sciences, University of Cordoba, Av. de Medina Azahara, 5, 1014 Cordoba, Spain

⁴ Department of Biological Sciences, Kuwait University, Kuwait City, Kuwait

⁵ IDELE – Institut de l'élevage, INRAE, 149 Rue de Bercy, 75012 Paris, France

* pamela.burger@vetmeduni.ac.at

AIM:

The aim of this presentation is to introduce the work and activities of the Sheep, Goats and Camelids Working Group (SGC-WG) of ICAR to the larger camel research community. The need for advanced phenotype recording techniques has been recognized and the ICAR network can provide opportunities to help improving phenotype recording in camelids.

INTRODUCTION:

The WG was endorsed at the 40th ICAR Biennial Session and is the result of merging three previous working groups of performance recording of dairy sheep, goats, and animal fibre. In 2018, the WG was enlarged to include the large camelids, namely dromedary and Bactrian camel.

METHODS:

We review current methods for animal identification and production trait phenotyping in camelids. Furthermore, a short overview about new technologies applied in other livestock species will be given.

RESULTS:

The objectives of the SGC-WG are to (i) provide a forum for ICAR members to collaborate and exchange information on all aspects of performance recording and genetic evaluation for sheep, goats and camelids; (ii) maintain, update and extend guidelines for sheep, goats and camelids performance recording for traits relevant to genetic improvement, farm management, quality assurance, and animal health & welfare worldwide; (iii) conduct and report the results of periodic international survey on sheep cots and camelid performance recording and genetic evaluation; and (iv) develop and support services relevant to sheep, goats and camelids that ICAR will provide to its members on a use-pays basis.

CONCLUSION:

The SGC-WG provides new opportunities to the camelid research community to facilitate and coordinate international collaboration in research and development on camelid performance recording and genetic evaluation.

KEYWORDS

Old and New World camels, Genetic evaluation, Phenotype recording, Production traits, Genomic evaluation

CITATION

Burger, P.A., Ciani, E., Pastrana, C., Alhaddad, H. and Astruc, J-M. (2023). The sheep, goats and camelids working group at icar (international committee of animal recording) and its opportunities for advanced performance recording. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Analysis on the Fusion of Different Religions and Cultures Based on the Plastic Arts of Bactrian Camels

Wurihan H. and Batsaikhan T.*

The School of Industry Technology, Mongolian University of science and technology, Mongolia

* batsaikhan@must.edu.mn

AIM:

We hope to understand the role of Bactrian camels in cultural and religious exchanges from the perspective of art by studying the cultural relics of Bactrian camels in ancient Central Asia and Western China.

INTRODUCTION:

Ancient Central Asia and western China were important transportation hubs, with ethnic, religious and cultural diversity. Non-governmental and official trade enables the exchange and integration of Eastern and Western civilizations here. The utensils with animal shapes are of great significance in people's daily life and religious worship activities. Therefore, most of the cultural relics unearthed here are animal shapes, such as camels, deer and tigers. This study takes the Bactrian camel shaped objects in tombs as the research object, and analyzes and studies the cultural connotation behind them.

METHODS:

Based on historical research methods, cultural methodologies and artistic methodologies, we have studied the internal logic of the development of the shape and decoration of the Bactrian camel cultural relics, and analyzed how the ancients gave different cultural, religious content and symbolic significance to the Bactrian camel handicrafts in the process of creating artistic works.

RESULTS:

Through the study of the brocades, potteries and stone carvings in the tombs in the shape of camels, we have found the scenes of the sun god, the god of wine and the religious sacrifice. It can be seen that these cultural relics not only have traces of the influence of Greek mythology and Persian Sassanian culture, but also have traces from the nomadic culture of the Eurasian grassland, the ancient Indian Buddhist culture and the Chinese culture.

CONCLUSION:

Bactrian camels are not only the main bridge between East and West, but also have symbolic significance because of their combination with different religions and cultures. Therefore, it has become one of the divine animals that bear the spiritual sustenance of the people of all ethnic groups in these regions.

KEYWORDS

Bactrian camel, Plastic Arts, Religious and cultural

CITATION

Wurihan, H. and Batsaikhan, T. (2023). Analysis on the fusion of different religions and cultures based on the plastic arts of bactrian camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

A technico-Ecomic Modelling to Assess The Profitability of Dairy Camel Farming

Bernard Faye

CIRAD-ES, Montpellier, France

bjfaye50@gmail.com

AIM:

To propose a technico-economic model for assessing the profitability of a dairy camel farm.

THE MODEL:

The assessment of profitability in a farm is depending on the demographic changes, on the charges and on the products. The demography of a herd on a farm is estimated on the basis of entries (births and purchases) and exits (deaths, culling and sales), which in turn depend on a number of zootechnical parameters such as fertility rate for entries, mortality, abortion, offsprings, and culling rate for exits (Alzuraiq et al., 2015). The costs are including the variable costs (purchase of animals, feeds, veterinary expenses, manpower, fluids, marketing) and fixed costs (depreciation costs for infrastructure and equipment, taxes and duties) while the products are including the milk and the culling animals.

ASSESSMENT OF THE COSTS:

The cost of feeding depends on whether the animals have access to free-range or rented pasture. In the latter case, the cost of the land (land taxes, maintenance, rental or amortization of the acquisition) must be integrated. In all cases, the amount of feed required must be estimated according to the composition of the herd.

Health-related costs are two types of expenditure: (i) preventive expenditure (vaccination, deworming, veterinary pharmacy), and (ii) veterinary intervention expenditure. It is possible to estimate them using the concept of the veterinary intervention unit (VIU) varying according the camel category.

The manpower comprises a fixed number of people for administrative and management tasks and a variable number for technical tasks.

THE PRODUCTS:

Concerning milk, an added value can be obtained in case of on-farm processing (cheese, fermented and pasteurized milk), but this implies additional investments in equipment.

FINAL PROFITABILITY:

The evaluation of the profitability of a dairy farm will therefore depend on many parameters, both zootechnical (productivity, performance) and human (management). The use of the demographic model combined with the evaluation of costs and products allows the expected financial results to be visualized

KEYWORDS

dairy farm, profitability, demographic changes

CITATION

Faye, B. (2023). A technico-ecomic modelling to assess the profitability of dairy camel farming. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Histological and Immunohistochemical Study on prenatal development of pancreatic islets of Langerhans of dromedary Camel with especial emphasis on β - cells

Abdelhay Mohamed Ali

Department of Anatomy, College of Veterinary Medicine, King Faisal University, P.O. Box 400 Al-Ahsa 31982, Saudi Arabia
arhamallha@kfu.edu.sa

AIM:

This study aimed to investigate the prenatal development of islets of Langerhans and β - cells of Camel.

INTRODUCTION:

Mammals pancreas is composed of both exocrine and endocrine elements. The pancreatic endocrine cells, which include the insulin-producing cells (β -cells), make up the islets of Langerhans, the endocrine component of the pancreas. The prenatal development of camel islets and beta cells is poorly understood. Studies on the endocrine pancreas of adult camels revealed that the majority of the islets cells were composed of β - cells.

METHODS:

Pancreatic tissues were obtained from 27 camel foetuses at first, second and third trimester of gestation. Tissues were fixed in 10% buffered formalin, processed for histology and stained by Hematoxylin and Eosin. For immunoreactivity of β - cells, sections were stained with anti-insulin antibody.

In first trimester, parenchyma of fetal pancreas was formed of branching tubular epithelium. Typical islets of Langerhans were not seen histologically at this time, but single endocrine cells were visible, particularly in the walls of the tubules. Early in the second trimester, groups of endocrine cells were seen closely linked to growing ducts, and during its mid and late stages, a few tiny islets were found. At the third trimester, in addition to individual endocrine cells, small and few large islets were found scattered among the acini separated by thin layer of connective tissue.

RESULTS:

In the first trimester, immunoreactive cells were observed as single cells in the tubules' wall . By the second trimester, they were numerous, distributed singly, in cords or clusters throughout the acini. At third trimester, most of these cells were localized in the newly formed islets.

CONCLUSION:

In conclusion, the results showed that, although development of endocrine cells observed in early stage of gestation, formation of discrete islets of Langerhans started latter.

KEYWORDS

Camel, Islets of Langerhans, β - cells

CITATION

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Pharmacokinetic of Tetracycline Antibiotic in Camel Milk

F. Amutova, * Z. Bilal, A. Akhatzhanova, A. Issayeva, N. Akhmetsadykov, S. Akhmetsadykova, G. Konuspayeva

Antigen LLP, Scientific and Production Enterprise, 040905, Almaty Region, Kazakhstan.

amutovafb@gmail.com

AIM:

The aim of this work was to study pharmacokinetic of tetracycline antibiotic in camel milk after intramuscular administration.

INTRODUCTION:

Camel milk are the primary source of food in 48 countries around the world (FAO 2022). However, no international standards for camel milk and its products have been established to date. In practice, many veterinary drugs (antibiotics) have requirements only for ruminants in their instructions for use, but camels are pseudo-ruminants. As a result, dosages and excretion periods do not match the drug instructions. Many practitioners administer individual drugs to camels, and some drugs are not specifically designed for camels. In this context, it is necessary to experimentally demonstrate the period of complete elimination of veterinary drugs via dairy camel milk, which has almost no data in the world of pharmacokinetics and pharmacodynamics. Based on the results, it will be possible to develop technologies to get organic camel milk, allowing producers to produce safe products for both the local and global markets. Therefore.

METHODS:

Five dromedary camels received a single intramuscular injection of oxytetracycline (0.1 mL/kg BW). After a specified period, milk samples were collected (30 minutes, 24 hours, 48 hours, 3 days, 7 days, 9 days, 14 days, 19 days, and 24 days), extracted and analysed by HPLC-MS/MS.

RESULTS:

After 24 hours of animal treatment, the oxytetracycline in camel milk reached its maximum concentration of 1.3 ± 0.3 mg/kg. Seventh- and fourteenth-day antibiotic levels were 0.17 ± 0.01 and 0.07 ± 0.01 mg/kg, respectively. Even after 24 days, oxytetracycline in camel milk exceeded the European MRL threshold (>0.01 mg/kg).

CONCLUSION:

These results demonstrated that camel elimination of tetracycline antibiotic required more than 24 days and could last about 1 month for full removal from the camel body to produce a milk below MRL threshold.

KEYWORDS

Camel milk, Antibiotics, Pharmacokinetic

CITATION

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“The Role of Camel in Food Security and Economic Development”

Protective Effect of Camel Milk on Fatty Liver Disease induced High Cholesterol Diet intake of Albino Rats

Ayman Balla Mustafa*, Abdalla Eleignaidi and Safa Elsharief

Department of Therapeutic Nutrition, Faculty of Health Sciences, Misurata, University, P.O. Box: 2478, Misurata, Libya

*a.yassien@nurs.misuratau.edu.ly

ABSTRACT:

Fatty liver disease is considered to be most common cause of persistently elevated liver enzymes in the general population and is significantly associated with higher body mass index and obesity.

AIM:

Study was designed and implemented to investigate the protective effect of camel milk on dyslipidemia and liver dysfunction induced fatty diet intake in albino rats.

INTRODUCTION:

Fatty liver disease is considered to be most common cause of persistently elevated liver enzymes in the general population and is significantly associated with higher body mass index and obesity.

MATERIALS AND METHODS:

32 Wister Albino rats of both sexes with average weight 151.16 ± 11.68 gm were brought and divided into 4 groups. Group 1 (control group) received standard ration, group 2 rats received high fat diet (HFD), it was concentrated with cholesterol 100g/kg, group 3 free access to fresh milk that collected from natural pasture in addition to standard ration and group 4 rats were free access to fresh milk at an early morning then after provided with high fat diet in mid-day on daily base. Experiment lasts for 7 weeks after that rats were euthanized and post-mortem findings were recorded, Blood samples were obtained from the orbital plexus of rats on last day of the experiment, we put it into dry clean bottles with anticoagulant for biochemical examination, which include triglyceride (TG) level, total cholesterol (TC) level, beside activities of liver enzymes such as Aspartate transaminase (AST), Alanine transaminase (ALT). Numerical data were expressed as means and standard errors.

RESULTS:

The result revealed that the values of blood lipid and liver function tests were a significant difference ($P < 0.05$) in all groups of the experiment, it showed the mean values of TC and TG were significantly ($P < 0.05$) decrease in group 3 and 4 while it was increased in group 2. Whereas, values of ALT and AST showed significantly ($P < 0.05$) increased in group 2 and decreased in group 3 and 4.

CONCLUSION:

Protective 2 effects of camel's milk was observed in our trial, which approved that camel's milk could be useful in supporting and enhancing therapeutic influence of nonalcoholic fatty liver disease and dyslipidemia.

KEYWORDS

Alpino Rats, Camel Milk, High Fat Diet, Liver disease, Protective Effect

CITATION

Last Name, First Name's Initial. (2023). Protective effect of camel milk on fatty liver disease induced high cholesterol diet intake of albino rats. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Physicochemical, Antioxidant and Antihypertensive Properties of Fermented Camel Milk: A Comparative Study With Fermented Cow Milk

Olfa OUSSAIEF^{1,*}, Zeineb Jrad^{1,2}, Touhami Khorchani¹ and Halima El Hatmi^{1,2}

¹ Livestock and Wildlife Laboratory, Arid Lands Institute of Medenine, University of Gabes, Tunisia

² Department of Food, High Institute of Applied Biology of Medenine, University of Gabes, 4119 Medenine, Tunisia

* olfa.loussaief@hotmail.fr

AIM:

This work aimed to investigate the physicochemical, antioxidant and antihypertensive properties of fermented camel milk, by an autochthonous probiotic strain, in comparison with fermented cow milk.

INTRODUCTION:

Besides biopreservation, fermentation could enhance the nutritional and functional properties of milk. Commercially available starter cultures are from bovine-based dairy industry being not competitive with endogenous microbiota of camel milk, which might not give a desirable final product.

METHODS:

Camel and cow milks were fermented by the probiotic strain *Lactococcus lactis* LEFS29, previously isolated from spontaneously fermented camel milk. Both unfermented and fermented camel and cow milks were assessed for their physicochemical properties (pH, acidity, viscosity, color, protein, lactose, ash and organic acids). The in vitro antioxidant activity was evaluated using two tests including DPPH radical scavenging activity and ferrous ion chelating activity. The antihypertensive activity was evaluated in vitro using the angiotensin-converting enzyme (ACE) inhibitory assay.

RESULTS:

The results showed that the fermentation of camel and cow milks by the autochthonous strain *Lactococcus lactis* LEFS29 increased their acidity, viscosity as well as their color parameters (L^* , a^* and b^*). The chemical composition of fermented milks was similar to that of unfermented milks except for the lactose content, which decreased after fermentation. The level of lactic, acetic and propionic acid increased after fermentation. Lactic acid was found to be the major organic acid in fermented milks. Interestingly, the fermentation process increased the antioxidant and antihypertensive activity of both types of milk. Fermented camel milk possessed higher DPPH radical scavenging activity (64.25 %), ferrous ion chelating activity (71.09 %) and antihypertensive activity (77.20 %) compared to fermented cow milk (all the activities < 54%).

CONCLUSION:

Our findings suggest that fermented camel milk using the autochthonous strain *Lactococcus lactis* LEFS29 could be considered as a functional food. Further work is needed to identify bioactive peptides from fermented camel milk.

KEYWORDS

Camel milk, Fermentation, Probiotic, Antioxidant, Antihypertensive

CITATION

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“The Role of Camel in Food Security and Economic Development”

Quantitative Determination of D and L Lactates in Raw and Fermented Camel Milk in Kazakhstan

Zauresh Bilal^{1,2*}, Assem Issayeva², Shynar Akhmetsadykova^{2,3}, Gaukhar Konuspayeva^{1,2} and Helene Tormo⁴

¹ Al-Farabi Kazakh National University, Department of Biotechnology.

² LLP “Research and Production Enterprise “Antigen”, Department of physical and chemical research methods.

³ LLP “Kazakh Research Institute for Livestock and Fodder Production”, Department of horse and camel breeding.

⁴ Université de Toulouse, INP El-Purpan, Toulouse, France.

* bilalzauresh@gmail.com

AIM:

Determination D and L lactates levels in the milk and shubat of various camel breeds from three regions of Kazakhstan to explain the ability of these dairy products to be digested in the organism without the manifestation of lactose-intolerant symptoms.

INTRODUCTION:

More research is needed to determine the easy digestibility of camel milk based products in people with lactose intolerance, especially since lactose intolerance is becoming more common among modern consumers.

According to preliminary studies, the total lactate content in camel milk is comparable to cow's milk, but the amount of L-lactate in camel milk is 100 times greater than in cow's milk. This is most likely one of the factors that contribute to its easy digestibility.

METHODS:

During the summer period, 15 camel milk and 6 shubat samples of dromedaries, Bactrians, and hybrids were collected from six farms in three different regions of Kazakhstan. An enzymological method based on the spectrophotometric measurement of NADH was used for quantitative analysis (test system NZYTECH, Portugal).

RESULTS:

The total lactic acid level in camel milk ranged from 0.1 to 0.7 g/l, while L-lactate content ranged from 0.08 to 0.6 g/l and D-lactate content ranged from 0.05 to 0.09 g/l. Shubat contained 2.6-2.8 g/l of lactic acid, with 1.8-1.9 g/l of L-lactate and 1.0-1.1 g/l of D-lactate.

CONCLUSION:

The content of lactic acid increased during fermentation process. The study results showed that the content of L lactate in raw camel milk and shubat is higher than D lactate. More research into this subject is required. All seasonal sampling is planned for seasonal correlation.

KEYWORDS

Camel milk, Shubat, D and L lactate, Spectrophotometric method, Lactose-intolerant

CITATION

Bilal, Z., Issayeva, A., Akhmetsadykova, S., Konuspayeva, G. and Helene Tormo, H. (2023). Quantitative determination of D and L lactates in raw and fermented camel milk in Kazakhstan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Nanobodies-Based System for High-Sensitivity Detection of Escherichia Coli in A Diarrhea Camel Feces Sample

Asma Dhehibi^{1*}, Amal Raouafi², Mohammed Terrak³, Nourddine Raouafi², Mohamed Hammadi¹ and Imed Salhi¹

¹ Livestock and Wildlife Laboratory, Arid Lands Institute (I.R.A), University of Gabès, Agricultural Research and Higher Education Institutions (IRESA), Tunisia.

² Sensors and Biosensors Group, Analytical Chemistry and Electrochemistry Lab (LR99E515), University of Tunis El Manar, Tunis El Manar 2092, Tunisia.

³ InBioS-Centre for Protein Engineering, University of Liege, Belgium.

* asmadhehibi@gmail.com

AIM:

The design of a sandwich nanobodies-based immunoassay for pathogenic E.coli detection.

INTRODUCTION:

The diagnosis of colibacillosis is based on classical methods for Escherichia coli (E.coli) detection. Consequently, the research of a more sensitive detection approach for this pathogenic strain is essential to limit animal loss. In recent decades nanobodies have become popular and versatile tools for the diagnosis of infectious diseases due to their unique recognition properties.

METHODS:

The design of a simple magnetofluorescent sandwich immunoassay with two anti-F17A VHHs for the detection of pathogenic E. coli. These nanobodies were isolated from a VHH library constructed after immunization of a camel with the F17A protein that we cloned and purified.

RESULTS:

After immunization of a camel with purified F17A protein, we selected two VHH fragments (Nb1 and Nb4) based on phage display approach. We demonstrated that these Nbs specifically recognize their target on the surface of living bacteria. The two Nbs were further used for the development of the bioassay; Nb1 for capture by conjugation to magnetic beads and Nb4 for detection by conjugation to HRP. Our results show that our biosensor is able to recognize E. coli F17 with high specificity and sensitivity with a LOD of 1.8 CFU/ml in an assay of 90 min. We also showed that the biosensor could be used to detect E. coli F17 from untreated fecal samples. We also showed that the biosensor is functional after storage at 4°C for at least one month.

CONCLUSION:

This study indicated that the recombinant form of the fimbrial protein F17A is a promising tool in the immunization process. In conclusion, the obtained result shows that the high affinity and specificity of the anti-F17A-Nbs have facilitated the design of a sensitive magnetofluorescence bioassay for the pathogenic strain of E.coli.

KEYWORDS

Nanobodies, Fimbriae F17A, Escherichia coli, Immunoassay

CITATION

Dhehibi, A., Amal Raouafi, A., Terrak, M., Raouafi, N., Hammadi, M. and Salhi, I. (2023). Nanobodies-based system for High-Sensitivity detection of Escherichia coli in a diarrhea camel feces sample. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Nanobo Effect of Habituation to Milking Parlour on Camel's Behavioural Response During Training to Machine Milking Die

Chayma Chaouch Aoun^{1,2*}, Marwa Brahmi^{1,3}, Moufida Atigui¹, Houcine Khediri¹, Wiem Ben Salem⁴, Mohamed Hammadi^{1,5}

¹ Laboratoire d'Élevage et de Faune Sauvage, Institut des Régions Arides, Université de Gabès, Médenine-Tunisie.

² Université de Gabès, Faculté des sciences, Cité Erriadh, 6072 Gabès – Tunisie.

³ Université de Sousse, Institut Supérieur Agronomique de Chott Mariem, Sousse – Tunisie.

⁴ Office d'Élevage et des Pâturages, Alain Savary 1082 Tunis – Tunisie.

⁵ Université de Gabès, Ecole Doctorale SIS, Cité Erriadh, 6072 Gabès – Tunisie.

* cchaouch4@gmail.com

AIM:

The present study was performed to investigate the effect of a progressive habituation protocol for machine milking on camel's behaviour during training period.

INTRODUCTION:

During first days of training to machine milking, stress behaviours usually increase in dairy animals with possible injuries to animals and handlers. Thus, a pre-habituation period is recommended, yet it has never been tested for dairy camels.

METHODS:

Twelve dairy Maghrebi camels (BW: 430.0 ± 33.0 kg; age 11.5 ± 5.4 years; lactation stage: 71 ± 22 DIM) belonging to the experimental station of Arid Region Institute (Chenchou, Tunisia) were divided into two homogeneous groups; G1 (habituated) and G2 (non-habituated) and followed for 18 days. The habituation protocol consisted of 8 days before the start of machine milking, where G1 received four successive habituation sessions of two days each (hand milking, passing through the milking parlour with machine switched off, passed through the milking parlour with machinery switched on and for the last 2 days camels were stopped in the milking stall for 2 minutes). Behavioural responses were recorded using surveillance video and data were analysed using BORIS software (6.3.1).

RESULTS:

Observed stress behaviours were Flinching-Stepping-Kicking (FSK), grunt, biting, jumping, liquid defecation, urination and unhooking the milking clusters, whereas welfare behaviours were rumination, solid defecation and scratching. Stress behaviours were more frequently performed ($P < 0.01$) by G2 (FSK: 6.5 ± 0.7 vs. 12.8 ± 1.3, jumping: 1.6 ± 0.3 vs. 5.6 ± 0.8, biting: 0.3 ± 0.1 vs. 1.5 ± 0.3, defecation frequency: 1.1 ± 0.1 vs. 1.4 ± 0.2 and urination: 0 ± 0 vs. 0.5 ± 0.1 and unhook: 1.4 ± 0.4 vs. 7.3 ± 1.1 for G1 and G2, respectively). Rumination was more observed in habituated group (4.8 ± 0.7 vs. 1.4 ± 0.4, $P < 0.0001$ for G1 and G2, respectively). Grunt and scratching behaviours did not differ between the two groups.

CONCLUSION:

Habituation of dairy camels to milking parlour reduces stress reactivity of dams during the first weeks of training to machine milking.

KEYWORDS

Camels, Behaviour, Habituation, Machine milking

CITATION

Aoun, C.C., Brahmi, M., Atigui, M., Khediri, H., Ben Salem, W. and Hammadi, M. (2023). Nanobo effect of habituation to milking parlour on camel's behavioural response during training to machine milking Die. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Camel Skin Valorisation: From Lab to Market

Salma Bessalah*, Touhami Khorchani, Mohamed Hammadi

Livestock Wildlife Laboratory -Arid land Institute (IRA), University of Gabes-Tunisia.

*bessalahsalma@yahoo.fr

AIM:

The key objective of this work is the commercialization of research results by launching a start-up « Caminova ».

INTRODUCTION:

Currently, the main origins of gelatin production are porcine and bovine which are associated with religious and healthcare restrictions. In the other hand, the increasing consumer's demands to acquire healthier foods with enhanced functional proprieties have encouraged the expansion of research about the extraction of gelatin from other sources like camel. In this context, our start-up « Caminova » offers camel gelatin in powder form for the food industries.

METHODS:

In order to convert our research into commercial success story, different activities have been planified. We followed several one-on-one mentor sessions with national and international entrepreneurship programs (IFA/AUF; TECHNORIAT; GIMED; SATT-Paris Saclay University), about prototype development, market evaluation, business development (sustainability, finance and more).

RESULTS:

Camel by-products have good potential for replacing porcine and bovine sources for gelatin extraction. According to Technological Readiness Level (TRL), our project is at a level of maturation 7 (TRL7). In order to explore market opportunities, obtaining good knowledge of the market is a critical step. Through a qualitative analysis of a global market, gelatine's market will peak at 13.9 billion by 2023. It is predicted that the global demand for gelatin will increase significantly (30%) in the future. Finally, knowing who will buy a product and under which performance or price conditions, is the success factor for successful market oriented exploitation. In this context, a complete financial study was carried out. The analyses of different scenarios have demonstrated that the project remains viable from an economic point of view in the long term.

CONCLUSION:

Based on the information, it can be concluded that camel gelatin may be a competitive alternative to other types of gelatin on the market in the near future.

KEYWORDS

Start-up, Innovation, Commercialization

CITATION

Bessalah, S., Khorchani, T. and Hammadi, M. (2023). Camel skin valorisation: From lab to market. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Cheese Making From Camel Milk: Usefulness of *Cynara Cardunculus* Flower Extract As Substitute to Rennet

Amel Sboui*, Imen Fguiri, Mahassen Naouel, Mohamed Hammadi, Touhami Khorchani

Livestock and Wildlife Laboratory, Arid Land Institute, Medenine, Tunisia/ University of Gabes

*amelsb8@gmail.com

AIM:

This study was conducted aiming to test the usefulness of Cardon (*cardunculus cynara*) flowers extract (CEFC) as substitute to rennet on the manufacture of camel milk cheese.

INTRODUCTION:

Camel milk is mainly consumed raw just after milking or fermented but rarely processed into cheese due to a low amount of K-casein. Production of cheese from camel milk has been challenging due to the lack of coagulants that can specifically cleave camel milk K casein.

METHODS:

The conditions of milk clotting were optimized at different temperature (30-75°C), pH (4.5-8), and CaCl₂ concentration (0.01M-0.09M). The CEFC is then characterized by measuring the clotting and proteolytic activities. CEFC was used at different concentrations (1%, 2.5%, 5%, 10%) as coagulant to manufacture fresh camel cheese.

RESULTS:

Optimal coagulation activity of CEFC was observed at pH 5 and 45°C with a CaCl₂ concentration of 0.02 M. The milk clotting activity of CEFC was about 14.29 UP. A concentration 5% of CEFC was mainly suitable to prepare soft cheese from camel milk with 23% as cheese yield.

The results showed that the prepared camel fresh cheese presented the following means composition: Fat 42.5±7.25 g/kg, proteins 29.92±2.08, dry matter 20.8±1.93 g/kg, ash 2,83 ± 0,93 g/kg.

Vitamin C was the major vitamin in the obtained camel cheese (60.3±6.36 mg/l).

CONCLUSION:

The usefulness of *Cynara cardunculus* flower extract as coagulant to prepare camel milk cheese was confirmed in this study.

KEYWORDS

camel milk, coagulation, cheese, composition

CITATION

Sboui, A., Fguiri, I., Naouel, M., Hammadi, M. and Khorchani, T. (2023). Cheese making from camel milk: Usefulness of *Cynara cardunculus* flower extract as substitute to rennet. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Dietary Chromium Interacts with Copper and Iron Bioavailability in Dromedary Camel Calves

K. A. Abdoun*, M. A. Alsofi, I. A. Alhidary, E. M. Samara, M. A. Al-Badwi and A. A. Al-Haidary

Department of Animal Production, College of Food and Agriculture Sciences, King Saud University

*kabdoun@ksu.edu.sa

AIM:

This study was intended to evaluate the effects of different dietary chromium (Cr) levels on apparent Cr, copper (Cu) and iron (Fe) bioavailability in dromedary camel calves.

INTRODUCTION:

Chromium as an essential micronutrient plays an important role in the growth and health of livestock as it is involved in a wide range of physiological functions. Although Cr requirement of camels has not been defined, it is obvious that stress and disease conditions could increase the requirement for Cr. Chromium intake at high level will have antagonistic effects on the other minerals; nevertheless, the knowledge pertaining to the interaction of Cr with other minerals is not completely explored.

METHODS:

The experiment was conducted on 15 male dromedary camel calves. The animals were divided into three equal groups, and housed individually under shelter. Camel calves were fed ad libitum on complete pelleted feed supplemented with 0.0, 0.5 or 1.0mg Cr/kg DM for 12 weeks. Thereafter, a metabolic trial was conducted for a period of 8 days (4 days for adaptation, followed by 4 days for samples collection). During the collection period, feed offered and refusal and the masses of feces and urine were measured daily from each animal. Representative samples (feed, 10% of urine, and 20% of feces) were collected and frozen at -20°C until analysis of selected trace minerals.

RESULTS:

In the current experiment, Cr utilization increased ($P<0.05$) with the increasing level of dietary Cr supplementation. Where, Cr absorption and retention were increased by 46.7% and two folds, respectively at 1.0mg Cr/kg DM. However, increasing the level of dietary Cr supplementation reduced ($P<0.05$) Cu, and increased ($P<0.05$) Fe bioavailability.

CONCLUSION:

Dietary Cr supplementation interacted with the absorption of both Cu and Fe. Therefore, attention should be paid to the bioavailability of other trace minerals during supplementation of Cr to feed of camel calves.

KEYWORDS

Dromedary Camel, Chromium, Copper, Iron

CITATION

Abdoun, K.A., Alsofi, M.A., Alhidary, I.A., Samara, E.M., Al-Badwi, M.A. and Al-Haidary, A.A. (2023). Dietary chromium interacts with copper and iron bioavailability in dromedary camel calves. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Influence of Feeding Different Energy and Protein Levels on Milk Yield and Composition in Early Lactating Lassi Camels

Illahi Bakhsh Marghazani^{1,*}, Baboo Saleem^{1,2,*}, Gulfam Ali Mughal², Farman Ali Sial², Asim Faraz³, Ressa Amina⁴ and Muhammad Akram⁵

¹ PARC-LUAWMS Camel Project (AS010), Department of Animal Nutrition, Faculty of Veterinary and Animal Sciences, Lasbela University of Agriculture, Water and Marine Sciences, Uthal, Pakistan.

² Department of Animal Nutrition, Faculty of Animal Husbandry and Veterinary Sciences, Sind Agriculture University, Tandojam, Pakistan.

³ Department of Livestock and Poultry Production, Bahauddin Zakarya University, Multan, Pakistan.

⁴ Laboratory of Biotechnology and Sustainable Development of Natural Resources, Department of Life Sciences, Poly disciplinary faculty, Sultan Moulay Slimane University, Beni Mellal, Morocco.

⁵ Livestock and Dairy Development Department, Balochistan, Pakistan.

* marghazani76@yahoo.com

AIM:

The study conducted to know the influence of feeding different energy and protein levels on milk yield and composition of Lassi camels at early stage of lactation.

INTRODUCTION:

Balochistan is the hub of camelids in Pakistan. The milk yield is estimated 166 ton/d however, this potential is entirely based on grazing in pastoral habitat. Therefore, supplement feeding may explore the actual milk potential and prospects of keeping camels for commercial purposes.

METHODS:

Twenty multi-parous, early lactating Lassi camels (12±5 days) were selected and randomly divided into five groups. Group A served as control group and fed on conventional pattern of grazing only. Group B was fed supplement 1 having lower energy with low CP (1.50 kcal/Kg M.E; CP 10%) level whilst group C was fed supplement 02 having low energy with high CP contents (1.5 kcal/Kg M.E; CP 14%). Group D was provided supplement 03 that had higher energy with low CP level (2.5 kcal/Kg M.E; CP 10%) whilst group E was fed supplement 04 having high energy with high CP levels (2.5 kcal/Kg M.E; CP 14%). Data were statistically analyzed using analysis of variance technique under completely randomized design.

RESULTS:

Results showed significant differences (P<0.05) in average milk yield. All supplemented groups (B, C, D, and E) showed significant difference (P<0.05) with non-supplemented groups (group A). Maximum (P<0.05) milk yield (8.41±0.13) recorded in group E followed by group D whilst minimum (P<0.05) milk yield (5.82±0.60) recorded in group A. In milk composition, fat contents were significantly maximum (P<0.05) in group D whilst lowest in group E. Lactose, solid not fat, protein and salts percentages were found highest (P<0.05) in group C, followed by group D whilst lowest (P<0.05) in group E.

CONCLUSION:

It was concluded that feeding higher energy supplement to grazing early lactating camels significantly increases milk yield regardless of protein level under present experiment situation.

KEYWORDS

Camels, Lactation, Milk, Supplement, Energy, Protein

CITATION

Marghazani, I.B., Saleem, B., Mughal, G.A., Sial, F.A., Faraz, A., Amina, R. and Akram, M. (2023). Influence of feeding different energy and protein levels on milk yield and composition in early lactating Lassi camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Investigation of Endemic and Imported Camel Diseases in Libya

Fouziyah Alghanay

¹ Ministry of Agriculture and Livestock, National Centre for Animal Health, Libya

* Fawzia_salem@yahoo.com

ABSTRACT:

The Center was established by a decision of the Council of Ministers No. (100) for the year 2012 Has legal personality and independent financial disclosure Affiliated to the Ministry of Agriculture and Livestock. The National Center for Animal Health aspires to be a veterinary service institution with a good reputation in the field of animal health, food safety and the environment. Camels are exposed to many diseases, including bacterial, viral and parasitic e, which in turn cause problems for infected animals and cause cages, which requires treatment and an investigation of diseases to know them and develop programs to eliminate them or reduce their risks, as well as the Union of procedures to prevent the entry of imported and trans boundary diseases. Accordingly and through the competence of the Center: -Proposing plans and programs for epidemiological surveillance, survey and eradication of animal diseases and zoonotic diseases example (Brucella). In this study 300 sample of camel herds (142 sera, 116 blood, and 7 organ) were collected during 2020-2022 from various regions east - west – south Diagnostic tests (rapid test. ELISA, Bacteriology and parasitology.

AIM:

Protecting the wealth of camels from endemic and imported diseases and protecting food security.

INTRODUCTION:

The National Center for Animal Health is committed to protecting livestock and achieving food security by providing the best veterinary services to animal and poultry breeders by veterinarians and technicians with high quality training and qualification.

Strategic Objectives

- Contribute to supporting national economic by protecting livestock from diseases through the application of survey, early identification and rapid response programs to control these diseases.
- Establishing veterinary laboratories and enhancing their capabilities and providing with the last equipment.
- Developing scientific research programs in the field of animal health.
- Concluding agreements with local universities and international research centers to benefit from their experience in field of training

Livestock in Libya: Camels 140000, Cows 100000, Sheep 6 million, Goats 1.5 million.

METHODS:

Application of Libyan veterinary health conditions to imported animals, Conducting periodic surveys and national projects, Collecting samples for serological, bacterial and parasite analysis, 322 samples were collected from herds of camels during the survey programs.in east. West. South and central Libya.

RESULTS:

Of the 170 serum samples tested, 10 were found to be brucellosis seropositive. 22 organ samples for isolation 5 positive sample.130 blood samples for parasite 75 positive.

CONCLUSION:

Continuing to apply health conditions, Conducting periodic surveys, Continue training.

KEYWORDS

Brucella, ELISA, NCAH,- survey- LIBYA

CITATION

Alghanay, F. (2023). Investigation of endemic and imported camel diseases in Libya. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Serum Proteins Capillary Electrophoretic Pattern During the Transition Period in Camels (*Camelus Dromedarius*)

Nawal Mohamed Elkhair^{1,2,*}

¹ Department of Physiology, Faculty of Veterinary Medicine, University of Khartoum, 13314, Shambat, Sudan

² Department of Biomedical Sciences, College of Veterinary Medicine, King Faisal University, 31982, AlAhsa, Saudi Arabia

* nelkhair@kfu.edu.sa

AIM:

The study aimed to characterize serum protein capillary electrophoretic pattern during the transition period in camels.

INTRODUCTION:

Transition period (from late pregnancy to early lactation) is a physiological state that has been shown to modify protein metabolism in camels. Capillary electrophoresis is a well-established and efficient method for monitoring health and a diagnostic screening tool for protein metabolism-related diseases in animals. Few data are available concerning the application of capillary electrophoresis technique to camels during transition period.

METHODS:

Twenty (20) apparently healthy time-mated multiparous pregnant Arabian camels (age: 11-16 years, parities: 2-3) were divided to two equal groups (10 each). The animals were monitored one month before/and after parturition (late pregnancy and early lactation, respectively). The animals were reared under semi-intensive system and maintained on grazing and browsing trees for 2 hours daily, in addition to daily concentrate ration, which was offered twice at 7:00 am and 18:00 pm with free access to fresh water. Blood samples were collected in the morning before feeding by jugular venipuncture 4 times at two (2) weeks interval: one month before parturition (-15 and -30 days) and one month postpartum (+15 and +30 days). Serum harvested was used to determine total protein concentration ([TP]) and protein fractions using Biuret spectrophotometric method and capillary electrophoresis technique, respectively. ANOVA (Levine's and Post Hoc Tests) were used to assess the significant difference between the groups at the $P \leq 0.05$ level.

RESULTS:

Analysis of serum proteins by capillary electrophoresis produced 6 fractions: albumin, α_1 , α_2 , β_1 , β_2 and γ - globulins. The relative (%) and the absolute (g/l) concentrations of α_1 , α_2 and β_1 -globulins fraction increased significantly ($P \leq 0.05$) during early lactation compared to late pregnancy, whereas A/G ratio decreased ($P < 0.01$). Serum-[TP] did not change significantly during early lactation compared to late pregnancy, while albumin and β_2 -globulins fraction concentrations decreased.

CONCLUSION:

Capillary electrophoresis successfully used to assess and interpret the potential changes in the production and consumption of various serum protein fractions during the transition period in camels.

KEYWORDS

Camel, transition period, serum protein, capillary electrophoresis

CITATION

Elkhair, N.M. (2023). Serum proteins capillary electrophoretic pattern during the transition period in camels (*Camelus dromedarius*). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Impact of Glycine Betaine on Cooled Camel Semen Quality and Fertility Rate

Zeidan, A.E.B.^{1*}, A.M. Amer¹, Dalia, S.A. Al-Tahan² and Liza A. Abdel-Rafaa¹

¹ Animal Production Research Institute, Agricultural Research Center, Giza, Egypt.

² Animal Health Research Institute, Agricultural Research Center, Mansoura Laboratory, Egypt

* doctoramer69@gmail.com

AIM:

the present study aimed to define the effect of different concentrations of Glycine betine (GB) addition to Maghrebi camel spermatozoa extended with Lactose-Yolk-Citrate (LYC) extender and stored at 5°C for three days.

INTRODUCTION:

artificial insemination (AI) is considered fast way for the application of genetic improvement and the live spermatozoa can be prolonged for several days in chilled state (2- 5 °C).

METHODS:

semen was collected from five healthy camels using an artificial vagina and extended with LYC extender free-GB medium (first medium) or addition of GB at concentrations of 100 mM, 200 mM or 300 mM for second, third or fourth media respectively for a final sperm concentration of 100x10⁶ sperm cell/ ml, the conception rates of she-camel inseminated with extended semen free-GB medium or added with 100 mM, 200 mM or 300 mM were determined after 45 days.

RESULTS:

showed that the percentage of motile camel spermatozoa extended with LYC extender added with 100 or 200 mM GB were significantly ($P < 0.05$) higher compared with 300 mM GB or free-GB medium however, the percentage of dead, abnormal, acrosome damage, chromatin damage and activities of aspartate-aminotransferase (AST) and alanine-aminotransferase (ALT) enzymes (U/10⁶ spermatozoa) were significantly ($P < 0.05$) lower during storage at 5°C for three days. The prolongation of storage time was significantly ($P < 0.05$) decrease of the camel semen quality with or without GB medium. Additionally, the conception rates for one day of the dromedary she-camels artificially inseminated were 31.57, 52.63, 47.61 and 26.31 %, in the first, second, third and fourth media, respectively.

CONCLUSION:

enrichment of the camel sperm quality and fertility rates were recorded with GB addition to the cooled camel spermatozoa at 100 or 200 mM, during storage at 5°C.

KEYWORDS

Camel spermatozoa; Glycine betaine; Sperm quality; Fertility

CITATION

Zeidan, A.E.B., Amer, A.M., Dalia, Al-Tahan, S.A. and Abdel-Rafaa, L.A. (2023). Impact of glycine betaine on cooled camel semen quality and fertility rate. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Importance of Liner Design and Milking Machine Settings for Optimal Milking Performance and Welfare in Camels

Skaskous

Department of Research and Development, Siliconform, Schelmengriesstrasse 1, 86842 Türkheim, Germany

*skaskous@siliconform.com

AIM:

The aim of the present study is to demonstrate the importance of liner design and milking machine settings for optimal milking performance and welfare in camels.

INTRODUCTION:

The purpose of milking machines is to harvest milk at optimal speed while maintaining camel comfort and teat defense mechanisms against invading mastitis pathogens. The mechanical forces during mechanical milking impact the teat tissue. This effect is related to the degree of adaptation of the milking machines to the physiological requirement of lactating camels. If both milking machine settings and liners are not suitable for the camels on the respective farm, the udder will not be fully milked and the camels can develop mastitis and the teat condition will deteriorate.

METHODS:

The study was carried out on 10 dromedaries in Germany and Switzerland, each with 5 camels. The camels were milked twice a day for a period of one year with a new milking machine-StimuLactor for camels-which has the following characteristics: a vacuum level of 36–38 kPa, a pulsation rate of 90 cycles/min and a pulsation ratio of 65:35. During the study period, daily milk yield was recorded and milk samples were taken for qualitative analysis.

RESULTS:

The results show that no pathogenic bacteria could be detected in any of the milk samples tested, i. e. all quarters were healthy during the study period. In addition, the milk produced was of high quality as the somatic cell count was low and the milk components were high.

CONCLUSION:

An ideal milking machine adapts to the morphological, anatomical, and physiological characteristics of the udder and teats of lactating camels and it should achieve a physiologically ideal milking process meeting high animal welfare standards for increased milk production with high quality standard.

KEYWORDS

Camel, Liner, Milking machine, Silicone, Teat cup

CITATION

Kaskous, S. (2023). Importance of liner design and milking machine settings for optimal milking performance and welfare in camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Production Profile of Marecha Camelid (*Camelus Dromedaries*) in Desert Ecosystem of Pakistan

Asim Faraz

Department of Livestock and Poultry Production, Bahauddin Zakariya University Multan
drasimfaraz@bzu.edu.pk

AIM:

This study was attained at Camel Breeding and Research Station (CBRS) Rakh Mahni to check the production potential of Marecha camel in desert adobes.

INTRODUCTION:

Camel is a salient character of pastoral economy in the world. Apropos to this title role camel take part in crucial prudence of ecclesiastical in arid/semi-arid areas of Pakistan.

METHODS:

About 42 suckling/weaned calves of 8-16 months & 50-62 she-camels of different parities in mid lactation were housed in semi-open pens at farm and available housing in field. They were stall-fed with gram straw, Alfalfa, concentrate of 18% CP & 2.88Mcal energy, allowed grazing/browsing in semi-intensive (SIMS) and extensive management system (EMS) along with ample clean water. Deworming and Vaccination (Trypanemedium) was performed against trypanosomes infection.

RESULTS:

There was about 480 grams daily weight gain (DWG) in open grazing and 520 grams in intensive management system (IMS) while 675 grams in ♂, 650 grams in ♀ under IMS and 420 grams in ♂ and 377 grams in ♀ under SIMS. The calves showed 540 grams in ♂ and 437 grams in ♀ under EMS. In feedlot system, the weaned calves explicit 956-998 grams DWG. The mean milk yield and range of Marecha she-camel was found to be 5.62 and 3-8 kg in EMS and fat, protein, lactose, SNF & total solids as 4.44, 3.42, 4.82, 8.96 and 13.38 %. The mean milk yield and range was found to be 6.2 and 5-9 kg under SIMS while fat, protein, lactose, SNF and total solids were as 4.40, 3.38, 4.76, 8.93 and 13.33 %.

CONCLUSION:

Higher daily gains and milk values were achieved which could be used as guidelines for the ideal intensification and prove camel a food security animal of changing climate in this global warming alert.

KEYWORDS

Camel, Milk, Meat, Growth, Pastoral, Food security, Pakistan

CITATION

Faraz, A. (2023). Production profile of marecha camelid (*camelus dromedaries*) in desert ecosystem of pakistan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

TYR Variants are Associated with Light Brown and Black Coat Color of the Dromedary

Fahad Alshanbari

Department of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Qassim University, Buraydah 51452, Saudi Arabia
*shnbry@qu.edu.sa

AIM:

Identification TYR gene contribution in dromedary camel coat colour phenotypes.

INTRODUCTION:

Coat color genetics has been studied in many mammalian species. However, in the dromedary camel, there are only few efforts reported three genes associated with coat color (MC1R, ASIP and KIT). Dromedary camel coat color varies from white, light brown, brown, dark brown and black. There is a spotted dromedary breed originated from Canary Island that is rare to see in other regions or in other camel breeds. Tyrosinase (encoded by TYR gene) is a key enzyme responsible for converting tyrosine to melanin in the melanin pathway. TYR is known as the albino locus as it causes albinism in several species. TYR variants are also associated with diluted coat color phenotypes in rabbits and mice. Here, we investigated the possibility of TYR contribution in the dromedary coat color variations.

METHODS:

Blood samples were collected from 123 dromedaries representing 5 coat colour groups (white, light brown, brown, dark brown and black) from 7 dromedary camel breeds. DNA was isolated, and primers were designed to amplify all TYR 5 exons.

RESULTS:

We sequenced TYR exons and identified 3 single nucleotide polymorphisms (SNPs) in exon 1, 2 and 3 respectively. One missense variant in the open reading frame c.201 C>T was discovered in exon 1 that replaces proline with leucine. Heterozygous individuals were significantly associated with black and light brown coat color (p -value < .05) suggesting codominant inheritance. Two synonymous variants were discovered in exon 2 c.861 G>A and exon3 c.950 C>T. No SNP discovery was observed in exon 4 nor 5.

CONCLUSION:

TYR gene is associated with diluted coat color in the dromedary. We also showed that TYR exon 1 and exon 2 are linked.

KEYWORDS

Dromedary; Coat colour, genetics; TYR; Camelids

CITATION

Alshanbari, F. (2023). TYR variants are associated with light brown and black coat color of the dromedary. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Hsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

An Outbreak of Abortions and High Perinatal Mortality Associated With An Iatrogenically Transmitted *Trypanosoma Evansi* Infection in A Camel Farm in the UAE

Mostafa Nasef*, Aungshuman Das Gupta

Bulaida farms, Al Mayya group, Fujairah, UAE

*mostafa@bulaidafarms.ae

AIM:

The purpose of this paper is to present the devastating effect of the introduction of a *Trypanosoma evansi* strain into a naïve camel herd, especially on the pregnancy outcome of pregnant camels. Data was collected during the breeding season 2021-2022.

INTRODUCTION:

Trypanosomiasis due to *Trypanosoma evansi* is a major and often underestimated enzootic disease of the dromedary camel. It is well known that *Trypanosoma evansi* causes abortions, premature births, and weak calves in domestic animals.

METHODS:

At the beginning of the breeding season, camels harboring *Trypanosoma evansi* were bought from the local market and introduced into the farm without proper disease screening or quarantine measures. As part of the embryo transfer program in the farm, female camels were being examined regularly by ultrasound and injected Xylazine intravenously during each examination with reused and potentially contaminated needles and syringes.

RESULTS:

A strong upward linear correlation ($r=0.81$) was found between the number of examinations/intravenous injections and rate of infection as detected by ELISA. Infection rate among camels that weren't included in the breeding program, hence, were not injected regularly, was 5.5% in contrast to about 93% among camels that were examined and injected more than 10 times.

From a total of 64 infected pregnant camels whose pregnancy terminated, about 26% gave birth after full-term gestation period (> 345 days), and 74% either aborted or gave birth to a premature calf among which a 90% mortality rate was reached.

CONCLUSION:

An overall negative outcome (abortion or death) of 69% was recorded which is attributable to *Trypanosoma evansi* infection which is much higher than the acceptable rate of less than 10%.

KEYWORDS

Trypanosomiasis, Abortion, Premature births, *Trypanosoma evansi*

CITATION

Nasef, M., Gupta, A.D. (2023). An outbreak of abortions and high perinatal mortality associated with an iatrogenically transmitted *trypanosoma evansi* infection in a camel farm in the UAE. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Anti-adhesive (MUC1) and Adhesive (OPN) Protein Expression in the Embryonic Trophoctoderm of the Dromedary Camel During the Peri-Implantation Period

Mohammed Salem Moqbel^{1*}, Saeed Yaseen Al-Ramadan¹, Abdulraman Khalid Alhaider²

¹ Department of Anatomy, College of Veterinary Medicine, King Faisal University, Al-Ahsa, KSA.

² Department of Clinical Studies, College of Veterinary Medicine, King Faisal University, Al-Ahsa, KSA

* 218038433@student.kfu.edu.sa

AIM:

To investigate, for the first time, the temporospatial expression of MUC1 and OPN in trophoctoderm (Tr) during the peri-implantation period.

INTRODUCTION:

The implantation process is initiated by a dramatic transformation of trophoctoderm (Tr) and the endometrium surfaces from a non-adhesive to an adhesive status. Several molecules are differentially expressed on these surfaces to achieve successful attachment. Mucin1 (MUC1) is expressed by the endometrium and acts as an anti-adhesive protein. Therefore, the downregulation of MUC1 is permissive for embryo attachment and implantation. Conversely, osteopontin (OPN) is an indispensable adhesion protein that is highly expressed during embryo attachment and implantation. In dromedary camels, the lower reproductive capacity might be due to the asynchrony of the conceptus and endometrial expression of these two proteins during the peri-implantation window resulting in early embryonic death.

METHODS:

Twelve embryos were recovered from 12 camel females on Days 8, 10, and 12 of pregnancy (n=4 each designed day). Each embryo was divided into three parts, and each part was assigned to different techniques (qrt-PCR, Immunohistochemistry, and immunofluorescence).

RESULTS:

MUC1 mRNA expression began at Day 8 and peaked on Day 10 before decreasing dramatically on Day 12. Conversely, OPN mRNA expression started on Day 10 and increased sharply on Day 12. Immunohistochemistry and immunofluorescence results showed that MUC1 immunointensity was high at day 10 and decreased at day 12. While, the OPN protein in Tr showed low immunointensity on day 10 and increased sharply on Day 12 of gestation.

CONCLUSION:

Tr expressed MUC1 early (Days 8 and 10) during the peri-implantation period and thus might play an important role in embryo protection, motility, and anti-adhesion, then downregulated around the attachment time of implantation (Day 12), allowing for stating the implantation process. On the other hand, the OPN expression pattern of Tr might play a crucial role in embryo adhesion, attachment, and implantation early during the peri-implantation period.

KEYWORDS

MUC1, OPN, Trophoctoderm, Expression, Implantation

CITATION

Moqbel, M.S., Al-Ramadan, S.Y. and Alhaider, A.K. (2023). Anti-adhesive (MUC1) and adhesive (OPN) protein expression in the embryonic trophoctoderm of the dromedary camel during the peri-implantation period. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Effect of Heat Treatment on the Vitamins, Proteins and Amino Acids Composition of Camel Milk

Amel Sboui*, Maha Hammouda, Abir Omrani, Mohamed Dbara, Touhami Khorchani

Livestock and Wildlife Laboratory, Arid Land Institute, Medenine / University of Gabes/ Institution of Agricultural Research and Higher Education (IRESA), Tunisia
*amelsb8@gmail.com

AIM:

Camel milk is generally consumed freshly. Therefore, to improve to extend its shelf life different heat treatments such as pasteurization and boiling for home use may be applied.

INTRODUCTION:

The present study aim to investigate the effect of heat treatment on the camel milk vitamins, proteins and amino acids composition.

METHODS:

Raw, pasteurized (63°C during 30 min) and boiled (for 2 min) camel milk samples were used to determine the effect of heat treatment on these components.

The concentration of each protein was obtained after separation using High Performance Liquid Chromatography (HPLC) method. Amino acids composition was achieved using Ultra-high Performance Liquid Chromatography (UPLC). Vitamins composition was determined by Liquid chromatography method.

RESULTS:

It was clear that boiling temperature caused a significant decrease of some proteins concentration in particular kappa-caseins and beta casein fraction: β -Casein showed the highest sensitivity to boiling temperature of camel milk (from 14613.4 \pm 21.2 mg/l in raw milk to 2728 \pm 20.33 mg/l after boiling), κ -casein concentration was also decreased in boiled camel milk (from 826.33 \pm 12.33 mg/l to 300 \pm 12.33mg/l). Lactoferrin was completely destroyed after boiling.

Compared to raw milk boiled camel milk showed a significant decrease in some vitamins composition especially Vit C (169.73 \pm 5.12 to 49.69 \pm 3.23 mg/l) and vit B3 (391.2 \pm 3.38 to 70.55 \pm 3.14 mg/l). Amino acids composition showed a decrease in the amount of essential amino acids especially leucine, methionine and valine amounts after boiling (from 67.2 \pm 4.33 g/100g in raw milk to 52.33 \pm 3.66 g/100g in boiled camel milk).

Although pasteurized camel milk didn't shows any significant effect on the aminoacids composition of camel milk. Only kappa casein concentration significantly decreased in pasteurized camel milk.

CONCLUSION:

Pasteurization could be the greatest heating process to ensure the stability of micronutrients of milk.

KEYWORDS

Camel milk, Heat treatment, Proteins, Vitamins, Amino acids

CITATION

Sboui, A., Hammouda, M., Omrani, A., Dbara, M., Khorchani, T. (2023). Effect of heat treatment on the vitamins, proteins and amino acids composition of camel milk. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Epidemiological Study on Parasitic Diseases of Camels in Tunisia

Mohamed Habib JEMLI^{1*}, Haykel KESSA², Wiem BEN SALEM³, Hafed KHELIF⁴ and Talel Hamza⁵

¹ National School of Veterinary Medicine, Sidi Thabet, Manouba University, Tunisia

² Animal Production Department - Sousse, Tunisia

³ Livestock and Pasture Office - Ministry of Agriculture, Tunisia

⁴ ACSAD-www.acsad.org

⁵ Animal Production Department – Tozeur, Tunisia

*jemli.medhabib@yahoo.fr

AIM:

An epidemiological study was conducted between 2018 and 2021 in Tunisia to evaluate main parasitosis of the dromedary in Tunisia.

INTRODUCTION:

Parasitic diseases of camels are considered to be the main causes of mortality and reduced production in this animal (milk, meat, etc.).

METHODS:

An epidemiological study was conducted between 2018 and 2021 in Tunisia to evaluate main parasitosis of the dromedary in Tunisia. Clinical and epidemiological surveys were carried out on farms and among veterinarians and farmers; Laboratory analyzes were carried out to confirm these pathologies and to assess their intensity in the herd.

RESULTS:

The clinic observations carried out on dromedaries reveals that sicknesses are ranked among the major constraints on the development of the breeding of this animal in Tunisia.

The Trypanosomiasis of *Trypanosoma evansi* and the scabies are the main parasitosis encountered among the Tunisian dromedaries at the present time.

The scabies (*Sarcoptes scabiei*) affect practically all breeding in the south of Tunisia with a clinic expression demonstrated among approximately 10% of the total number.

The seroprevalence of *Trypanosoma evansi* infection have revealed that more than 25% of dromedaries are positive with a net prevalence of the disease in autumn (37%) and in animals over 4 years (89%). The Kebili region was the most affected (44%). This parasitosis with varied clinical manifestations is spreading in the Sahel and central region in recent years.

Other parasitosis also deserves to be pointed out namely the infestation by ticks, the hydatidosis to *E. granulosus* and the cephalopinos.

CONCLUSION:

Appropriate treatment and prophylaxis programs have been proposed to overcome these camel pathologies.

KEYWORDS

Camle, trypanosoma evansi, scabies, parasitic diseases

CITATION

JEMLI, M.H., KESSA2, H., BEN SALEM, W., KHELIF, H. and Hamza, T. (2023). Epidemiological study on parasitic diseases of camels in Tunisia. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Evaluation of Reproductive Performance by Using Hormonal Treatment in Anestrus Iraqi Camel (*Camelus Dromedarius*)

Al-Hamedawi, T.M.¹, Alyasiri, E.A.¹ and Al-Fatlawy, A.K.²

¹ Department of surgery and obstetrics, College of Veterinary Medicine, University of Baghdad, Iraq.

² Department of surgery and obstetrics, College of Veterinary Medicine, University of Kufa, Iraq.

* enasali182@gmail.com

AIM:

Because of the few research about the reproductive performance in anestrus Iraqi she-camels, this study was designed to investigate the effect of progesterone releasing intravaginal device (PRID) and PMSG for induction of fertile estrus in anestrus Iraqi she-camels and to eliminate seasonality.

INTRODUCTION:

The type of camels in Iraq includes Bellows (Khoar) and Judi which characterized by big size used for transportation and meat exhaustion, while the anatomy of genital tract including ovaries which are oval, flattened, and lobulated organs in non-pregnant animal. The uterus in she-camel is bicornuate (Y and T) shaped with septum about 6-8 cm in length separate the two horns. Puberty occurs at 3-4 years but the first labor reached for 5-6years, while the sexual maturity recorded 68-72 months and the breeding continued to 30 years of age.

METHODS:

The present study conducted on 30 anestrus Iraqi she-camels which diagnosed by rectal palpation, the age was between 4-7 years, the methodology includes the steps of PRID from sterile the applicator with antiseptic solution to put the PRID in the vagina deeply and recorded many reproductive parameters include animals response, duration of response, number of services per conception and pregnancy rate. The study was performed at Al-Najaf province during the period from January to December 2022. Animals divided into three groups (10 she-camels for each one), the 1st group treated by PRID (1.50 mg of medroxy acetate progesterone) / 10 days only, the 2nd group treated with PRID / 10 days conjugated with 1000 IU of PMSG after withdrawal of PRID in day 10, the 3rd group was kept without treatment as a control group.

RESULTS:

Showed the animals response 60%, 90% and 70% in 1st, 2nd and 3rd group respectively but the duration of response recorded superior significantly ($P < 0.01$) related with 1st and 2nd groups compared with 3rd group (control group), while the number of services per conception recorded no significant in all groups. The pregnancy rate recorded 60%, 80% and 50% in 1st, 2nd and 3rd group respectively and the days open recorded significantly increase in 3rd group compared with 1st and 2nd group.

CONCLUSION:

of this study that the role of PRID and PMSG could improve the reproductive performance of anestrus Iraqi she-camels as well as this protocol could be safe and effective.

KEYWORDS

Camels, PRID, reproductive parameters, estrus induction

CITATION

Al-Hamedawi, T.M., Alyasiri, E.A. and Al-Fatlawy, A.K. (2023). Evaluation of reproductive performance by using hormonal treatment in anestrus iraqi camel (*Camelus dromedarius*). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Histopathological and Histochemical Investigation of a Case of Prion disease in a Female Camel in Tunisia

Abdelkader Amara^{1*}, Kéfia Elmehetli³, Michele Angelo Di Bari², Laura Pirisinu², Rihab Andolsi¹, Souhrgachout³, Boubaker Ben Smida³, Meriem Handous⁴, Heni Haj Ammar⁵, Roukaya Khorchani⁵, Malek Zrelli⁵, Cristina Casalone⁶, Laura De Antoniis⁷, Barbara Chiappini², Umberto Agrimi², Gabriele Vaccari²

¹ Ecole Nationale de Médecine Vétérinaire de Sidi Thabet, Université Mannouba, Tunis, Tunisia

² Istituto Superiore di Sanità, Department of Food safety, Nutrition and Veterinary public health, Rome, Italy

³ Arrondissement de Production Animale de Tataouine, Tunisia

⁴ Institut Pasteur, Tunis, Tunisia

⁵ Direction des Services Vétérinaires de Tunisie, Tunis, Tunisia

⁶ Istituto Zooprofilattico Sperimentale del Piemonte Liguria e Valle d'Aosta, Torino, Italy

⁷ Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale," Teramo, Italy

* abdelamara2@yahoo.fr

AIM:

Identification of a suspected prion disease case in a female dromedary by histological and histochemical investigations in Tunisia.

INTRODUCTION:

Transmissible spongiform encephalopathies (TSE) or prion diseases are a group of neurodegenerative diseases including Creutzfeldt-Jakob disease in humans, scrapie in small ruminants, and bovine spongiform encephalopathy (BSE). They are characterized by a long incubation period, a degeneration of the central nervous system whose outcome is always fatal. Following the reported cases of prion in camels in Algeria by Babelhadj and al (2018), some investigations were carried out on a suspect case of camel prion disease in a 12-year-old adult female from a runaway Dhahar region farm, slaughtered in Tataouine (Tunisia).

METHODS:

The methods employed for the identification of the case were based on the use of a classical histological analysis (hemalun/eosin) and an immunohistochemical technique followed by a western blot and a Sequence analysis of the prion protein gene.

RESULTS:

Histopathological examination brain tissue showed wide spongiform change, gliosis and neuronal loss. In particular, spongiosis involved either grey or white matter.

By immunohistochemistry (IHC), pathological prion protein (PrP^{Sc}) depositions were found in brain areas and retropharyngeal lymph node.

Western Blot analysis demonstrates the presence of the pathognomonic protease resistant PrP^{Sc} in different brain areas of the dromedary samples. Sequencing analysis showed that the animal had a wildtype genotype.

CONCLUSION:

Here we present for the first time the confirmation of a prion camel disease case from an autochthonous dromedary, born and grown in Tunisia.

KEYWORDS

Prion diseases, Camel prion disease, Camelus dromedarius, Tunisia

CITATION

Amara, A., Elmehetli, K., Bari, M.A.D., Pirisinu, L., Andolsi, R., Souhrgachout, Ben Smida, B., Handous, M., Ammar, H.H., Khorchani, R., Zrelli, M., Casalone, C., Antoniis, L.D.A., Chiappini, B., Agrimi, U. and Vaccari, G. (2023). Histopathological and Histochemical investigation of a case of prion disease in a female camel in Tunisia. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Isolation of Chlamydia Abortus From Bursal Tissue and Bursal Fluid of Female Dromedary Camels With Ovarian Hydrobursitis

Ahmed Ali^{1,2,*}, Derar R. Derar^{1,2}, Hadia A. Mousa³, Salama A. Osman^{1,4},

Walid Refaai^{5,6}, Tariq I. Almundarij¹, Musaad A. Al-dubaib¹, Sahar A. Allam⁷

¹ Department of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia

² Department of Theriogenology, Faculty of Veterinary Medicine, Assiut University, Egypt

³ Chlamydia Research Unit, Animal Health Research Institute, Dokki, Giza, Egypt

⁴ Department of Animal Medicine, Faculty of Veterinary Medicine, Kafrelsheikh University, Kafr El Sheikh, Egypt

⁵ University Veterinary Hospital, Qassim University, Saudi Arabia

⁶ Department of Surgery, Anesthesiology and Radiology, Faculty of Veterinary Medicine, Zagazig University, Egypt

⁷ Infectious Disease Unit, Animal and Poultry Health Department, Animal and Poultry Production Division, Desert Research Center, Cairo, Egypt

* amaly@qu.edu.sa; drahmedali77@gmail.com

AIM:

The purpose of this study was to isolate Chlamydia abortus (C. abortus) from camels suffering from ovarian hydrobursitis (OVHB).

METHODS:

Bursal tissue (n = 5) and bursal fluid (n = 6) samples were collected from 11 female dromedary camels with unilateral OVHB to achieve this goal. For the preliminary detection of C. abortus in infected samples, a quantitative polymerase chain reaction (qPCR) was used. The prepared samples were inoculated into embryonated chicken eggs for isolation. To detect any chlamydial inclusions in the infected yolk sacs, Giemsa, Gimenez, and direct immunofluorescence (DIF) staining were used. The infected yolk sacs were then subjected to a second qPCR. C. abortus DNA was found in 83.8% of infected bursal tissue and fluid samples.

RESULTS:

All of the yolk sac smears stained with Giemsa, Gimenez, and DIF showed intracytoplasmic inclusion bodies. Infected chicken embryos also had hemorrhagic patches, massive congestion, macerated yolk sacs, and dwarfism. C. abortus genes were found in 63.6% of infected yolk sacs.

CONCLUSION:

This is the first report of C. abortus isolation from female dromedary camels infected with OVHB, which is an important step toward developing a practical vaccine and avoiding fertility problems in female camels.

KEYWORDS

Ovarian hydrobursitis, Dromedary camels, Chlamydia abortus, Isolation

CITATION

Ahmed Ali, A., Derar, D.R., Mousa, H.A., Osman, S.A., Refaai, W., Almundarij, T.I., Al-dubaib, M.A. and Allam, S.A. (2023). Isolation of chlamydia abortus from bursal tissue and bursal fluid of female dromedary camels with ovarian hydrobursitis. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Male Camel Infertility: An Overview of Causes and Diagnosis Options

Ahmed Ali^{1,2,*}, Derar Refaat Derar^{1,2}, Tariq I. Almundarij¹

¹Department of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia

²Department of Theriogenology, Faculty of Veterinary Medicine, Assiut University, Assiut, Egypt

* Corresponding author: amaly@qu.edu.sa; drahmedali77@gmail.com

AIM:

The aim of this study was to highlight the etiology and diagnosis options for common reproductive disorders.

METHODS:

Over a 15-year period, data on infertile male camels were collected and analyzed at Qassim University's teaching hospital.

RESULTS:

The results showed that male camel infertility can take three forms: post-coital infertility (IG), inability to copulate (IC), and lack of sexual desire (LSD). IG is primarily a testicular disorder associated with a poor seminogram, stalled spermatogenesis, Sertoli cell-only syndrome, and testicular degeneration. The gold standard for IG diagnosis is sperm analysis, testicular biopsy, and fine-needle aspiration. In general, testicular ultrasonography was ineffective. High serum FSH levels were discovered in IG camels with oligo- and azoospermia, indicating primary spermatogenesis defects. The testis-expressed protein (TEX101) and the epididymis-expressed protein (ECM1) are reliable biomarkers for differentiating obstructive azoospermia from non-obstructive azoospermia. IC manifests in two ways: phimosis (PHI) and erectile dysfunction (ED). Preputial and penile pathologies, as well as leucocytosis, neutrophilia, and elevated nitric oxide metabolites, are frequently associated with PHI. The majority of ED camels have normal genital organs, and the condition is linked to an increase in cardiac troponin I. LSD is a rare disorder caused by hormonal imbalances, extreme heat, stress, and debilitating diseases.

CONCLUSION:

IG diagnosis requires sperm analysis, testicular biopsy or fine-needle aspiration, and FSH testing, whereas IC diagnosis necessitates preputial and penile examinations. Serum and seminal biomarkers are examples of diagnostic aids.

KEYWORDS

Male dromedary, Infertility, Etiology, Diagnosis

CITATION

Ali, A., Derar, D.R. and Almundarij, T.I. (2023). Male camel infertility: An overview of causes and diagnosis options. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Optimization and Validation of A Linear Appraisal Scoring System for Physical Fitness-Linked Zoometric Traits in Dromedary Camels

Carlos Iglesias Pastrana^{1,*}, Francisco Javier Navas González¹, Taher Kamal Sayed Osman², Elena Ciani³ and Juan Vicente Delgado Bermejo¹

¹Department of Genetics, Faculty of Veterinary Sciences, University of Cordoba, Cordoba, Spain

²Salam Veterinary Group, Kingdom of Saudi Arabia

³Department of Biosciences, Biotechnologies and Environment, University of Bari ‘Aldo Moro’, Bari, Italy

*ciglesiaspastrana@gmail.com

AIM:

The present study is intended to optimize a protocol implemented for the linear appraisal of dromedary camels (n=130) that are reared in single-sex herds for different functional purposes (milk production and leisure riding). Further, the replicability of the linear trait data as their potential to predict for physical fitness-related zoometric variability in this animal species is evaluated to validate such protocol.

INTRODUCTION:

Analogously to the development of alternative efficient techniques for extracting zoometric measurements of live individuals from images, it may exist the possibility to validate and optimize reliable linear appraisal scales that would allow describing the biological range for zoometric measurements across the population. Thereby, the tasks aimed at the morphological evaluation of large animal samples with a view to the selection of elite individuals for breeding, would be speeded up at the same time that the efficiency of human and economic resources improved.

METHODS:

The optimization and validation of the scale had two phases: reduction of scale dimensionality (PCA, Principal Component Analysis) and evaluation of the correlation (ICC, Intraclass Correlation Coefficient) between zoometric measurements and correspondent scale scores (1-5).

RESULTS:

All the zoometric variables considered were maintained since they all have explanatory potential of the variability present in the sample. However, a lack statistically significant representativeness across the five levels of the linear appraisal scale were found for some zoometric variables. In regards of the resemblance between linear appraisal and on-field zoometrics, apical body regions, which are more susceptible to continuous movement during animal evaluation, displayed the lesser values (ICC<0.5).

CONCLUSION:

A proposal for the optimization of the scale goes through the numerical reduction of the initially proposed linear categories for the variables given the fact that there is not enough representativeness in some categorical scores.

KEYWORDS

Scale dimensionality reduction, Inter-method agreement, Morphological trait, Phenotype assessment, Camel

CITATION

Pastrana, C.I., González, F.J.N., Osman, T.K.S., Ciani, E. and Bermejo, J.V.D. (2023). Optimization and validation of a linear appraisal scoring system for physical fitness-linked zoometric traits in dromedary camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

The Effects of Different Energy Levels on Performance and Forage Utilization by Grazing Camels During the Drought Season

Ahmed R. Askar^{1,*}, Khalid Z. Kewan¹ and Sami Abo Ragab²

¹ Animal and Poultry Nutrition Department, Desert Research Center, Cairo, Egypt

² Economic and Social Department, Desert Research Center, Cairo, Egypt

* ahmed_askar@yahoo.com; ahmed.askar71@gmail.com

AIM:

To evaluate the natural arid-area rangelands utilization with or without concentrate supplement during the drought season.

INTRODUCTION:

In North West Coast of Egypt, arid-area rangelands are the main source of feeding for grazing camels. A long drought season is taking place (August-December) in which the shortage of rains and forage is dominated.

METHODS:

Eighteen non-productive she-camels (8-10 years old) were chosen from a herd of 120 and marked for identification before being herded with the rest of the herd. Animals were divided into three treatments in which the concentrate supplement was individually given before grazing at 0% (control), 50% (low), and 100% (high) of the metabolizable energy requirements used for maintenance. The entire herd was daily grazing (08:00 - 18:00 h), which is dominated by *Ababasis articulata*. Energy expenditure was estimated by heart rate monitors after being calibrated by the face mask open-circuit respiratory system.

RESULTS:

Adding supplementary feeding alleviate the animal's deterioration by reducing the weight loss from -1049 g/ day (control) to -558 or -192 g/ day for low or high supplementation level, respectively. Increasing supplementation level had a positive effect on dry and organic matter digestibility but it negatively affected fibre fraction digestibility, which coincided with the drop in forage intake. Global Positioning System data revealed that increasing supplementation level significantly reduced the grazing activity related to the distance travel in which camels were walking 13.2 km instead of 25.2 km daily in search of feeds when they supplemented with high vs. zero concentrate level. The results of energy expenditure are going on the same trend as the distance travelled data.

CONCLUSION:

The nutritive value of the natural rangelands is low in the drought season and that concentrate supplement rich in protein is essential to maintain grazing camels without deterioration in natural arid-area rangelands.

KEYWORDS

Arid-area rangeland, Grazing, Forage utilization, Drought

CITATION

Askar, A.R., Kewan, K.Z. and Abo Ragab, S. (2023). The Effects of different energy levels on performance and forage utilization by grazing camels during the drought season. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

The Illumina® Agricultural Greater Good Initiative: Development of a Medium-Density SNP Chip for Camels

Bruno, S.¹, Senczuk, G.², Landi, V.³, Di Civita, M.², Brooks, S.⁴, Almathen, F.^{5,6}, Faye, B.⁷, Gaouar, SBS⁸, Piro, M.⁹, Kim, K.-S.¹⁰, Dadi, H.¹¹, Iglesias Pastrana, C.¹², Al-Haddad, H.¹³, Al-Abri, M.¹⁴, David, X.¹⁵, Eggen, A.¹⁵, Burger, P.¹⁶, Ciani, E.^{1*}

¹ Department of Biosciences, Biotechnologies and Environment, University of Bari “Aldo Moro”, Bari, Italy

² Department of Agricultural, Environmental and Food Sciences, University of Molise, Campobasso, Italy

³ Department of Veterinary Medicine, University of Bari “Aldo Moro”, Valenzano, BA, Italy

⁴ Department of Animal Sciences, University of Florida, Gainesville, FL, USA

⁵ Department of Public Health, College of Veterinary Medicine, King Faisal University, Al Hufuf, Al-Ahsa, Saudi Arabia

⁶ Camel Research Center, King Faisal University, Al Hufuf, Al-Ahsa, Saudi Arabia

⁷ CIRAD-ES, UMR SELMET, Montpellier, France

⁸ Department of Biology, Abou Bakr Belkaid University of Tlemcen, Algeria

⁹ Department of Medicine, Surgery and Reproduction, Institut Agronomique et Vétérinaire Hassan II, Rabat, Morocco

¹⁰ Department of Animal Sciences, Chungbuk National University, Chungbuk, South Korea

¹¹ Ethiopian Biotechnology Institute (EBTi), Addis Ababa, Ethiopia

¹² Department of Genetics, Faculty of Veterinary Sciences, University of Córdoba, Córdoba, Spain

¹³ Department of Biological Sciences, Kuwait University, Kuwait City, Kuwait

¹⁴ Department of Animal and Veterinary Sciences, Sultan Qaboos University, Muscat, Oman

¹⁵ Illumina, Agrigenomics, Evry Cedex, France

¹⁶ Research Institute of Wildlife Ecology, Vetmeduni, Vienna, Austria

* elena.ciani@uniba.it

AIM:

The 11th Illumina® Agricultural Greater Good Initiative focused on the design of a medium-density SNP chip for dromedaries.

METHODS:

The Illumina® NovaSeq technology was used to whole genome sequence 192 dromedaries from 19 countries with an average coverage of 30X. In addition, 22 publicly available dromedary whole genomes were added to the dataset. Raw data were analysed through the DRAGEN Germline Pipeline, using CamDro3 as reference genome (Genebank: GCA_000803125.3). The quality control was performed by PLINK software and, overall, 179 samples and 641,741 Single Nucleotide Polymorphisms (SNPs) passed the check. The performance of the 61K selected SNPs to be included in the array was assessed (i) by comparing the 61K patterns of genetic structure among the 179 samples with those generated, on the same animals, using a higher-density dataset (505K), and (ii) through polymorphism analysis of the 61K SNPs in 179 novel whole genomes from seven countries (including four additional ones). The technical validation of the SNP chip, based on SNP genotyping, is currently ongoing.

RESULTS:

The final SNP array design was composed by 61K biallelic loci including (i) 59K SNPs on autosomes, with an average distance of 32 kbps, and (ii) 1230 SNPs on chromosome X, both sets having minor allele frequencies ≥ 0.1 ; (iii) 77 SNPs on the mitochondrial genome, with an average distance of 200 bps; (iv) 832 SNPs from 47 genes with known functional relevance in other livestock species. The in-silico performance analyses confirmed the effectiveness of the tool.

CONCLUSION:

The SNP chip has already been manufactured by Illumina® and will be released in Q1 2023. Its adoption will contribute boosting genetic diversity and genome-wide association studies, as well as gene/genome-assisted selective breeding in this species.

KEYWORDS

Camelus dromedarius, Whole-genome sequences, Single Nucleotide Polymorphisms, SNP chip

CITATION

Bruno, S., Senczuk, G., Landi, V., Di Civita, M., Brooks, S., Almathen, F., Faye, B., Gaouar, S.B.S., Piro, M., Kim, K.-S., Dadi, H., Iglesias Pastrana, C., Al-Haddad, H., Al-Abri, M., David, X., Eggen, A., Burger, P. and Ciani, E. (2023). The Illumina® agricultural greater good initiative: Development of a medium-density SNP chip for camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Toll-Like Receptor 2 Gene Variations in Lassi and Mareecha Camel Populations of Pakistan

Tanveer Hussain^{*1}, Shahbaz Hyder², Masroor Ellahi Babar³, Abdul Wajid⁴, Ayesha Mohiuddin², Goher Ayub² and Muhammad A. Awan¹

¹Department of Molecular Biology, Virtual University of Pakistan, Rawalpindi, 46300

²Department of Biotechnology, Virtual University of Pakistan, Lahore, 54590

³The University of Agriculture, Dera Ismail Khan, Pakistan, 29111

⁴Department of Biotechnology, Baluchistan University of Information Technically, Engineering and Management Sciences, Quetta, Pakistan, 95150

* tanveer.hussain@vu.edu.pk

AIM:

The Camel (*Camelus dromedarius*) has acquired special characteristics to live in the harsh environments. Camel is thought to be less prone to many diseases that may be attributed to the immune system that detects a variety of pathogens and initiates suitable immune responses. Therefore, two famous camel populations of Pakistan were investigated for immune function Toll-like receptor (TLR) 2 gene.

INTRODUCTION:

The family of receptors vital for the immune function TLR has an important role in the early detection of pathogen-associated molecular patterns and the successive activation of the adaptive immune response. The present study was designed to explore the polymorphism in TLR2 gene in local Pakistani camels.

METHODS:

The 40 DNA samples from Lassi and Mareecha (20 each) camel populations of Pakistan were sequencing and data was analyzed using various bioinformatics software.

RESULTS:

The sequence editing showed 16 variable sites including 68% non-synonymous and 31% synonymous in TLR2 gene in Lassi population. While in Mareecha, 15 polymorphisms were identified out of which 60% were non-synonymous and 40% were synonymous. Four polymorphic sites at amino acid (aa) position 161 (in Lassi), 5, 146, and 196 (in Mareecha) were presumed to have possible damaging effect. Overall, 90% of the variations were detected in the leucine-rich repeats (LRR) of extracellular domain, region responsible for ligand binding. The changes in LRR region may have biological consequence for considering the possible association with infectious agents. A variation was identified in both TIR and ECD domains, and these domains showed maximum sequence similarity as compared to extracellular domain leading to have conserved function for intracellular signaling.

CONCLUSION:

In conclusion, the polymorphisms in TLR2 gene in Lassi and Mareecha camel populations may be used as molecular marker for disease resistance by selective breeding and will be helpful in future studies on the Camel disease resistance.

KEYWORDS

Toll-Like Receptor 2, Sequence variations, Lassi and Mareecha, dromedary camel, Pakistan

CITATION

Hussain, T., Hyder, S., Babar, M.E., Abdul Wajid, Mohiuddin, A., Ayub, G. and Awan, M.A. (2023). Toll-Like receptor 2 gene variations in lassi and mareecha camel populations of pakistan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Three-Dimensional Structure of Camel Lipase Predicted by Homology Modeling Method

Hatem Belguith^{1,2} and Imen Glaied²

¹ Faculté des Sciences de Bizerte, Carthage University, Tunisia.

² Bioresources, Environment and Biotechnology Laboratory, Institut Supérieur des Sciences Biologiques appliquées de Tunis (ISSBAT), El-Manar University, Tunisia

AIM:

The present work aimed to predict by homology modeling method the 3D structure of camel lipase.

INTRODUCTION:

Lipases (triacylglycerolacylhydrolases, EC 3.1.1.3) are enzymes that catalyze the hydrolysis of ester bonds in triacylglycerides (TAGs), to generate glycerol and free fatty acids. In many lipases, a flexible hydrophobic ‘lid’ formed by an α -helix stretch covers the active site, which is released upon adsorption of the enzyme to the interface, thus allowing the access of the substrate.

METHODS:

Modeling the 3-D proteins structure gives us valuable information about the molecular organization, function, docking simulations, and effective drug designing experiments. In the present work, we have predicted the camel triacylglycerol lipase 3D structure using the template homology modeling (threading).

RESULTS AND CONCLUSION:

The obtained model was then assessed for stereochemical quality and side chain environment. The structure of camel lipase shows a typical alpha/beta hydrolase fold containing α -helix and β -sheets. The catalytic center of this enzyme is analogous to those of other GxSxG-motif lipase family and serine proteases. Apart from the serine residue within this motif, the other members of the catalytic triad characteristic of all true lipases can be found at positions 407 (Asp) and 475 (His) in the deduced amino acid sequence. We have docked some specific substrates against it.

KEYWORDS

Camel lipase, Homology modeling, Docking

CITATION

Belguith, H. and Glaied, I. (2023). Three-dimensional structure of camel lipase predicted by homology modeling method. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Management System on Reproductive Performance, Hormonal and Blood Biochemical Changes in Non-Pregnant Sudanese Dromedary Camels

Eglal E.S.^{1,2}, Abdoon A.S.², Makkawi A.¹ Sid-Ahmed S.¹ and Nesreen A.A.³

¹ College of Agriculture Studies, Department of Animal Production, Sudan University of Science and Technology, Khartoum, North- Shambat P.O Box: 407.

² Department of Animal Reproduction, Veterinary Research Division, National Research Centre, Tahrir St., Dokki 12622, Cairo–Egypt.

³ College of Animal production, Department of Animal Production, Sudan University of Science and Technology

*eglal_elkhider@yahoo.com

AIM:

This study was conducted to determine the effect of nomadic or intensive management system on hormonal and biochemical changes in non-pregnant, pregnant and postpartum Sudanese dromedary camel, in addition to effect on reproductive performance of non-pregnant camel.

INTRODUCTION:

The nomadic system in which camel herds were raised in Butana area, Sudan, which lies between Latitude 13 40' and 17 50' North and Longitude 32 40' and 36 00' East. Its climate is tropical continental climate and the temperature ranged between 32oC to 46oC. Camels were fed on Acacia shrub and short grasslands. The intensive system, in which camel farms located in Khartoum which lies between 15.5518°N latitude and 32.5324°E longitude. The climate is hot dry from April to June and September to October. At Khartoum camel farms the animals were fed on green fodder and concentrate ration, while, water was available the whole day. The study was conducted during the period from January 2014 to January 2016.

METHODS:

This experiment was conducted on 23 mature female dromedary camels kept at Butana area and representing the nomadic camel management system, and 17 mature female dromedary camel kept at a private camel farm at Khartoum and representing the intensive management system. In both groups, reproductive performance, blood biochemical and hormonal levels were examined for non-pregnant camels under nomadic or intensive management system by using BIOMERIEUX diagnostic kits (France).

RESULTS:

Results of experiment indicated that duration of estrus was significantly shorter, also, number of follicular cycles/breeding season were larger, while, longevity of female was higher dromedary camel kept under intensive than nomadic management system. Serum total protein, albumin, globulin, blood urea nitrogen, uric acid and cholesterol concentrations were significantly higher in non-pregnant dromedary camels kept under nomadic than intensive management system, however, T4 values were higher in intensive than nomadic system.

CONCLUSION:

It could be concluded that management systems could affect the reproductive performance, hormonal and biochemical levels of nonpregnant dromedary camel and also hormonal.

KEYWORDS

Sudanese camel, Intensive or Nomadic system, Reproductive status, Hormone, Blood biochemistry

CITATION

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

From Genome to Functional Products: A Research Status of Bactrian Camel

Ming Liang¹, Khosbileg², Tuyatsetseg Jambal³ and Jirimutu^{1,*}

¹ College of Food Science and Engineering, Inner Mongolia Agricultural University, Hohhot 010018, China;

² Inner Mongolia Gobi Red Camel Biotechnology Co., Ltd., Bayannuur, Inner Mongolia, 015500, China;

³ China-Mongolia joint laboratory for biomacromolecule Research, Ulaanbaatar, 17043, Mongolia

*yeluotuo1999@vip.163.com

AIM:

This review covers the research of Bactrian camel genome and camel milk, meat and their products, which will provide a theoretical reference for a comprehensive understanding of the unique biological characteristics, genetic improvement and development of functional food of Bactrian camels.

INTRODUCTION:

Bactrian camel is an important animal species in the Gobi Desert of Central Asia, and are rich in resources and have unique traits such as cold and hot resistance, anti-starvation, and strong immune system, which have aroused the interest of scholars to conduct in-depth research on them. Meanwhile, bactrian camels are unique in their morphological and physiological characteristics and are capable of providing milk and meat even under extreme environmental conditions. Like other species, the bactrian camel has also benefited from the development of the molecular genetics and development of the functional foods to increase the knowledge about different aspect in camel genetics, camel milk and camel meat.

METHODS:

More than 100 research papers related to camel genome and its products were collected and summarized.

RESULTS:

Our research described the characteristics of different domestic Bactrian camel breeds, summarized the research status of the whole genome, reviewed the origin and evolution, introduced desert adaptation and immune-related functional genes of Bactrian camels, as well as briefly analyzed the functional characteristics of camel milk, meat and their products.

CONCLUSION:

Throughout the history of human history, Bactrian camels have played an irreplaceable role in transportation, trade, war, farming, cultural exchange and other aspects, greatly promoting the exchange of human civilization and social progress. Here we discussed the research of Bactrian camel genome and its products. In the future, more extensive studies should be performed on the camel milk and meat to better understand the impacts on human body.

KEYWORDS

Bactrian camel; breed characteristics; functional genome; camel milk and meat

CITATION

Liang, M., Khosbileg, Jambal, T. and Jirimutu. (2023). From genome to functional products: A research status of bactrian camel. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Nanobody Based Indirect Competitive ELISA for Aflatoxin M1 in Dairy Products

Yili^{1,2,3}, Haiyuan Liu¹, Yingda Liu¹ and Jirimutu^{1,2,*}

¹ Key Laboratory of Dairy Biotechnology and Engineering, Ministry of Education, College of Food Science and Engineering, Inner Mongolia Agricultural University, Hohhot, Inner Mongolia 010018, China

² Inner Mongolia Institute of Camel Research, West Alax, Inner Mongolia, 737399, China

³ Laboratory of Medical Biochemistry, University of Antwerp, Antwerp, 2610, Belgium

* yeluo1999@vip.163.com

AIM:

This study aimed to report a highly sensitive indirect competitive enzyme-linked immunosorbent (ic-ELISA) assay based on specific nanobody to detect aflatoxin M1 in dairy products.

INTRODUCTION:

Aflatoxin M1 (AFM1) is a product of the hydroxylated metabolism of aflatoxin B1, which has mutagenic and teratogenic effects on humans, particularly infants. Several studies have documented extensive occurrence of AFM1 extensively contaminates dairy products. Thus, it is rather essential to develop rapid detection methods for protecting consumption safety so as to detect the ultra-trace-level contamination in dairy products as early as possible.

METHODS:

The anti-AFM1 nanobody (VHH-M4) was selected from an immunized Bactrian camel VHH phage display library. Then, a sensitive indirect competitive enzyme-linked immunosorbent assay (ic-ELISA) for AFM1, based on the VHH-M4 with great thermostability and methanol solvent tolerance, was established under optimized conditions.

RESULTS:

VHH-M4 shows outstanding features in specificity and sensitivity, the IC50 is 0.338 ng/mL and exhibit almost no cross-reactivity with other aflatoxin analogs. Compared anti-AFM1 monoclonal antibody 1E6, VHH-M4 retained binding activity after exposure to 90°C for 10 min. The results revealed a linear range from 0.168 ng/mL to 0.679 ng/mL, with a limit of detection (LOD) of 0.051 ng/mL. The recovery of spiked samples (milk, milk powder and yoghurt) ranged from 88.44-104.88%.

CONCLUSION:

The results indicated that VHH-M4 is an ideal candidate for application in immunoassay assays for the determination of AFM1 and has potential for biosensor development.

KEYWORDS

Nanobody; Aflatoxin M1; ELISA; Dairy products

CITATION

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“The Role of Camel in Food Security and Economic Development”

Ovulation Induction in Dromedary she – Camels by Using two Different Protocols During Non-Breeding Season

A.aziz Makkawi¹, Nesreen Abd alrasoul², Duria Alhag,³ and Tsabeh Hussien Hashem¹

¹ Department of Animal Production-College of Agricultural Studies-Sudan University of Science and Technology

² College of Animal Production - Sudan University of Science and Technology

³ Safari Institute for Animal Reproductive Technology.

* azizmakkawy@yahoo.com

AIM:

The aim of this study is to compare the effect of two hormonal protocols in ovulation induction in dromedary she- camel (*Camelus dromedarius*) during non breeding season.

INTRODUCTION:

The reproductive efficiency of camels under their natural pastoral conditions is low. The reasons for this low reproductive efficiency include the short breeding season, the late age of reaching puberty and the long gestation period. For this reason the introduction of controlled breeding programs is very important and use of reproductive technologies such as artificial insemination, embryo transfer, synchronization and ovulation induction in this species are very effective to increase reproductively (Cooper et al - 1992).

METHODS:

A number of eleven she – camels with varying age (6 – 17 years) and average body weight from (250 – 350 kg) and one male used for mating was selected for this experiment. The experimental animals were divided into three groups: Group (A) as control group (N =3); while the treated group (B) (N = 3) was intravenously injected with (1500 IU) HCG and group (C), (N= 5) was intravenously injected with (1000 IU) of Folligon (PMSG). The ovarian activity and the characteristic of ovarian follicular dynamic were monitored by ultrasonographic equipment, equipped linear array transducer with frequency ranges of 5 to 7.5 MHz producing rectangular shaped images.

RESULTS:

The result of this study showed that ovulation was observed in all experimental groups. The proportion of ovulation (4/5, 2/3, 1/3) 80%, 67 % 33% PMSG, control and HCG respectively. Results of the present study demonstrated that there is a significant difference ($P \leq 0.05$) between HCG , PMSG and control group in induction of ovulation in dromedary she – camel during non breeding season. Also there were significant difference ($P \leq 0.05$) in the number and size of ovarian follicle in left and right ovaries of the experimental animals. The PMSG group ovulation occurred after 48 h post injection while in the HCG group the ovulation occurred after 5 days post injection and in control group ovulation occurred in the right ovary 48 h after mating.

CONCLUSION:

The study concluded that for ovulation to occur the size of the mature ovarian follicle should reach size of 0.7 – 3cm. Concerning the tow treated groups, both protocols of hormonal injection expressed better results than the control group.

KEYWORDS

HCG , PMSG, Ultrasonographic equipment, ovulation, Follicular size

CITATION

A. Makkawi, A., Abd alrasoul, N., Alhag, D. and Hashem, T.H. (2023). Ovulation induction in dromedary she – camels by using two different protocols during non-breeding season. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Use of Hormones and Ultrasonic for Assessment of Ovarian Activity and Uterine Condition of she Camels (*Camelus Dromedaries*) During Early Pregnancy Stages (Non-Breeding Season)

Nesreen Abd alrasoul

Department of Animal Production-College of Animal production-Sudan University of Science and Technology
nesreenalheber10@gmail.com

AIM:

This study was carried out to assess the ovarian activity and determination the fetus position in the uterus horn (Right or Left).

METHODS:

This study was conducted in the camel research center (CRC) (Shambat, University of Khartoum) to assess the ovarian activity, the characteristic of ovarian follicular dynamic and determination of the fetus position in each uterus horn (Right or Left). Location of Follicles after inducing ovulation by using (PMSG, HCG) hormones in each ovary (Right or Left), site of C.L after fertilization in each ovary (Right or Left) and calibration of pregnancy rate in dromedary camels (*Camelus dromedarius*) during non-breeding season. Eleven females and one male experimental animals were use in this study (aged between 5 - 17) years and average of body weight (250- 350 kg) during non-breeding season (March to August 2017), divided into three groups: group (A) control group (N=3), group (B) (N = 3) intravenous injection with (1500 IU) HCG group (C), (N= 5) were intravenous of injected with (1000 IU) of Folligon (PMSG).. Ovulation was observed in all experimental groups. The confirmation of the ovulation, ovarian follicular dynamic, position of follicles and fetus after the fertilization (20days before implantation) and C.L in each ovary were done by ultrasonographic examination. The ovarian activity and the characteristic of ovarian follicular dynamic were monitored by ultrasonographic equipment, equipped linear array transducer with frequency ranges of 5 to 7.5 MHz producing rectangular shaped images. Camels were ultrasonographically examined in standing or sitting posit.

RESULTS:

The results showed that significant ($P \leq 0.05$) differences in the number and size of the ovarian follicles in the left and right ovaries before and after hormonal injection. The result of this investigation also showed that there were significant ($P \leq 0.05$) differences between the right and left ovaries activity before, after hormone injected and in natural estrus. Before hormone of treatment the proportion of activity of ovaries was 28.5% for right, 0% for left and after the treatment was 57.5% for right, 15% for left. While the right and left activity in natural estrus ovaries proportion were 100, 33.5% respectively. Also the present study indicated that there were significant ($P \leq 0.05$) differences between the right and left ovaries inactivity before, after the hormonal treatment and in natural estrus. Before and after the hormone treatment the proportion of inactivity of right and left ovaries were 71.5, 100, 42.5, 85% respectively. While the right and left ovaries inactivity in natural estrus proportion was 0, 66.5 % respectively. The result of this study also reported the percentage of the fetuses and corpus leutei existed in both left horn and the right ovaries was (84.5%). This probably means that the fetus migration from the right horn to left horn might have happened. While the pregnancy and nonpregnancy proportions were 54.5, 45.5% respectively, and for pregnancy proportions between treated animal and natural estrus animal was 50, 50 % respectively.

CONCLUSION:

Although the right ovary is very active than the left ovary and most of ovulation occurred in the right ovary while most of pregnancies occurred in the left horn is quite evident that means the fetus migration from the right horn to left horn, this study also recommend more research on the phenomenon of camels pregnancies and their reproductive physiological activities.

KEYWORDS

Ultrasonic, Ovarian Activity, Utrine Condition, Ovulation

CITATION

Abd alrasoul, N. (2023). Use of hormones and Ultrasonic for assessment of ovarian activity and uterine condition of she camels (*Camelus dromedaries*) during early pregnancy stages (non-breeding season). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Acaricidal Activity of *Cymbopogon Schoenanthus* Whole Plant Extracts Against Larvae and Engorged Females of *Hyalomma Dromedarii* (Acari: Ixodidae) Under Laboratory Conditions

Maha Ahmed Eltigani^{1,*}, Omran Fadl Osman², Ilham Mohammed Osman³, Sakina Mohamed Ahmed Yagi² and Husna Mohmmmed Elbashier¹

¹ Tumbool Camel Research Centre, Gazira, Sudan.

² University of Khartoum, Faculty of Science, Khartoum, Sudan.

³ Central Veterinary Research Laboratories Center, Soba, Khartoum, Sudan.

* mahatigani23@gmail.com

AIM:

This study was conducted to evaluate the acaricidal activity of essential oils extracted from dried aerial parts of *Cymbopogon choenanthus* (lemon grass) using water, hexane and ethanol.

INTRODUCTION:

Ticks are hematophagous arthropods, notorious vectors of human and animal pathogens and constitute an emerging economic and health problem in tropical and sub-tropical regions. Selection of alternative safe and environmentally friendly herbal extracts for tick control is important mainly to replace or reduce reliance on chemical substances.

METHODS:

Essential oils extracted from dried Aerial parts of *Cymbopogon choenanthus* (lemon grass) using water, hexane and ethanol. Engorged *H. dromedarii* females ticks were collected from camels at Tumbool Camel Research Centre and reared in lab condition for oviposition and hatching, larvae one -two weeks-old were used for larval immersion test (LIT) for the three extracts for 48 hours and the rest of larvae fed on clean, healthy goats using ear bags for colony. Engorged females ticks of the colony were used to test a dulticidal activity of three extracts used adult immersion test (AIT).

RESULTS:

The result showed that (oil, hexane and ethanol) *C. schoenanthus* extracts significantly affected on tick larvae. At all extracts used there was significant increase ($P \leq 0.05$) in mortality with increased concentration. The lower concentration that killed 50% and 99% of the larvae was 6.00 and 22.28 respectively of the hexane extract. A dulticidal activity of (oil, hexane and ethanol) *C. schoenanthus* extracts showed a significant effect ($P \leq 0.05$). High concentration of ethanol and hexane extracts (15%) and (30%) caused high mortality (100%) at 24 hours after treatment. Other effected of the other extracts (0.9375 & 3.75) included reduction of preoviposition, eggs weight, oviposition period, prehatch hatch period, hatchability and survival of females.

CONCLUSION:

Treatment of ticks and tick larvae in camels using *C. schoenanthus* extracts (oil, hexane and ethanol) was efficient and can be used to eradicate ticks infestation in camels.

KEYWORDS

H. dromedarii, *Cymbopogon schoenanthus*, acaricidal, +efficiency

CITATION

Eltigani, M.A., Osman, O.F., Osman, I.M., Yagi, S.M.A. and Elbashier, H.M. (2023). Acaricidal activity of *cymbopogon schoenanthus* whole plant extracts against larvae and engorged females of *hyalomma dromedarii* (acari: ixodidae) under laboratory conditions. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Biodiversity of Dromedary Camels and Hybrids in Kazakhstan

Akhmetsadykova Shynar.^{1,2}, E. Shertay¹, G. Konuspayeva^{2,3}, A. Torekhanov¹, K. Dossybayev^{1,3,4}, A. Kantay¹, E. Talzhanov¹, M. Ermakhanov⁵ and B. Faye⁶

¹ LLP «Kazakh Research Institute for Livestock and Fodder Production», horse and camel breeding department, 51, Zhandosov str., Almaty, 50035, Kazakhstan.

² Research and production enterprise “ANTIGEN” Co Ltd, biochemistry department, 4, Azerbayeva str., Abai v., Karasai district, 050409, Almaty region, Kazakhstan.

³ Al-Farabi Kazakh National University, Biotechnology department, 71 Al-Farabi avenue, 050040 Almaty, Kazakhstan.

⁴ Laboratory of Genetics and Cytogenetics, RSE “Institute of Genetics and Physiology” CS MES RK, Al-Farabi Avenue, 93, 050060, Almaty, Kazakhstan.

⁵ Southwest Research Institute of Animal Husbandry and Crop Production, 51, Esalieva str., Karatau district, 160021, Shymkent, Kazakhstan.

⁶ Agronomic research and international cooperation organization for the sustainable development of tropical and Mediterranean regions – CIRAD, Campus, International de Baillarguet, 34398, Montpellier, Cedex 5, France.

*shynar.akhmetsadykova@gmail.com

AIM:

To characterize biodiversity of dromedary camels and hybrids in Kazakhstan by description detailed phenotype and genotype parameters in order to have possibility to compare them with camels in the worldwide.

INTRODUCTION:

Studying the phenotype and genotype of pure breed camels and their hybrids by the latest methods will give an opportunity to develop each “breed standards” and detect genotypes with high productivity qualities.

METHODS:

Seventeen camel farms were visited, located in four different regions of Kazakhstan. In total, 484 female camels of Arvana breed and 98 hybrids (Nar-Maya hybrid (Crossbreed F1) and Kospak hybrid (crossbreed F2)) were described by the phenotype questionnaire including milk parameters data. The software used was XLstat (Addinsoft©, 2022). For the genotyping 347 Arvana camels and 98 hybrids’ DNA samples were taken. Genotyping was performed on GeneTitan MC tool and Plate with a wide range of Axiom genome for genotyping camels Axiom myDesign™ Massive plate with 196,000 SNP (Thermo Fisher Scientific).

RESULTS:

The Discriminating Factorial Analysis confirmed the clear separation between the breed based on their body measurements with a total of 95% of well-classed. The main discriminating parameters were in the order: (i) the length of the head, (ii) the neck length, (iii) the neck circumference, (iv) the teat length, and (v) the udder length. Genotyping records results are under the treatment by using different bioinformatical tools. Determination of population structure and phylogenetic tree presented considerable differences between studied populations.

CONCLUSION:

On the basis of expected and current scientific data, it will be possible to develop a “breeding strategy program” for each local camel population as well as to develop a genomic selection domain by designation of specific SNP markers for the native camel populations.

KEYWORDS

Dromedary camels, hybrids, phenotype, genotype, biodiversity

CITATION

Shynar, A., Shertay, E., Konuspayeva, G., Torekhanov, A., Dossybayev, K., Kantay, A., Talzhanov, E., Ermakhanov, M. and Faye, B. (2023). Biodiversity of dromedary camels and hybrids in Kazakhstan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Concentrate Proportion in Diet on Intake, Digestibility and Variations of Rumen Ph and Temperature in Fattening Camel

Mohamed Hammadi^{1*}, Fatma Abdelkebir^{1,2}, Andreia Castro-Costa³, Mabrouk-Mouldi Seddik¹, Mohamed Dbara¹, Touhami Khorchani¹ and Gerardo Caja³

¹ Laboratoire Elevage et Faune Sauvage, Institut des Régions Arides, Médenine, Université de Gabès, Tunisie

² Institut National Agronomique de Tunis, Institution de Recherche et d'Enseignement Supérieur Agricoles, Tunisie

³ * Group of Research in Ruminants (G2R), Department of Animal and Food Sciences, Universitat Autònoma de Barcelona, Bellaterra 08193, Spain

* mohamed.hammadi@ira.rnrt.tn

AIM:

This work aims to study the effect of the proportion of the concentrate on the intake and digestibility of the diet and the variations of the ruminal pH and temperature.

INTRODUCTION:

In arid regions, the diet of fattening camel calves is based on poor quality fodders. The incorporation of rich protein feed concentrates is often the solution to obtain satisfactory growth performance. However, the use of concentrate-based diets has been criticized for its consequences on ruminal pH and the development of subacute acidosis.

METHODS:

Eight Maghrebi camel calves (age: 24 ± 4 month, BW: 303 ± 37 kg) were divided into 2 groups and fed with 2 diets varying in forage-to-concentrate ratio (low concentrate (group 1) 70:30; high concentrate (group 2) 30:70). Rumen boluses (Kahne, Auckland, New Zealand) were inserted into the compartment 1 of calves to assess pH and temperature variations. Trial included two 21-day periods, during which the first 2 weeks were for adaptation and training animals for diets and measurements, and the third week was reserved for data collection.

RESULTS:

Intake dry and organic matters increased with the concentrate proportion (49.0 vs. 59.0 g/kg BW 0.75, $P = 0.0003$ and 46.0 vs. 54.0 g/kg BW 0.75, $P = 0.0005$, in group 1 and group 2, respectively). Dry and organic matter digestibilities were enhanced by the increasing of the concentrate proportion in the diet (58.4 vs. 66.4 g/kg BW 0.75, $P = 0.0007$ and 61.7 vs. 69.2 g/kg BW 0.75, $P = 0.0051$, in group 1 and group 2, respectively). However, water intake was not affected ($P = 0.5007$) by the proportion of concentrate (137 vs. 128 mL/kg BW 0.75, in group 1 and group 2, respectively). Rumen pH, which was maximal before feeding in the two groups, decreased after nourishing reaching a minimum value depending on the concentrate proportion (4.58 ± 0.07 at 6 h 15 min vs. 4.35 ± 0.07 at 6 h 45 min after the last feeding, in group 1 and group 2, respectively). Rumen temperature increased after feeding to reach a maximum value 38.16°C and 38.65°C , respectively in group 1 and group 2. Nevertheless, watering dropped the rumen temperature (-1°C) during 1 h 30 min after what it increased again to reach plateau after the last feeding.

CONCLUSION:

In conclusion, high proportion of concentrate in fattening camel calves could improve intake and diet digestibility, and bolus sensors proved to be a useful tool to monitor rumen pH and temperature as affected by feeding conditions.

KEYWORDS

Fattening camel, intake, digestibility, rumen sensor, pH and temperature

CITATION

Hammadi, M., Abdelkebir, F., Castro-Costa, A., Seddik, M.-M., Dbara, M., Khorchani, T. and Caja, G. (2023). Effect of concentrate proportion in diet on intake, digestibility and variations of rumen pH and temperature in fattening camel. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Female Dromedary Camel Infertility: Insights Into the Causal Link, Diagnostics and Management Strategies

Ahmed Ali^{1,2,*}, Derar R. Derar^{1,2} and Tariq I. Almundarij¹

¹ Department of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia

² Department of Theriogenology, Faculty of Veterinary Medicine, Assiut University, Egypt

* drahmedali77@gmail.com

AIM:

The study's goal was to identify the most common causes of reproductive problems in dromedary camels, as well as methods of detection and management.

METHODS:

Data were collected from infertile females examined at Qassim University's veterinary hospital.

RESULTS:

Data analysis revealed that the four major categories were congenital, functional, pathological, and management disorders. Ovarian agenesis, mesonephric duct segmental aplasia, endometrial agenesis, double cervix/vagina, imperforated hymen, vulvar atresia, and intersex are all congenital causes. Ovarian inactivity, overgrown follicles, and ovulation failure are all functional causes. Ovarian hydrobursitis, hydrosalpinx and pyosalpinx, clinical and subclinical endometritis, hydrometra and pyometra, vaginal and cervical adhesions, and neoplasms are all pathological causes. Mating errors, the use of traditional management systems, an incorrect herder/camel ratio, and insufficient managerial experience are all management causes. The main causes of female camel infertility are pathological lesions and management errors. There are several effective endometritis treatment protocols available, each with a favorable prognosis.

CONCLUSION:

It could be concluded that the ovarian hydrobursitis and vaginal adhesion are serious conditions that necessitate appropriate preventive measures due to the difficulty of treatment and the poor prognosis. Improved management practices are required to boost the reproductive efficiency of dromedary herds.

KEYWORDS

Infertility, female dromedary, diagnosis, management

CITATION

Ali1, A., Derar, D.R. and Almundarij, T.I. (2023). Female dromedary camel infertility: Insights into the causal link, diagnostics and management strategies. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Phenotypic and Genotypic Characterization of Kazakhstani Bactrian Camels

Akhmetsadykova Shynar.^{1,2}, E.Sher tay¹, G. Konuspayeva^{2,3}, A. Torekhanov¹, K. Dossybayev^{1,3,4}, A. Kantay¹, E. Talzhanov¹, N. Alibayev⁵ and B. Faye⁶

¹ LLP «Kazakh Research Institute for Livestock and Fodder Production», horse and camel breeding department, 51, Zhandosov str., Almaty, 50035, Kazakhstan.

² Research and production enterprise “ANTIGEN” Co Ltd, biochemistry department, 4, Azerbayeva str., Abai v., Karasai district, Almaty region, 050409, Kazakhstan.

³ Al-Farabi Kazakh National University, Biotechnology department, 71 Al-Farabi avenue, 050040 Almaty, Kazakhstan.

⁴ Laboratory of Genetics and Cytogenetics, RSE “Institute of Genetics and Physiology” CS MES RK, Al-Farabi Avenue, 93, Almaty 050060,

⁵ Southwest Research Institute of Animal Husbandry and Crop Production, 51, Esaliev str., Karatau district, 160021, Shymkent, Kazakhstan.

⁶ Agronomic research and international cooperation organization for the sustainable development of tropical and Mediterranean regions – CIRAD, Campus International de Baillarguet, 34398 – Montpellier, Cedex 5, France.

* Corresponding author: shynar.akhmetsadykova@gmail.com

AIM:

To conduct a comprehensive study of the phenotypic traits of Bactrian camels and the genome-wide association study by using detailed phenotypic records and SNP markers.

INTRODUCTION:

Bactrians are present approximately 90% of the total camel population in Kazakhstan. Phenotype data of local camels are mostly published during the Soviet Union time and described few body quantitative measurements. The genome-wide SNP investigation has not been done on native camel populations yet. Literature sources are not sufficient to describe the biodiversity of the local populations due to the absence of synchronized phenotype and genotype data.

METHODS:

Phenotypic description of 107 Bactrians from one farm in the West Kazakhstan was performed according to Faye et al. (2012). The software XLstat was used for data analysis. Blood samples were collected for the DNA isolation. Genotyping was performed on GeneTitan MC tool and Plate with a wide range of Axiom genome for genotyping camels Axiom myDesign™ Massive plate with 196,000 SNP.

RESULTS:

Average phenotypic data were determined (cm): head length 44,7±3.07; length of front-leg 143 ±12.5; length of neck 118,4±9,4; neck circumference 86±5; length of left front teat 3±1,04; length of the udder 38,4±5,7; height of animals 181,2±10,5; body length 185 ±12,7; girth circumference 211±22; thigh circumference 76,3±7,4. Genotyped data analysis is under processing by using different bioinformatic tools. The quality control of SNP was performed with Plink software and unmapped, sex chromosome and MT SNPs were excluded. The genetic relationships within populations, genetic diversity and variability, genomic inbreeding rate and genome-wide association study will be carried out further.

CONCLUSION:

The genome-wide association study will make it possible to improve breeding methods, assessment of genomic breeding value and genomic selection, designation of specific SNP markers for the native camel populations, also to preserve the genetic diversity of camels.

KEYWORDS

Bactrians, phenotype, genotype, biodiversity

CITATION

Shynar, A., Shertay, E., Konuspayeva, G., Torekhanov, A., Dossybayev, K., Kantay, A., Talzhanov, E., Alibayev, N. and Faye, B. (2023). Phenotypic and genotypic characterization of kazakhstani bactrian camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Prediction of Gestational Age in Dromedary Camels

Ahmed Ali^{1,2,*}, Refaat Derar Derar^{1,2}, Fahd A. Al-Sobyil¹ and Omar El-Tookhy³

¹Department of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia

²Department of Theriogenology, Faculty of Veterinary Medicine, Assiut University, Egypt

³Department of Surgery, Faculty of Veterinary Medicine, Cairo University, Egypt

*drahmedali77@gmail.com

AIM:

The aim of this study was to achieve high accuracy in estimating gestational age in dromedary camels.

METHODS:

Pregnant dromedary camels (n=7) were subjected to serial ultrasonographic examinations between the second and 54th weeks of pregnancy. Intrauterine fluid accumulation was discovered between the second and third weeks of pregnancy.

RESULTS:

The embryo was discovered between the third and fourth weeks of pregnancy. The embryo's organization was first observed between the sixth and seventh weeks. Ossification was discovered between the seventh and ninth weeks. During the entire gestational period, crown-rump length was 10.6% accessible, biparietal diameter was 10.6% accessible, abdominal diameter was 12.8% accessible, ruminal length was 12.8% accessible, and eyeball diameter was 38.3% accessible. The regressions of various fetal measurements on gestational age are presented, along with the corresponding predictive equations. Each of the studied parameters had a high correlation with gestational age ($P < 0.0001$). During the first trimester, the greatest correlation was found with crown-rump length and biparietal diameter, and during the third trimester, with eyeball diameter.

CONCLUSION:

It is concluded that sonographic fetometry can be used to estimate gestational age in dromedary camels.

KEYWORDS

Gestation, duration, prediction, dromedary camels, ultrasonography

CITATION

Ali, A., Derar, R.D., Al-Sobyil, F.A. and El-Tookhy, O. (2023). Prediction of gestational age in dromedary camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

The Effect of Flaxseed on Milk Quality and Unsaturated Fatty Acids of Dairy Camels

Taherah Mohammadabadi

¹ Professor, Faculty of Animal Science and Food Technology, Agricultural Sciences and Natural Resources University, Iran

* t.mohammadabadi.t@gmail.com

AIM:

This study was conducted to investigate the effect of supplementing flaxseed on the milk production and composition of dairy camels.

INTRODUCTION:

Flaxseed contains high fat and protein that increases the proportion of omega-3 fatty acids in milk fat with beneficial effects on the heart health.

METHODS:

Ten lactating camels with average body weight of 450 kg fed treatments of control and 300 g flaxseed per day for 40 days. The camels had access to the desert plants and fed 1 kg barely/day. The flaxseed seeds were crushed and fed to the camels every morning before going to the desert. Milk production was recorded on daily basis, and milk composition and fatty acids were determined. The data were analyzed as a completely randomized design.

RESULTS:

The result indicated using of flaxseed increased ($P<0.05$) milk production of the camels in compared to the control (7.3 and 4.4 liter/day, respectively). Supplementation of flaxseed increased milk fat percentage (4.4 and 3.5%, respectively) ($P<0.05$). But milk protein, lactose and ash were not influenced by treatments ($P>0.05$). Inclusion of flaxseeds in camels diet decreased saturated fatty acids and increased unsaturated fatty acids ($P<0.05$). The C18:3 value was 0.97 and 1.46 % and CLA was 0.25 and 0.41% for control and flaxseed treatment, respectively.

CONCLUSION:

The current study revealed that supplementation of flaxseed to dairy camels' increased milk production and unsaturated fatty acids. Therefore, its recommended inclusion of 300 g flaxseed /day in diet of dairy camels' for increasing of the milk production and quality toward heart health.

KEYWORDS

Camel milk, flaxseed, milk fatty acids

CITATION

Mohammadabadi, T. (2023). The effect of flaxseed on milk quality and unsaturated fatty acids of dairy camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Preventive Effect and Mechanism of Camel Whey Protein on Liver Injury Induced by Heat Stress

Donghua Du^{1,2} and Surong Hasi^{1,*}

¹ Key Laboratory of Clinical Diagnosis and Treatment Technology in Animal Disease/Ministry of Agriculture and Rural Affairs; College of Veterinary Medicine, Inner Mongolia Agricultural University, Hohhot, 010018, China.

² Department of Veterinary Medicine, College of Animal Science and Technology, Hebei North University, Zhangjiakou, 075131, Hebei, China.

* surong@imau.edu.cn

AIM:

This study aimed to investigate the effect and mechanism of rats supplemented with camel whey protein (CWP) to resist heat stress (HS)-induced liver injury.

INTRODUCTION:

Liver damage is the most severe complication of HS. Dietary supplementation of CWP has been shown to alleviate HS-induced tissue damage. However, whether and how CWP can reduce HS-induced liver injury remains unclear. Thus, we evaluated the ability of rats supplemented with CWP to resist HS-induced liver injury.

METHODS:

SD rats were administered CWP by oral gavage before being exposed to HS. Histological changes, inflammation, apoptosis, biomarkers for liver function, the activities of several antioxidant enzymes, and the expression of related proteins in the livers of the heat stressed rats were analysed.

RESULTS:

We confirmed that NLRP3 inflammasome activation is involved in HS-induced hepatocyte apoptosis and injury in rats. HS-induced hepatocyte NLRP3 activation is dependent on elevated extracellular HMGB1 levels. CWP reversed HS-induced abnormal expression of HMGB1, RAGE, NLRP3, IL-1 β , ALT, Bcl-2, and Caspase-3, inhibited Caspase-1 activity, and alleviated apoptosis and liver histological changes. In addition, we observed that CWP enhanced Nrf2 and HO-1 expression, which inhibited ROS production, NOX activity, and MDA levels, and increased SOD1 activity and reduced GSH content in the HS-treated liver, ultimately increasing the total antioxidant capacity in the liver. Administration of Nrf2 or HO-1 inhibitors before HS abolished the protective effects of CWP against oxidative damage in the liver of HS-treated rats, accompanied by increased levels of HMGB1 in the cytoplasm. More importantly, CWP combined with anti-inflammatory agents (glycyrrhizic acid) or antioxidant (NAC) almost completely prevented HS-induced liver injury.

CONCLUSION:

CWP has protective effects against HS-induced liver injury. The potential mechanism was associated with the activation of the Nrf2/HO-1 pathway to enhance hepatic antioxidant capacity and the inhibition of the HMGB1/RAGE/ NLRP3 axis.

KEYWORDS

Heat stress; liver injury; camel whey protein; inflammation; oxidative stress

CITATION

Du, D. and Hasi, S. (2023). Preventive effect and mechanism of camel whey protein on liver injury induced by heat stress. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Production of Camel Cheese Using Enzymatic Extracts of Plant Origin

Imen Fguiri*, Amel sboui, samira arroum, Mohamed Dbara, Mohamed Hammadi and Touhami Khorchani

Laboratory of livestock and Wild life Institute of Arid lands (IRA Medenine). 4119. Médenine. Tunisia

* imen.fguiri@yahoo.com

AIM:

The objective of this work is the development of a new process for the manufacture of cheese, using enzymes of plant origin (pineapple and ginger) as coagulating agents to obtain a cheese of good organoleptic and nutritional quality while by improving the yield of the transformation compared to conventional processes (coagulation by rennet).

INTRODUCTION:

Camel milk has limited aptitudes for the various technological transformations compared to milks from other species (goats and sheep) and more particularly its aptitude for cheese processing.

METHODS:

The optimal characteristics of the extract were determined (pH, temperature and CaCl₂ concentration), a fresh cheese was produced and the physicochemical and organoleptic qualities of the product were determined.

RESULTS:

Our results regarding the characterization of the enzymatic extract showed an extraction yield (pineapple: 75.28% ± 4.59; ginger: 28.64% ± 1.47). The optimal coagulation conditions were: for pineapple: pH = 5, temperature = 45°C and for ginger: pH = 6.6; temperature = 45°C.

CONCLUSION:

A fresh cheese was produced with good organoleptic and nutritional quality.

KEYWORDS

Camel milk, pineapple, ginger, enzyme extract, cheese

CITATION

Fguiri, I., sboui, A., Arroum, S., Dbara, M., Hammadi, M. and Khorchani, T. (2023). Production of camel cheese using enzymatic extracts of plant origin. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Outbreaks of Epidemic Respiratory Complex (Al Nahaz) in Arabian Camels in Al Muthanna Province/ Iraq

Karima Al-Salihi

¹ College of Veterinary Medicine, Al Muthanna University

* kama-akool18@mu.edu.iq

AIM:

This study intended to report the occurrence of the epidemic respiratory complex in 7 camel herds suffering from acute respiratory signs in Samawa desert / Iraq. Moreover, to isolate the causative agent and investigate the gross and histopathological changes in the lungs of the dead camels.

INTRODUCTION:

Traditionally, Al Nahaz is a disease that affects animals in their lungs, causing violent cough. Epidemic Respiratory Complex (ERC), including Haemorrhagic septicemia (HS) like disease and Middle East Respiratory Syndrome coronavirus, has been reported previously in Asia and Africa that caused morbidities and mortalities in OW and NW camelids. However, the etiology of these diseases still needs to be investigated. A literature review regarding ERC revealed no publications on camels in Iraq.

METHODS:

Specific health problems raised during 2022, as experienced by the owners. The affected camels suffered from loss appetite, coughing, and nasal and eye discharges and died of ten camels. Nasal swabs and lung samples from dead animals collected for bacterial isolation and histopathological evaluation, respectively.

RESULTS:

A total of 1387 animals examined during the outbreaks. The total bacterial isolates were 135 (9.73%), including 23 (17.03%), 27(20%), 50 (37.03%), and 35 (25.92%) for *P. multocida*, *Mannheimia haemolytica*, *E. coli*, and *Pseudomonas aeruginosa*, respectively. Lung adhesion, various stages of pneumonia, Hydrothorax, and hydropericardium were seen grossly. Necrotic, suppurative, fibrinous bronchopneumonia, Broncho-interstitial, and pyogranulomatous pneumonia were seen histologically.

CONCLUSION:

This study reported ERC in 7 camel herds in the Al-Muthanna governorate accompanied by the isolation of various pathogenic bacteria. A molecular study recommends by the author to investigate the pathogenic bacterial genes such as capsular type B and E for *Pasteurella Sp*, which helps to determine their circulation between the herds, thereby providing the basis for effective preventive strategies.

KEYWORDS

Al Nahaz, epidemic, *Mannheimia haemolytica*, *P. multocida*, lung

CITATION

Al-Salihi, K. (2023). Outbreaks of epidemic respiratory complex (Al Nahaz) in Arabian camels in Al Muthanna province/ Iraq. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Assessment the Variation Factors of Milk Production and Composition of Camels in Kazakhstan

E. Shertay¹, Akhmetsadykova Sh.^{1,2}, G. Konuspayeva^{2,3}, A. Torekhanov¹, A. Shamshimanova³, G. Abuov⁴ and B. Faye⁵

¹ 1LLP «Kazakh Research Institute for Livestock and Fodder Production», horse and camel breeding department, 51, Zhandosov str., Almaty, 50035, Kazakhstan.

² Research and production enterprise “ANTIGEN” Co Ltd, biochemistry department, 4, Azerbayeva str., Abai v., Karasai district, 050409, Almaty region, Kazakhstan.

³ Al-Farabi Kazakh National University, Biotechnology department, 71 Al-Farabi avenue, 050040 Almaty, Kazakhstan.

⁴ Southwest Research Institute of Animal Husbandry and Crop Production, 51, Esalieva str., Karatau district, 160021, Shymkent, Kazakhstan.

⁵ Agronomic research and international cooperation organization for the sustainable development of tropical and Mediterranean regions – CIRAD, Campus International de Baillarguet, 34398, Montpellier, Cedex 5, France

*ersyltan0606@gmail.com

AIM:

To assess the variation factors of milk composition and milk productivity of Bactrians, dromedaries and hybrids from Kazakhstan.

INTRODUCTION:

Nowadays, camel milk is in high demand both in domestic and foreign markets. The potential value of camel milk is on average 3.6% of the total national milk production, and this proportion increased by 30% since its independence. In the last 20 years, the production of camel products increased 5 times. There is an upward trend in prices for camel dairy products, which create an attractiveness for breeding camels with high dairy productivity in the country. Specific physiology and adaptive capacity and increased interest for these animals as livestock species worldwide could lead to high productive camels becoming an important milk source for humans.

METHODS:

Milk composition (SNF, density, fat and protein content) and milk production/12h of 447 Arvana dromedaries, 159 Bactrians and 107 hybrids from different regions in Kazakhstan were determined. As illustrative data, region, parity, physiological stage, and age of the camel is reported. The software used was XLstat (Addinsoft©, 2022).

RESULTS:

In the factorial plan issued from the Discriminant Factorial analysis, Bactrian milk composition and production is appearing at the opposite on average from all other species along the main factorial axis. More than 86% of dromedaries are well classed according to their milk composition and production while it is only around 50% of the Bactrian only. The hybrids are mainly closed to Arvana profile. As a whole, 66% of the camels are well-classed. The more discriminant parameter is the density and the less is the protein. However, all the parameters are contributing to the discrimination.

CONCLUSION:

According to the results, the local camel populations could be discriminated according to their milk composition.

KEYWORDS

Milk productivity, milk composition, Bactrians, dromedary camels, hybrids

CITATION

Shertay, E., Sh., A., Konuspayeva, G., Torekhanov, A., Shamshimanova, A., Abuov, G. and Faye, B. (2023). Assessment the variation factors of milk production and composition of camels in Kazakhstan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

The efficiency of MERS-CoV MVA vaccine in Camels: A systematic review

Ahmed Alsaleem¹, Mahmoud Kandeel^{1,2,*}

¹ Department of Biomedical Sciences, College of Veterinary Medicine, King Faisal University, 31982 Al-Ahsa, Saudi Arabia.

² Department of Pharmacology, Faculty of Veterinary Medicine, Kafrelsheikh University, 33516 Kafrelsheikh, Egypt

AIM:

Modified vaccinia virus Ankara (MVA) has been used to generate vaccines for several viral diseases.

INTRODUCTION:

Most viral vector-based MERS vaccines use the full-length MERS-CoV S or S1 protein as the coding antigen and are immunogenic in animals. PRISMA workflow was used for handling the published articles.

METHODS:

The population, exposure, control, outcome, and studies (PECOS) criteria were used in this study. MVA-MERS-S produced strong antibodies as well as specific B-cells in a homologous vaccination regimen, although T-cell responses varied among cohorts.

RESULTS:

A booster or third vaccine is important because it increases the number of antibodies and B-cells that are specific to MERS-CoV-S.

CONCLUSION:

The antibodies' levels and neutralization capacity were observed to have stabilized following a late boost. MVA vaccination proved efficiency in immune response to MERS-CoV..

KEYWORDS

MERS-Cov, Camel, VaccineB-cells, antibodies

CITATION

Alsaleem, A. and Kandeel, M. (2023). The efficiency of MERS-CoV MVA vaccine in camels: A systematic review. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Camel Milk as A Nutraceutical Adjuvant in Autistic Children

Artabandhu Sahoo¹, Raghavendra Singh² and Pritpal Singh³

¹ ICAR-National Research Centre on Camel, Bikaner, India

² ICAR-Central Sheep and Wool Research Institute, Avikanagar, India

³ Baba Farid Center for Special Children, Faridkot, India

*sahooarta1@gmail.com

AIM:

Expanding camel-milk usage as a nutraceutical adjuvant in various human ailments including autism spectrum disorder (ASD).

INTRODUCTION:

Fresh and fermented camel milk have been acknowledged to provide a potential treatment/therapeutic nutritional supplement for a series of diseases ascribed through a number of bioactive components present in camel milk. ASD is a genetically determined neurodevelopmental brain disorder that is exhibited in children of 2-12 years of age, who exhibited restricted, repetitive patterns of behaviors, interests, and activities, or persistent deficit in social communication and social interaction. The children with ASD are mainly at a greater risk of general gastro-intestinal tract concerns (viz. constipation, diarrhea, abdominal pain) leading to multilevel pathways in the gut–brain axis contributing to alterations in behavior and cognition. It is hypothesized that camel milk provides nutrition and has proven hypo-allergenicity to children and may thus helpful in addressing the GIT concerns and amelioration of autism disorder.

METHODS:

In addition to regular treatment and management protocol of 108 autistic children, camel milk was given at the rate of 20 ml per kg body weight apart from regular gluten free diet. Any alteration/improvement in affected children is evaluated by following Autism Treatment Evaluation Checklist (ATEC).

RESULTS:

There was significant improvement observed in all the children on camel milk therapy. It was also noted that children with less pretreatment score showed more improvement while less improvement was observed with high score. Above all, 30% more improvement was noted in children taking camel milk compared to others who are not on camel milk, but on regular therapeutic and behavioural improvement protocol followed for all the children.

CONCLUSION:

Provision of camel milk at the rate of 200-500 ml to autistic children weighing 8-25 kg in the age group of 2-10 years of age not only provides nutrition but also helps in ameliorating ASD and there is scope of 30% more improvement in health, cognitive awareness and behavioral parameters in the affected children.

KEYWORDS

Camel milk, autism, children

CITATION

Sahoo, A., Singh, R. and Singh, P. (2023). Camel milk as a nutraceutical adjuvant in Autistic children. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Seasonal Effect on Camel Milk Microbiota

Abdulaziz Al-Ateeqi*, Abrar Akbar, Husam Alomirah, Mohamed Kishk, Anisha Shajan and Rita Rahmeh

¹ Author's 1 Details

² Author's 2 Details

AIM:

Our work aimed to identify camel milk's microbiota in different seasons and breeds.

INTRODUCTION:

There are many nutritional and therapeutic properties associated with camel milk.

METHODS:

We collected raw camel milk from different camel breeds and different seasons in Kuwait. The first season had temperatures below (20 °C), and the second had temperatures above (37.5 °C). Sequencing was performed on the variable regions V3 and V4 of the 16S rRNA gene. The raw milk of camels contained a diverse bacterial community.

RESULTS:

Proteobacteria, Firmicutes, Actinobacteria, and Bacteroidota were found to be the four most predominant phyla of bacteria in both seasons. Different seasons resulted in a shift in the relative abundance of these phyla. In season 1, Lactobacillus was the most prevalent genus at the genus level. Four genera (Lactobacillus, Pediococcus, Paenibacillus and Streptococcus) were dominant in season 1 compared to season 2. These findings shed light on raw camel milk's bacterial microbiome.

CONCLUSION:

The microbiomes of camel milk were influenced significantly by the season. Food industries can take advantage of the findings of this study, because the beneficial bacteria in camel milk could be used in food technology and health promotion.

KEYWORDS

Camel, milk, bacteria, microbiome

CITATION

Al-Ateeqi, A., Akbar, A., Alomirah, H., Kishk, M., Shajan, A. and Rahmeh, R. (2023). Seasonal effect on camel milk microbiota. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Apparent Digestibility of Major Minerals in Camels (*Camelus Dromedarius*)

Seddik Mabrouk Mouldi*, Saifi Ali, Dbara Mohamed, Jarray Naceur, Hammadi Mohamed And Khorchani Touhami

Breeding and Wildlife Laboratory . Institut des Régions Arides, University of Gabes, IRESA- Tunisia

*mabrouk.seddik16@gmail.com

AIM OF THE WORK:

This work aims to evaluate the appeared in vivo digestibility of dry matter and the major minerals calcium (Ca), phosphorus (P), sodium (Na) and potassium (K) in camel.

INTRODUCTION:

In arid and desert regions, the dromedary (*Camelus dromedarius*) occupies a privileged place thanks to its anatomical and physiological particularities which allow it to adapt to the most precarious conditions. The feeding behavior of camels remains a model for study in arid regions, this animal is considered a pseudo-ruminant given the anatomical particularities of its digestive tract which can affect the digestive use of its ration.

METHODS:

This work was performed on four young camels in growth stage (285 kg \pm 24kg) receiving a diet based on alfalfa hay and supplemented with 2 kg of concentrate. The digestibility of the dry matter dry matter and the major minerals calcium (Ca), phosphorus (P), sodium (Na) and potassium (K), was calculated after determining their quantities in the hay and concentrated feed ingested and faeces eliminated during 7 days survey.

RESULTS:

This work shows that the dry matter digestibility was 61.6%, while that of the inorganic material was 39.6%. This digestibility depends on the mineral element; it was 48.3% for calcium, 35.7% for phosphorus, 81.1% for sodium, and 96% for potassium. Apart phosphorus, this variability is significant based on the monitoring day, however it varies little between the animals followed.

CONCLUSION:

The results obtained show most important variability of the apparent digestibility of Ca and P and that was relatively low. These two minerals given the importance of their endogenous metabolism so it's recommended to determine the real digestive utilization coefficient of studied minerals, especially for calcium and phosphorus. This finding constitutes an element to study the pathogeny of Krafft disease in camel rangelands in the south of Tunisia.

KEYWORDS

Mineral digestibility, dromedary camel

CITATION

Mouldi, S.M., Ali, S., Mohamed, D., Naceur, J., Mohamed, H. And Touhami, K. (2023). Apparent digestibility of major minerals in camels (*Camelus dromedarius*). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Analysis of Dromedary Genetic Diversity and Structure Using Whole-Genome Sequence Data

Bruno S.¹, Senczuk G.², Landi V.³, Di Civita M.², Brooks S.⁴, Almathen F.^{5,6}, Faye B.⁷, Gaouar SBS⁸, Piro M.⁹, Kim K.-S.¹⁰, Dadi H.¹¹, Iglesias Pastrana C.¹², Al-Haddad H.¹³, Al-Abri M.¹⁴, David X.¹⁵, Eggen A.¹⁵, Burger P.¹⁶ and Ciani E.¹

¹ Department of Biosciences, Biotechnologies and Environment, University of Bari “Aldo Moro”, Bari, Italy

² Department of Agricultural, Environmental and Food Sciences, University of Molise, Campobasso, Italy

³ Department of Veterinary Medicine, University of Bari “Aldo Moro”, Valenzano, BA, Italy

⁴ Department of Animal Sciences, University of Florida, Gainesville, FL, USA

⁵ Department of Public Health, College of Veterinary Medicine, King Faisal University, Al Hufuf, Al-Ahsa, Saudi Arabia

⁶ Camel Research Center, King Faisal University, Al Hufuf, Al-Ahsa, Saudi Arabia

⁷ CIRAD-ES, UMR SELMET, Montpellier, France

⁸ Department of Biology, Abou Bakr Belkaid University of Tlemcen, Algeria

⁹ Department of Medicine, Surgery and Reproduction, Institut Agronomique et Vétérinaire Hassan II, Rabat, Morocco

¹⁰ Department of Animal Sciences, Chungbuk National University, Chungbuk, South Korea

¹¹ Ethiopian Biotechnology Institute (EBTi), Addis Ababa, Ethiopia

¹² Department of Genetics, Faculty of Veterinary Sciences, University of Córdoba, Córdoba, Spain

¹³ Department of Biological Sciences, Kuwait University, Kuwait City, Kuwait

¹⁴ Department of Animal and Veterinary Sciences, Sultan Qaboos University, Muscat, Oman

¹⁵ Illumina, Ayr, Evry Cedex, France

¹⁶ Research Institute of Wildlife Ecology, Vetmeduni, Vienna, Austria

* elena.ciani@uniba.it

AIM:

The aim of this study is to perform an intercontinental *Camelus dromedarius* genetic diversity study using whole-genome sequence data.

METHODS:

Sequencing was performed through Illumina® NovaSeq. Raw data were analyzed by the DRAGEN Germline Pipeline, using CamDro3 as reference genome (Genebank: GCA_000803125.3). Quality control and MDS analysis were performed by PLINK. Bayesian clustering was done using ADMIXTURE. SplitsTree was used to build neighbor-net networks.

RESULTS:

A total of 358 whole-genomes of dromedaries from 22 countries were generated (28.5X depth). We obtained 23,471,177 variants, out of which 18,344,556 were biallelic SNPs and 13,560,911 were biallelic autosomal SNPs. Overall, 354 samples and 505,662 autosomal SNPs passed the quality control. MDS patterns displayed consistence with those previously observed by our group genotyping 22K SNP loci through a ddRAD approach. Bayesian clustering highlighted (i) the separation of the samples from Horn of Africa (i.e., Ethiopia and Kenya) from the rest of the analyzed range, starting from $k=2$ (with k being the number of subpopulations), and (ii) the presence of a genetic differentiation between North African and Asian dromedaries, starting from $k=4$, (iii) the presence of additional phylogeographic clusters, at higher k values, including the group of Australian and Pakistani samples, the samples from Oman, UAE and Qatar, the cluster of Northern Africa samples (Mauritania, Morocco, Algeria, Tunisia, Libya and Canary Islands) and an additional group containing samples from Kuwait, Saudi Arabia, Yemen and, interestingly, Iran. Reynolds' and Nei's genetic distances grossly mirrored the above results.

CONCLUSION:

Observed results were mostly consistent with the historical networks of known caravan routes.

KEYWORDS

Camelus dromedarius, Single Nucleotide Polymorphisms, phylogeography

CITATION

Bruno, S., Senczuk, G., Landi, V., Di Civita, M., Brooks, S., Almathen, F., Faye, B., Gaouar, S.B.S., Piro, M., Kim, K.-S., Dadi, H., Pastrana, C.I., Al-Haddad, H., Al-Abri, M., David, X., Eggen, A., Burger, P. and Ciani, E. (2023). Analysis of dromedary genetic diversity and structure using whole-genome sequence data. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

High Hydrostatic Pressure Preservation Treatment of Camel's Milk

Siddiq H. Hamad¹, Salah M. Aleid¹ and Fahad M. Aljassas²

¹ Dept. of Food and Nutrition Sciences, College of Agric. and Food Sciences, King Faisal University, Al Ahsa, Saudi Arabia

² King Abdulaziz City for Science and Technology, Life science and Environment Research Institute, National Center for Agriculture Technologies, Riyadh, Saudi Arabia

AIM:

To investigate Microbiological, chemical and physical analysis of camel milk before, after treatment, and during storage at 3°C for 00 days.

INTRODUCTION:

High-pressure processing is capable of inactivating microorganisms and specific enzymes at room temperature, thereby prolonging milk shelf life and guaranteeing its safety upon consumption. Due to its minimal effects on the sensory and nutritional characteristics of the final products, High hydrostatic pressure preservation commonly generates foods with better acceptability and enhanced sensory properties, as quality is maintained during processing.

METHODS:

camel milk samples were collected in sterile bottles from farms around Hofuf City, Saudi Arabia, packed in polyethylene pouches, and evacuated using a Tower-Vac machine. Pressure treatments at 200, 250, 300, 350, 400, 450, 500 and 600 MPa were applied at 40°C for 5 minutes in a Stansted 'FOOD-LAB' model S-FL-850-9-W high hydrostatic pressure research apparatus. Microbiological, chemical and physical analysis was conducted before, after treatment, and during storage at 3°C for 00 days. Treatments at 300 to 350 MPa for 5 minutes at 40°C were enough to reduce normal contamination with mesophilic aerobic bacteria in the camel milk samples to levels of 102 cfu/ml or less.

RESULTS:

It was also enough to reduce contaminations with Enterobacteriaceae, molds and yeasts to non-detectable levels. Such a treatment can prolong the shelf life of refrigerated (3°C) camel's milk up to 28 days. Clotting of camel's milk occurred in some samples at pressures up to 300 MPa, a phenomenon that seems unique to camel milk because it was not observed in milks of cows or sheep treated in the same way.

CONCLUSION:

The pressure treatment slightly effected color and caused a slight decrease in protease activity and a slight increase in the oxidation products of lipids but showed no significant effects on the organoleptic characteristics of the milk.

KEYWORDS

High hydrostatic pressure preservation, Camel milk, organoleptic properties of the milk

CITATION

Hamad, S.H., Aleid, S.M. and Aljassas, F.M. (2023). High hydrostatic pressure preservation treatment of camel's milk. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Rift Valley Fever in Sudanese Camels

Nahid A.M. Ibrahim, Tamador M.A. Elhassan, Mohammed E.A. Mansour, Awatif A. Ahmed and Manal A. Abdalla

Rift Valley Fever unit, Central Veterinary Research Lab (CVRL) Po Box 8067

ABSTRACT:

Camels (*Camelus dromedarius*) are susceptible to RVF infection, although it is subclinical in mature animals. Abortion rates of 70% of those pregnant animals occurred with many death in foals 3-4 months of age (Eisa et al., 1977).

OBJECTIVES:

To determine the seroprevalence of RVF antibodies, to investigate the epidemiological role of these animals in disease distribution and to detect the existence of the virus antigen in apparently healthy camels.

MATERIALS AND METHODS:

This study was conducted in central Sudan (ElGazira, Botana and Tambol) in the year 2007 and 2008 during the last outbreak in Sudan. Blood samples were collected in plain vacutainers from live camels and liver samples collected from the same animals after slaughtering. sera were prepared and stored at -20 °C. All sera samples were tested for the detection of RVF antibodies using ID Screen multispecies RVF competition ELISA.

Total RVFV RNA was extracted from infected vero cell culture with the vaccine strain (Smithburne) as positive control and liver specimens using Trizol according to the manufacturer protocol and examined using Reverse transcriptase Polymerase chain reaction (RT-PCR).

RESULTS:

A total of 439 Camels sera samples were collected during a disease outbreak in central Sudan in the year 2007, 72 (16.4%) had positive RVF antibodies. Analysis of the RT-PCR products in agarose gel and staining with promphenol blue revealed the presence of the expected bands of the 363 bp obtained from RVFV vaccine strain as positive control and 11 homogenate of liver samples.

CONCLUSION AND RECOMMENDATIONS:

RVF antibodies were detected in camels sera indicates previous infection. Camels may be involved in the spread of disease in some instances. Since then these populations were monitored for RVF because these are known to reemerge under certain circumstances. regional projects to address the threats of RVF transmission in the region

- Studies for the role of other vectors (e.g. tick)
- Study the genetic variation of the RVFV.
- The role of the wildlife in the enteric zoonotic period of the disease must be studied also.
- Panafrikan Project for the molecular epidemiology for RVFV.

KEYWORDS

camel, rift valley fever, antibodies, RVF

CITATION

Ibrahim, N.A.M., Elhassan, T.M.A., Mansour, M.E.A., Ahmed, A.A. and Abdalla, M.A. (2023). Rift valley fever in sudanese camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Protective Effect of Black Cumin Oil Against the Heat-Induced Oxidative Stress in Camel Meat

FARH Mohamed^{1,*}, Moussahil Abderrahim¹, IDDAR Abdelghani² and El KHASMI Mohammed¹

¹Hassan II University of Casablanca, Ben M'Sick Faculty of Sciences, Physiopathology and Molecular Genetic Laboratory, Casablanca, Morocco

²Biotechnology and Biomolecules Engineering Unit, Life Sciences Division, National Center for Nuclear Energy, Science and Technology, Rabat, Morocco

* Corresponding author: farh50@hotmail.com

AIM:

The aim of this investigation was to evaluate the protective effect of Nigella oil against oxidative stress (OS) in cooked meat of the Arabian camel.

INTRODUCTION:

Cooking meat could induce lipid and protein oxidation. Camel meat, compared to other red meats from other domestic animals, is relatively rich in poly unsaturated fatty acids, myoglobin and other compounds heminics, which could act as prooxidants and thus promote the oxidation of meat. Medicinal plants are rich in antioxidants and could be useful to fight against lipid peroxidation of meat, during storage or refrigeration. In this work, the protective effect of Nigella seeds fixed oil (NSO) against OS in cooked meat of camel was evaluated by analyzing malondialdehyde (MDA) and carbonyls content and activities of Catalase (CAT), Glutathion peroxidase (GSHPx) and Superoxide dismutase (SOD).

METHODS:

Meat samples from 5 male dromedaries were minced and stored at -80°C until further analysis. After thawing they were divided into 2 portions, one was treated at different temperatures (60, 70 and 80°C) and the other was kept raw as a control. The cooked and raw samples were then stored in the refrigerator at 8°C to measure the water, dry matter, ash, protein and lipid contents on day 0, and those of OS indicators on days 0, 1, 3 and 6. Cooked meat samples (80°C), were treated with NSO (50 or 100 µL) to analyze the same indicators of OS on days 0 and 6 of storage at 8°C.

RESULTS:

Compared to raw meat, cooking induced a significant ($P<0.05$) increase in dry matter, protein, lipid, MDA and carbonyls, and cooking loss, and a significant ($P<0.05$) decrease of CAT, GSHPx and SOD. During cold storage of raw and cooked samples a significant ($P<0.05$) increase of MDA and carbonyls and a significant ($P<0.05$) decrease of enzymatic activities with time were noted. The cooked samples and then treated by NSO, showed during their cold storage a significant ($P<0.05$) decrease in MDA and carbonyls, and a significant ($P<0.05$) increase of CAT, GSHPx and SOD activities compared to control samples.

CONCLUSION:

NSO showed an antioxidant activity on cooked camel meat during refrigerated storage.

KEYWORDS

Oxidant stress, cooked meat, Nigella oil, camel, Morocco

CITATION

Mohamed, F., Abderrahim, M., Abdelghani, I. and Mohammed, E. (2023). Protective effect of black cumin oil against the heat-induced oxidative stress in camel meat. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

A Comparative Evaluation of PCR, c-ELISA, SAT and Rose Bengal Tests for Diagnosis of Camel Brucellosis in Khartoum State

Ehsan Mansour^{1,2}, EL Sanousi Enaam², Dalia Mursi³ and G.E. Mohammed²

¹ Central Veterinary Research Laboratory P.O.box 8067, Amarat, Khartoum, Sudan.

² Faculty of Veterinary Medicine, University of Khartoum-Khartoum North.

³ Central Laboratory, Ministry of Higher Education and Scientific Research, Khartoum-Sudan

*ehsanomran33@gmail.com

AIM:

To determine the sensitivity and specificity of serological and molecular techniques in detection of camel brucellosis, to compare the eligibility of serological and molecular techniques in detection of Brucellosis in camel serum and determine the seroprevalence of the brucellosis in the camels in Khartoum.

INTRODUCTION:

Brucellosis is one of the most common diseases that affects both humans and animals. It is prevalent in many regions of the world including Latin America, Middle East, the Mediterranean basin, Africa and Asia. According to WHO, more than half a million new cases of infection are reported in the world annually. Brucella can be transmitted to humans in several ways including the consumption of unpasteurized dairy products, inhalation of the microorganism as well as transmission through the skin.

METHODS:

A total of 642 serum samples were collected from a apparently healthy camels, diagnosed and the seroprevalence was 25.3%, 21.3 %, 15, 4%, and 11.% using PCR ,RBPT, SAT , and c-ELISA respectively.

RESULTS:

The sensitivity and specificity of these three tests were in comparison to conventional PCR as a gold standard test, were, highest sensitivity obtained by RBPT (54%) followed by, SAT (35%) and c-ELISA (35%), while c-ELISA obtained the highest specificity (97.1%) followed by SAT (91.2%) and RBPT (89.8%).

CONCLUSION:

PCR can't be used as initial screening tests for large herds because of high cost as compared to other tests. RBPT obtained higher sensitivity and lower specificity as it cans potentially cross-react with antibodies to other non-Brucellaantigens. However c-ELISA showing the highest rate of specificity. So that diagnosis based on the results of two or more tests initially using a screening test if positive reaction observed, a confirmatory test will be done.

KEYWORDS

Brucella Spp., Serological Test, Molecular Test, Dromedary and Sudan

CITATION

Mansour, E., Enaam2, E.S., Mursi, D. and Mohammed, G.E. (2023). A comparative evaluation of PCR, c-ELISA, SAT and Rose bengal tests for diagnosis of camel brucellosis in khartoum state. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Chemical Composition Determination of Leaves of Some Fodder Trees Preferred by Camel, Sudan

Alsadig H.^{*}, Elsamni O. and Seazar K.

Faculty of Animal Production , University of Khartoum – Sudan. P.O BOX 123 Khartoum North- Sudan

^{*}alsadighamad111@gmail.com

AIM:

The study aimed to determine the nutritive value of leaves of some fodder trees preferred by camels. Four fodder trees were used in the study namely *Ziziphusspina-christi* (Sidir), *Balanitesaegyptiaca* (Hejleg), *Acacia mellifera* (Sunut) and *AzadirachtaIndica* (Neem). The experiment carried out to determine proximate composition, neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), metabolizable energy (ME), Tannin, Saponin and Polyphenol.

METHODS:

Four samples of fodder trees that preferred by cattle were collected from University of Khartoum farm namely: *Ziziphus spina-christi* (Sidir), *Balanites aegyptiaca* (Hejleg), *Acacia nilotica* (Sunut) and *Azadirachta Indica* (Neem). Once brought to the labrotary, the leaves were separated from the hole plant and let to be dried. The leaf samples were ground in a hammer mill to pass a 1mm screen for chemical. The dried samples were grinded in a hummer mill to be used for proximate analysis. Crude protein, crude fiber, ether extract and ash and were determined according to AOAC (1990), NFE and ME were calculated. (NDF) Neutral detergent fiber, (ADF) acid detergent fiber and (ADL) acid detergent lignin were determined using (Van Soest et al. 1991). The measurement tannins and sappnins was performed according to the methods described by (FAO 1986).

RESULTS:

The obtained data were subjected to analysis of variance (ANOVA) for a completely randomized design using SPSS program. The results showed significant difference between fodder trees ($P<0.05$) in all proximate components. The highest value for CP (28.74%) was recorded for *Acacia mellifera*, while the lowest value (10.72%) was attained by *Azadirachta indica*. The highest value of EE (2.98 %) was recorded for *Balanities aegyptiaca*. The highest value of Ash (22.77%) was obtained by *Ziziphusspina Christi* while the lowest value was found for *Acacia mellifera* (8.67%). The highest value of ME was recorded for *Acacia mellifera* (11.14 MJ/kg) while the lowest value was found for *Ziziphusspina Christi* (8.23 MJ/kg). The values of fiber fraction showed highly significant differences between the four fodder trees. *Ziziphusspina Christi* contained the highest value of NDF (53.38%), hemicellulose (31.52%), and cellulose (17.44%), while the highest value of ADF (27.56%) was recorded for *Azadirachta indica*. Significant difference ($P<0.05$) was found between tannin and saponin between the fodder trees, *Acacia mellifera* recorded the highest value of tannin while (1.12%), while the highest value of saponin (0.223) was found in *Balanities aegyptiaca*. From this results it could be concluded that *Acacia mellifera* could be considered as a good feed for camels regarding to its high content.

CONCLUSION:

Based on the results of the current study it could be concluded that:

- *Aciamellifera* leaves recorded the highest value of CP, EE and ME and the lowest value of CF
- The highest value of DM and NFE were recorded by *Azadirachta indica*
- The lowest value of NDF, ADF and ADI were obtained by *Balanities aegyptiaca*, *Ziziphus spina Christi* and *Acacia mellifera* respectively
- For tannin and Saponin *Balanities aegyptiaca* and *Acacia mellifera* secured the lowest value respectively.

KEYWORDS

Chemical composition, fodder, leaves, camels

CITATION

Alsadig, H., Elsamni, O. and Seazar, K. (2023). Chemical composition determination of leaves of some fodder trees preferred by camel, Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Preservation of Camel Meat Using Different Maturation Stages of Date Extracts

Saleh*, F.A. Otaibi, M.M.

Food and Nutrition Sciences Dep. College of Agriculture and Food Science, KFU, Saudi Arabia.

* Corresponding author: fsaleh@kfu.edu.sa

AIM:

The study aimed to discover the ability of date extracts to fight against food-borne diseases at various maturation of ripeness. Additionally, it might be used to preserve camel meat.

INTRODUCTION:

One of the most crucial objectives of food security in many nations is extending the meat's shelf life. Due to their hazard to human health, industrial preservatives are increasingly being replaced by natural preservation methods worldwide. Several studies demonstrated the antibacterial activity of natural phytochemicals. Date palm is rich in phytochemical and phenolic components that change pending the maturing stage and may possess antibacterial properties. Studies on dates' antibacterial action, in particular their usage as a preservative for camel meat, are poorly covered in the literature review.

METHODS:

At various stages of maturity (Tamer, Rutab, and Biser) three different varieties of dates (Tamer, Rutab, and Biser) were gathered, then they were dried under vacuum, then ground, then kept in the fridge till use. The ether, ethanolic, and aqueous date extracts were prepared and then the solvent was removed. Phenolic and pigments compounds of extracts were determined as well as pathogenic antibacterial activity and the MIC were estimated against seven strains of food borne pathogens. *Staphylococcus saprophyticus* was subjected to an in situ test in minced camel meat.

RESULTS:

In comparison to previous maturation stages for all kinds, the ethanolic and then aqueous extracts of the Biser stage demonstrated a greater antibacterial activity against *Staphylococcus saprophyticus*. Rezag ethanol extract of at Biser stage (RBOH at the lowest dose caused *Staphylococcus saprophyticus* to become extremely sensitive. (MIC, 3.75 mg/ml). During refrigerated storage, RBOH was able to lower the number of *Staphylococcus saprophyticus* in minced camel meat by more than 1 log cycle.

CONCLUSION:

The RBOH ethanolic extract achieved the strongest antibacterial activity, and it could be used to preserve camel meat.

KEYWORDS

Camel meat, Date, Antibacterial, Pathogens

CITATION

Saleh, F.A. and Otaibi, M.M. (2023). Preservation of camel meat using different maturation stages of date extracts. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Camel Meat, An Alternative for Red Meat in Arid Zone: Case of Merguez, A Tunisian Traditional Sausage

K. Belguith^{1,*}, Z. Jrad², O. Ousseif² and H. Elhatmi²

¹Physiopathology, Food and Biomolecules Laboratory, LR17ES03, Higher Institute for Biotechnology Sidi Thabet, University of Manouba, Tunisia.

²Livestock and wildlife laboratory, LR16IRA04, Institute of Arid Land (IRA), Medenine, Tunisia

* khaoula.belguith@isbst.uma.tn

AIM:

Assessment and comparison of fresh merguez reformulated with camel meat and hump fat (CFM) with traditional one, made from beef meat and sheep tail fat (BFM).

INTRODUCTION:

Sausages are commonly appreciated around the world and their market is in perpetual growth. Merguez is a known traditional spicy fresh sausage from Tunisia and all North Africa, widely consumed. Dromedary camel meat, underused, despite known health benefits, can offer an alternative to improve Tunisian sausage market locally and abroad.

METHODS:

Physico-chemical properties, mineral composition, instrumental color, textural profile analysis, cooking, water and fat loss were performed respectively to CFM and BFM. Likewise, microbiological quality was checked. Statistic comparison of three batches from each type of merguez was carried out using XLSTAT and data were evaluated by analysis of variance (ANOVA), followed by Tukey's test.

RESULTS:

CFM and BFM showed a resemblance in physical properties. No significant difference was noticed in the texture profile including hardness, cohesiveness, elasticity, chewiness and adhesiveness. Neither in lightness and redness in color. Only yellowness (b^*) was significantly higher in CFM (29.02 ± 2.12). Functional performances of both products in cooking loss and fat loss were similar. Except, cooking water loss (7.09 ± 1.74) was significantly higher in CFM. Comparable results were deduced for both products in chemical composition comprising moisture, protein, and minerals (potassium, calcium, magnesium, zinc and iron), as well as microbial analyses covering enumeration of mesophilic aerobic bacteria, lactic acid bacteria, enterobacteria, yeast and mold, *Escherichia coli* β glucuronidase+, sulfate reducing anaerobic bacteria, positive coagulase staphylococcus and detection of *Listeria monocytogenes*.

Whereas, lower pH (5.2 ± 0.006) and smaller concentration of sodium (377.51 ± 47.13) recorded in FCM, revealed that the later was safer and healthier.

CONCLUSION:

Therefore Fresh camel merguez can offer an economic alternative to red meat ones, especially in arid zone, where camel livestock. Addition of natural holding water ingredients from arid zone flora can decrease water-cooking loss and improve yield of camel merguez exploitation.

KEYWORDS

Camel, beef, meat, merguez

CITATION

Belguith, K., Jrad, Z., Ousseif, O. and Elhatmi, H. (2023). Camel meat, an alternative for red meat in arid zone: Case of Merguez, a Tunisian traditional sausage. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

A Comparison of the Effects Of Adding Carob Syrup and Powder on the Nutritional Value and Antioxidant Capacity of Yogurt Made from Camel Milk

Abir Omrani^{1,2,*}, Amel Sboui¹, Maha Hamouda¹, Mohamed Dbara¹, Mohamed Hammadi¹ and Touhami Khorchani¹

¹ Arid Land Institute (IRA), Livestock and Wild Life Laboratory, University of Gabes, Institution of Agricultural Research and Higher Education (IRESA), Tunisia

² Higher Institute of Biotechnology of Monastir (ISBM), University of Monastir, Tunisia

*abyromrani@gmail.com

AIM:

This study aimed to investigate the effects of adding carob powder and carob syrup on the nutritional value and antioxidant capacity of yogurt made from camel milk.

INTRODUCTION:

Food fortification with fruits is an important process for improving the quality of food products. Fruits like carob in different forms are an excellent source of enrichment for dairy products such as yogurt due to their taste, aroma, and nutritional value.

METHODS:

Protein, fat and carbohydrate contents were determined using Kjeldahl method, soxhlet fat extraction method and Dubois method, respectively. Total solids content was determined by drying the sample at 105°C for 24 hours. In addition, total phenolic content was measured by the Folin–Ciocalteu method and antioxidant activity was evaluated by DPPH and ABTS tests.

RESULTS:

Fortified yogurt sample with carob powder showed significantly higher value of protein content (3.9±0.1 %). However, fortified yogurt samples with carob syrup showed significantly higher values of total solids (17.4±0.7 %), fat (6.3±0.2 %) carbohydrate (8±0.6 %), total phenolic content (0.57±0.05 mg/g). DPPH (83.4±3.5 %), and ABTS (95.6±3.7 %) scavenging activities were significantly higher compared to control and camel milk yogurt supplemented with carob powder samples.

CONCLUSION:

Fortification of camel milk yogurt with carob powder and syrup could help to provide functional dairy products with high nutritional values and antioxidant capacity.

KEYWORDS

Carob syrup, carob powder, antioxidant capacity, nutritional value, camel milk yogurt

CITATION

Omrani, A., Sboui, A., Hamouda, M., Dbara, M., Hammadi, M. and Touhami Khorchani, T. (2023). A comparison of the effects of adding carob syrup and powder on the nutritional value and antioxidant capacity of yogurt made from camel milk. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Colour Measurement of Camel Dromedary Colostrum for Estimation Its Protein Composition

El-Hatmi Halima^{*,1,2}, Oussaief Olfa^{1,2}, Hammadi Imen¹, Dbara Mohamed¹, Hammadi Mohamed¹, Khorchani Touhami¹ and Jrad Zeineb^{1,3}

¹ Livestock and wildlife laboratory, LR16IRA04 Institute of Arid Land (IRA), Medenine, Tunisia

² Higher Institute of Applied Biology of Medenine, University of Gabes, Tunisia

³ Institute of Higher Tourist Studies of Sidi Dhrif, University of Carthage, Tunisia

* halima.elhatmi@ira.rnrt.tn

AIM:

This approach consisted of studying the relationships between the protein composition and color attributes (L^* , a^* , and b^*) in the colostrum of dromedary camels at parturition and until day 15 postpartum.

INTRODUCTION:

The colostrum, defined as the first mammary gland secretion following parturition, is characterized by its high content in proteins. Dromedary camel colostrum is also a nutrient-rich fluid that is packed with immune and growth factors.

METHODS:

Individual colostrum samples were obtained from the first milking postpartum (2, 12, 24, 48, and 72 hours) of sixteen multiparous lactating camels (*Camelus dromedarius*) reared in Livestock and Wildlife Laboratory the Experimental Station of the Arid Land Institute of Medenine, Tunisia. Colour was measured by a Chroma Meter CR-400/410 (Konica Minolta, Osaka, Japan). The levels of protein of camel colostrum and milk samples were determined by the Kjeldahl method ($N \times 6.38$) after distillation and titration with 0.1 N hydrochloric acid. The relationship between colour parameters and protein of dromedary camel colostrum was determined by calculating the Pearson correlation coefficient.

RESULTS:

The brightness (L^*) values showed a progressive increase after parturition, and then they remained stable. This result shows that colostrum has a lower lightness than milk. Contrary to luminosity, the values of a^* and b^* gradually decreased throughout the study period. There was a sharp decline in the protein content from 17.43 ± 4.28 to $5.53 \pm 0.91\%$ within the first 48 h. There was a strong significant positive correlation between the amounts of protein (%) and the a^* values ($r = 0.837$; $p \leq 0.0001$) and the b^* values ($r = 0.610$; $p < 0.0001$) of camel colostrum.

CONCLUSION:

There was a strong correlation between protein content of camel colostrum and its colour. Therefore, colour can be an effective tool to detect colostrum in camel milk.

KEYWORDS

Camel dromedary colostrum, colour, protein

CITATION

Halima, E., Olfa, O., Imen, H., Mohamed, D., Mohamed, H., Touhami, K. and Zeineb, J. (2023). Colour measurement of camel dromedary colostrum for estimation its protein composition. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

The Impact of Concentrate to Roughage Ratio on Ph, VFA Levels and Buffering Capacity in Camels and Sheep

Touhami Khorchani¹, Mabrouk-Mouldi Seddik¹, Mohamed Hammadi¹ and Mongi Sghaeir^{2,*}

¹ Laboratoire Elevage et Faune Sauvage.

² Direction de la Valorisation des Résultats des Recherches, Institut des Régions Arides, Médenine, Université de Gabès, Tunisie.

* khorchani.touhami@ira.rnrt.tn & touha2009@gmail.com

AIM:

This study aims to compare the ruminal environment in response to a diet containing concentrate in dromedary and sheep.

INTRODUCTION:

Camels are very suitable for walking distant, often marginal pastures to meet part or all of their nutritional requirements. However, the increase in breeding costs and the succession of drought years have pushed herders to supplementing their herds on rangeland or in stables as an intensive system to produce milk or meat. The responses of animals to diets relatively high in concentrate have been little studied. Thus, the effect of 2 diets containing 2 levels of concentrate on 5 parameters in the rumen of dromedary compared to sheep (pH, AGV, bicarbonates, phosphates, lactic acid and buffering capacity) was studied.

METHODS:

Two Maghrebi camels (4 years old, 222 kg LW) and 2 Barbarine sheep (3 years old, 34 kg LW) were used in this trial. Camels were equipped with a cannula at the level of compartment 1 and sheep at the rumen. Two diets constituted of alfalfa hay and concentrate were distributed to the 2 species. Diet 1 contained a 2:1 hay/concentrate ratio while Diet 2 contained a 1:2 ratio. The two diets were distributed at a rate of 65 g dry matter /P0.75 for the 2 species. The pH and VFA concentration, the bicarbonate, phosphate and lactic acid contents were measured by standard methods. The buffering capacity was measured by the titrimetric method between pH=5 and pH=6 and expressed in meq/ ml of rumen juice.

RESULTS:

The average pH of the day (6.34 against 5.86) and 2 hours after meal was higher ($P<0.001$) in camels in the cases of diet 1 (6.37 against 5.73 and 2 hours after the meal) for diet 2 meal (5.71 versus 5.40), respectively for camels and sheep. However, the average daily pH was not different ($P>0.05$) between the 2 species in the case of the diet 2. The average levels during the day of VFA were equivalent in the 2 species (111.9 and 116.2 mM/l) in the case of diet 1 but these levels were higher ($P<0.001$) in camels in the case of diet 2 (125.1 versus 103.0, respectively). The bicarbonate contents were similar between the 2 species. However, the phosphate and lactic acid levels were ($P<0.01$) higher in sheep. Contrary to what is expected, the buffering capacity measured between pH 5 and 6 was lower in camels with the exception of the daily average corresponding to diet 2. The average values reached 37.30 against 57.97 and 46.12 against 40.12 in camels and sheep, respectively.

CONCLUSION:

The general trend of these results show a higher pH in the rumen of camels compared to sheep in the cases of the 2 diets studied for equivalent or higher VFA contents in the first species. This shows a better ability of camels to buffer the acidity resulting from the digestion of diets rich in concentrate, although the method of measuring the buffering capacity used did not clearly allow this difference. The dromedary seems well adapted to the ingestion and digestion of diets rich in carbohydrates in the intensified farming systems.

KEYWORDS

Camel nutrition, sheep, rumen pH and buffering capacity

CITATION

Khorchani, T., Seddik, M-M., Hammadi, M. and Mongi Sghaeir, M. (2023). The impact of concentrate to roughage ratio on pH, VFA levels and buffering capacity in camels and sheep. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Effect of Drying Period on Quality Characteristics of Dehydrated Camel Meat

Tyseer Zakaria Abdalla Abas^{1*} and Ikhlas Ahmed Nour²

¹ Department of Milk Production Science and Technology, Collage of animal production science and technology, Sudan University of Science and Technology.

² Department of Meat Production, Faculty of Animal Production, University of Khartoum.

* tyseer27@gmail.com

AIM:

The aim of this study is to determine the effect of sun drying period (DP) on quality characteristics of dehydrated camel meat.

INTRODUCTION:

Drying as preservation method is done for the purpose of dehydrating fresh meat for easy handling and prolong shelf life, but also be one of various processing technique to manufacture specific meat products.

METHODS:

Ten Kg fresh deboned lean camel meat was purchased from local meat market. Samples were prepared for drying process by slicing into thin strips of 1x1x10 cm, divided into 3 equal groups according to the drying period 0 hours (fresh), 48 and 96 hours, dried under natural temperature, humidity and circulation of air for 6 hours then returned to the laboratory room, this repeated according to the required drying period. Then the moisture, crude protein, fat, ash, color, smell, overall acceptability, objective color, water activity, rehydration, peroxide value and total bacterial load were analyzed.

RESULTS:

The results revealed that increasing DP from 48 to 96 hours resulted in a significantly ($P < 0.01$) decrease in moisture content by 4.45% (15.27 to 10.82) and the water activity from 0.43(48hrs) to 0.40(96hrs) this was reflected in reduction of total bacterial count from 3.92 to 3.25cfu/g While increasing the drying period from 48 to 96hrs resulted in slight increase of the peroxide value from 1.5 to 1.72meg/kg that produce specific flavor to the product resulting in increased overall acceptability (3.90 to 4.01) of the sensory attributes. Increasing the DP to 96 hrs resulted in significantly highest protein (77.43), fat(4.35) and ash(5.01). The rehydration percentage in tab water numerically increased than in boiled water but it decreased not significantly ($P < 0.05$) with increasing the DP to 96hrs.

CONCLUSION:

Sun drying of camel meat for up to 96hrs resulted in a product with high nutritional contents and consumers acceptability.

KEYWORDS

Camel meat, sun drying, rehydration

CITATION

Abas, T.Z.A. and Nour, I.A. (2023). Effect of drying period on quality characteristics of dehydrated camel meat. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Design of the First Milking Parlour for Dairy Camels in Tunisia

M. Brahmi^{1,2*}, M. Atigui¹, M. M. Seddik¹, H. Khediri¹, F. Soussi³, W. Ben Salem⁴, P.G. Marnet⁵ and M. Hammadi^{1,6,7}

¹ Laboratoire d'Élevage et de Faune Sauvage, Institut des Régions Arides, Médénine-Tunisie.

² Institut Supérieur Agronomique de Chott Mariem, Sousse – Tunisie.

³ Société Agri-Mat, El-Mourouj 3 – Tunisie.

⁴ Office d'Élevage et de Pâturage, 30 Avenue Alain Savary, Tunis – Tunisie.

⁵ Animal Sciences and Products Department, INSTITUT AGRO Rennes - Angers, F-35042, Rennes - France.

⁶ Ecole Doctorale SIS, Université de Gabès, Cité Erriadh, 6072 Gabès, Tunisie.

⁷ Institution de la Recherche et de l'Enseignement Supérieur Agricoles - Tunisie.

* Corresponding author: marwa.mounir01@hotmail.com

AIM:

This work aims to describe the first milking parlour for camels in Tunisia and North Africa.

INTRODUCTION:

For long, hand milking was the predominant milking system in camels. The increase of milk consumption in arid land requires an intensification in milk production. However, increasing the production of this species requires the adoption of new technologies such as machine milking. Milking management can be regarded as a key step in the milk production chain and milking parlour is the place of most humans - animals contact.

METHODS:

Measurements taken from twenty maghrebi camels belonging to the Arid Regions Institute's herd (IRA, Tunisia) were used to determine dimensions for setting up the milking parlour. This installation consider the fact of body physiognomy and measurements, easy access to the milking parlour, easy manipulation of udders and teats and the safety of both animals and handlers.

RESULTS:

The milking parlour specially designed for dairy camels was set up in the experimental station Chenchou (Tunisia) in December 2018 after many years of mechanical milking with individual milking units (milking pot) and several works on the conditioning for milking and the anatomical and physiological aptitudes of she-camels for machine milking. The milking parlour was designed and set up a by the Livestock and Wildlife Laboratory team (IRA-Medénine), Pr. Pierre-Guy Marnet (Institut Agro Rennes-Angers, France) and the Agri-Mat Company as part of the national strategy for the promotion of the camel sector (2016-2020), coordinated by the Office of Livestock and Pasture (OEP). In addition, defining dairy camels milking parlour characteristics requires knowledge and understanding of different disciplines such as ethology, herd management, animal handling, livestock buildings' management and optimization of working conditions. Conception of milking parlour must be done through different steps: Planning, designing (coordination and regulations), milking system and other equipment construction and installation according to animal's needs. For a better functioning of the milking parlour, the manufacturer must follow an ergonomic approach making it possible to reduce the laboriousness of the work of the dairy farmer in his milking parlour by facilitating the handling of the animals and by rationalizing the milking. Our milking centre consists of a holding area, milking parlour, a milk tank space and a vacuum pump room. It is a high-line herringbone-milking parlour allowing us to milk six dams simultaneously (3 on each side) with an of angle 30° and a pit of 2 m wide and 30 cm deep. The machine was set at 48 kPa with a pulsation rate of 60 pulse per minute and a pulsation ratio of 60:40.

CONCLUSION:

In conclusion, while reserving human and animal welfare, the designed milking parlour this system ensures shorter milking sessions and guarantees the quality of obtained milk.

KEYWORDS

Design, machine milking, milking parlour, dairy camels, Tunisia

CITATION

Brahmi, M., Atigui, M., Seddik, M.M., Khediri, H., Soussi, F., Ben Salem, W., Marnet, P.G. and Hammadi, M. (2023). Design of the first milking parlour for dairy camels in Tunisia. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Detection of Antibiotic Residue in Camel Meat, Khartoum, Sudan

Abbeer Abass Mohamed Adam*, Muna Ahmed Elkhalfifa and Alshima Hamdoon Eisa

Department of Bacteriology, Central Veterinary Research Laboratory, Al-Amarat, Animal Resources Research Corporation, Ministry of Animal Resources, Khartoum, Sudan.

*abeer2tt@gmail.com

AIM:

This study was conducted to evaluate the antibiotics residue in camel meat in Sudan and to assess the impact of different collection area of sampling on the prevalence of antibiotic residue in camel meat.

INTRODUCTION:

Antibiotics are widely used in animal feeds as growth promoters or for disease prevention and treatment. Abuse or misuse of the antimicrobials may lead to development of multidrug resistant bacteria, allergic, anaphylactic reactions and drug residue. Sulfamethazine was detected at higher levels in camel and sheep meat in Saudi Arabia by El-Ghareeb et al., 2019).

METHODS:

One hundred and twenty five camel meat samples were collected from three different slaughterhouses during 2022. All samples were transferred under cold storage to the Central Veterinary Research Laboratory, in the laboratory the microbiological screening test was performed to examine the presence of antibiotic residue in the samples. The bacteria *Bacillus subtilis* was cultured on a nutrient agar medium a suspension of it was prepared in a normal saline medium of 0.5 McFarland concentration streaked on Mueller Hinton Agar then put two grams of meat samples and incubated aerobically at 37°C for 24 hour. After incubation the plates were examined for clear zone around meat if antibiotic residue is remain.

RESULTS:

Out of 125 tested samples, 40 (32%) samples were positive for antibiotic residue these samples were reserved for confirmatory test by high performance chromatography technique to know which antibiotic residue in that samples and compare with maximum residual limit (MRL).

CONCLUSION:

The improper use of antibiotic lead to emergence of multi drug resistance bacteria lead to human health threat so to prevent antibiotic residue in animal product using of antibiotic under control measure and observing of withdrawal period of different antibiotic before slaughtering treated animals to reduce this phenomena.

KEYWORDS

Camel meat, antibiotic residue, residual limit, withdrawal period

CITATION

Adam, A.A.M., Elkhalfifa, A.E. and Eisa, A.H. (2023). Detection of antibiotic residue in camel meat, khartoum, Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Evolution of Processing for New Camel Milk Products

Gaukhar Konuspayeva

Al-Farabi University, Almaty, Kazakhstan

konuspayevags@hotmail.fr

AIM:

Description of the evolution in camel milk processing to get new products corresponding to new types of consumers.

INTRODUCTION:

With the growing urbanization, the changes in dairy camel farming systems (increasing periurban farming systems and emergence of semi-industrial camel dairy farms), and the growing interest for camel milk consumption due to its true or expected health claims, the camel milk market is facing to new demands from consumers both in terms of quality and diversity. Such a development is accompanied by new technological requirements on the part of the late-processing industry. The main question is to make milk safe enough for more demanding consumers.

METHODS:

Consumption of camel milk is mainly under drinkable form. Traditional drinkable camel milk is raw consumed just after milking. To produce drinkable product for those who are far from camel farms, it is necessary to treat milk for making it safe and with longer shelf life. The most common treatments are pasteurization, UHT, microfiltration, UHPH.

RESULTS:

The consumption of fermented camel milk is traditional and is existing for long time by using spontaneous fermentation. However, such spontaneous fermentations result in instable products regarding their organoleptic properties, their shelf-life and safety. So, the dairy industry is looking for controlled fermentation with specific adapted starters.

However, the best way to prolong the shelf-life of dairy products is the change from liquid to gel (yoghurt) or solid (cheese) forms. Technological innovations occur recently for getting acceptable yoghurt, cheese, ice cream, and powder made with camel milk.

CONCLUSION:

The emergence of a dairy industry processing camel milk contributes to the modernization of the camel farming and its integration into the world market despite the absence of an international standard.

KEYWORDS

Camel milk, pasteurization, shelf life, fermentation

CITATION

Konuspayeva, G. (2023). Evolution of processing for new camel milk products. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Biodiversity of Dromedary and Hybrid Camels in Kazakhstan

Akhmetsadykova Sh.^{1,2}, E. Shertai¹, G. Konuspayeva^{2,3}, Dosybayev K.^{1,4}, Kantay A.¹, Talzhanov T.¹, Baisaparov A.¹ and B. Faye⁵

¹ LLP «Kazakh Research Institute for Livestock and Fodder Production», horse and camel breeding department, 51, Zhandosov str., Almaty, 50035, Kazakhstan.

² Research and production enterprise “ANTIGEN” Co Ltd, biochemistry department, 4, Azerbayeva str., Abai v., Karasai district, Almaty region, 050409, Kazakhstan.

³ Al-Farabi Kazakh National University, Biotechnology department, 71 Al-Farabi avenue, 050040 Almaty, Kazakhstan.

⁴ Laboratory of Genetics and Cytogenetics, RSE “Institute of Genetics and Physiology” CS MES RK, Al-Farabi Avenue, 93, Almaty 050060, Kazakhstan.

⁵ Agronomic research and international cooperation organization for the sustainable development of tropical and Mediterranean regions – CIRAD, Campus International de Baillarguet, 34398 – Montpellier, Cedex 5, France.

* Corresponding author: shynar.akhmetsadykova@gmail.com

AIM:

To characterize the biodiversity of dromedary and hybrid camels in Kazakhstan by the description of detailed phenotype and genotype records in order to have a possibility to compare them with worldwide camels.

INTRODUCTION:

Studying the phenotype and genotype of pure breed camels and their hybrids by the latest methods will give an opportunity to develop each animal's “breed standard” and to detect genotypes associated with high productivity qualities.

METHODS:

Samples were taken from the seventeen camel farms located in four different regions of Kazakhstan. In total, 484 female individuals of Arvana breed, and 98 hybrids (Nar-Maya hybrid (Crossbreed F1) and Kospak hybrid (crossbreed F2)) were described by the phenotype questionnaire including milk parameters data. The XLstat software was used (Addinsoft©, 2022) for analysis. For the genotyping 347 Arvana camels and 98 hybrids' DNA samples were taken. Genotyping was performed on GeneTitan MC tool and Plate with a wide range of Axiom genome for genotyping camels Axiom myDesign™ Massive plate with 196,000 SNP (Thermo Fisher Scientific).

RESULTS:

The discriminating factorial analysis confirmed the clear separation between the breeds based on their body measurements with a total of 95% of well-classed. The main discriminating parameters were in the order: (i) the length of the head, (ii) the neck length, (iii) the neck circumference, (iv) the teat length, and (v) the udder length. Genotyping records results are under the treatment by using different bioinformatical tools. Determination of population structure and phylogenetic tree presented considerable differences between studied populations.

CONCLUSION:

On the basis of expected and current scientific data, it will be possible to develop a “breeding strategy program” for each local camel population as well as to develop a genomic selection domain by designation of specific SNP markers for the native camel populations.

KEYWORDS

Dromedary camels, hybrids, phenotype, genotype, biodiversity

CITATION

Sh., A., Shertai, E., Konuspayeva, G., Dosybayev, K., Kantay, A., Talzhanov, T., Baisaparov, A. and Faye, B. (2023). Biodiversity of dromedary and hybrid camels in Kazakhstan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Genetic Polymorphisms of Lipoprotein Lipase (LPL) Gene and Their Associations with Camel (*Camelus Dromedarius*) Milk Fatty Acids Composition

Latifa Chamekh^{1,2}, Jorge Hugo Calvo³, Touhami Khorchani¹ and Mohamed Habib Yahyaoui¹

¹ Livestock and Wildlife Laboratory, Arid Lands Institute, Medenine, Tunisia

² Faculty of Sciences of Gabès, University of Gabès, Gabès, Tunisia

³ Unit of Technology in Animal Production, Agrifood Research and Technology center of Aragon (CITA), Zaragoza, Spain

*latifa.chamekh@gmail.com

AIM:

The aim of this study was to identify single nucleotide polymorphisms (SNPs) in LPL gene and determine their associations with camel (*Camelus dromedarius*) milk FA composition.

INTRODUCTION:

Lipoprotein lipase (LPL) gene encodes for the rate-limiting enzyme that plays an important role in the metabolism and transport of lipids transportation. It is the key enzyme responsible for the hydrolysis of triglycerides in chylomicrons and very low-density lipoproteins. Polymorphisms in the LPL gene have been shown to affect milk traits.

METHODS:

Blood samples were collected from forty-eight camels. The genomic DNA was amplified in a final PCR reaction volume of 25 µl. Standard amplification cycles were used. PCR products were purified by Exonuclease I/Shrimp Alkaline Phosphatase treatment. The treated PCR products were then sequenced in ABI 3730 XL analyzer. Fatty acids were analyzed by gas chromatography coupled to mass spectrometry.

RESULTS:

A fragment spanning 480 bp of LPL gene was sequenced. Two synonymous mutations (280bpG/A and 295bpA/G) were detected in exon 5. The genotype frequencies were in Hardy–Weinberg equilibrium for the two SNPs. The association study showed that the content of the c11, c13-C20:2 FA was significantly affected by the SNP 280bpG/A. Camels carrying the GG genotype had greater content of this FA than the AA and AG animals. The SNP 295bpA/G have significantly affected the contents of c11, c13-C20:2; c13-C22:1 and docosahexanoic acids. The homozygote GG camels had greater contents of these FA than the GA animals. The significant effects of synonymous mutations suggests that they are in strong linkage disequilibrium with the causal locus or loci.

CONCLUSION:

These results are consistent with the role of the enzyme encoded by LPL gene. In fact, lipoprotein lipase allows the release of long-chain fatty acids of dietary origin in the mammary glands.

KEYWORDS

Camel milk, fatty acids, candidate gene, polymorphism, lipoprotein lipase

CITATION

Chamekh, L., Calvo, J.H., Khorchani, T. and Yahyaoui, M.H. (2023). Genetic polymorphisms of lipoprotein lipase (LPL) gene and their associations with camel (*Camelus dromedarius*) milk fatty acids composition. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Influence of Gum Arabic (Acacia senegal) Powder on Quality Characteristics and Stability during Frozen Storage of Camel Meatballs

Ikhlas Ahmed Nour* and Mohamed Hassan Elbadawi

Department of Meat Production, Faculty of Animal Production, University of Khartoum, Sudan

*ikhlas_nour@yahoo.com

AIM:

This study is conducted to assess the influence of adding Gum Arabic (Acacia senegal) powder (GAP) as natural antioxidant and antimicrobial agent on quality characteristics and stability during frozen storage of camel meatballs.

INTRODUCTION:

Gum Arabic is polysaccharide matrices widely used in food because of its unique emulsification, antioxidant, film forming and encapsulation properties of aroma and entrap active ingredients. Therefore utilization of it into meat products where binding is the challenge, can improve the product quality and acceptability.

METHODS:

Eight kg camel meat, 2kg subcutaneous camel fat and Gum Arabic were purchased from local market. Gum Arabic was blended to smooth powder. Treatments (0 control and 1% added GAP) and storage periods (0 control, 7 and 14 days) at -18°C were used with five replicates. Chemical composition, color, pH, TBA-RS, fat and moisture retention, extractable juice, total bacterial count (cfu/g) and sensory evaluation were determined. Data was analyzed using ANOVA as factorial arrangement 2x3, means were compared by Duncan's tests, SPSS was used.

RESULTS:

The results revealed no significant interaction between the GAP treatment and storage periods studied. Addition of 1% GAP resulted in a significant ($P<0.01$) increase of moisture, ash, L^* , b^* , cooking yield, fat and moisture retention and juiciness but very slight non significant ($P>0.05$) increase of protein, carbohydrate and fat contents. TBA-RS value, total bacterial count (cfu/g) and redness a^* were reduced

($P<0.05$). Panel scores were ($P<0.01$) increased. Storage period for 14 days resulted in significantly lowest moisture, protein, ash, fat, pH (5.41), fat retention, moisture retention and juiciness but carbohydrate, L^* , b^* , a^* , TBA-RS increased significantly ($P<0.01$).

CONCLUSION:

The study concluded that adding 1% GAP can be used as natural antioxidant and antibacterial agent to improve quality and shelf life of camel meat balls.

KEYWORDS

Camel meatballs, Gum Arabic, frozen storage

CITATION

Nour, I.A. and Elbadawi, M.H. (2023). Influence of Gum Arabic (Acacia senegal) powder on quality characteristics and stability during frozen storage of camel meatballs. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Fractionation of Pepsin-Hydrolyzed Camel and Cow Lactoferrin: Investigation of Antibacterial Activity

Jrad Zeineb^{1,2*}, El-Hatmi Halima^{2,3}, Adt Isabelle⁴, Degraeve Pascal⁴, Oulahal Nadia⁴ and Khorchani Touhami²

¹ Institute Of Higher Tourist Studies Of Sidi Dhrif, University of Carthage, Tunisia.

² Livestock And Wildlife Laboratory Arid Land Institute, University of Gabes, Tunisia.

³ Higher Institute of Applied Biology of Medenine, University of Gabes, Tunisia.

⁴ Université de Lyon, BioDyMIA (Bioingénierie et Dynamique Microbienne aux Interfaces Alimentaires) Equipe Mixte d'Accueil n 3733 Université Lyon, ISARA Lyon, Technopole Alimentec - rue Henri de Boissieu, Bourg en Bresse, France.

*jradzeineb@yahoo.fr

AIM:

This study aimed to investigate the antibacterial activity of camel and cow LF hydrolyzed with pepsin and their fractions.

INTRODUCTION:

Microbial contamination is the main factor limiting the food safety and shelf life. Therefore, to preserve foods, chemical substances are used, but with precaution due to their potential health damage. Hence, the use of natural additives as an alternative of synthetic ones is increasing. Numerous authors reported that hydrolyzates of milk whey proteins like lactoferrin (LF) are a source of antimicrobial peptides. The highest levels of LF production are attributed to camel colostrum, but studies on camel LF are scarce.

METHODS:

The LF was purified from camel colostrum using a cation exchange chromatography (CEC). Camel (LFC) and bovine (LFB) lactoferrin were hydrolyzed with pepsin. The hydrolysis was assessed by SDS-PAGE and RP-HPLC. Then, hydrolyzates were fractionated using CEC (Purolite C106 EP/2156) and eluted with NaCl (0-2 mol/L). The antibacterial activity against *E.coli* and *Linnocua* strains of obtaining hydrolyzates and fractions were investigated using the bioscreen method.

RESULTS:

The SDS-PAGE profile analysis revealed that the purified LFC presented a molecular weight of 76 kg.mol⁻¹. Considering OD280nm measurements, collected fractions were pooled in 4 fractions (dLFC1 to dLFC4) for LFC and 8 other (dLFB1 to dLFB8) for LFB. The highest fraction proportion from the dLFC (67.5%) is eluted at the highest concentration of NaCl buffer (2 mol/L), while that of LFB (26%) was recovered during of its fractionation at a concentration of NaCl (0.5-0.8 mol/L). LFC and LFB and their hydrolyzates did not exert any antibacterial activity. However, the most cationic collected fractions dLFC2, dLFC4 and dLFB8 exhibited high inhibitory activity.

CONCLUSION:

Fractions of dLFC releases more active antimicrobial activity than their protein source and thus provides an opportunity for their potential use to improve food safety.

KEYWORDS

Camel lactoferrin, fractionation, antibacterial activity, hydrolysis

CITATION

Zeineb, J., Halima, E., Isabelle, A., Pascal, D., Nadia, O. and Touhami, K. (2023). Fractionation of pepsin-hydrolyzed camel and cow lactoferrin: Investigation of antibacterial activity. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Launching the Camel Dairy Industry in Tunisia: Challenges and Opportunities

Hammadi M.^{1,2,3}, Atigui M.^{1,3}, Brahmi M.^{1,4}, Sboui A.^{1,3}, Seddik M.M.^{1,3}, Sghaier M.⁴ and Khorchani T.^{1,3}

¹ Livestock and Wildlife Laboratory, Arid Regions Institute, IRESA, Medenine 4100, Tunisia.

² Ecole Doctorale SIS, Université de Gabès, Cité Erriadh, 6072 Gabès, Tunisie.

³ Institution de la Recherche et de l'Enseignement Supérieur Agricoles –Tunisie.

⁴ Laboratory of economy and rural communities, Arid Regions Institute, IRESA Tunisia.

* mhammadi70@gmail.com

AIM:

The aim of this communication is to present the Tunisian experience in launching camel dairy industry as a model to emulate particularly in developing camel breeding countries and to highlight the main challenges and opportunities to promote this sector.

INTRODUCTION:

Camels are well adapted to harsh climate conditions, they could be considered as the most resilient farm animals facing global warming. Investing in this multi-purpose animal to contribute to the food security, poverty alleviation and economic diversification of the most marginal areas in the world is a key element to achieve their sustainable development.

METHODS:

In the beginning of the 90th of the 20th century, Tunisian Government launched a national strategy to safeguard and enhance the productivity of camel rearing. Many public (IRA, OEP, CRDA...) and private (Associations, breeders, GDA, SMSA...) actors were implicated in the policy which include research, development and combatting diseases. Many practical researches on intensification of dairy camel, machine milking and pasteurization of camel milk were conducted by IRA teams, and results were vulgarized via an information and training days to camel breeders and young promoters.

RESULTS:

The camel dairy sector is following the same worldwide trends and some individual private initiatives has emerged to fulfil an increasing demand for dairy camel's products. Until recently, the majority of the produced camel milk has been sold outside the formal supply chain, often directly to clients. Camel milk is very lucrative, however guaranteeing a sufficient, continuous and hygienic supply to the market is challenging for a successful establishment of camel milk chain. Along with low reproductive performance (delayed puberty and mating age, extend calving interval, low calving rate...), the lactation and pregnancy cannot superimpose for a long time in dromedary camels leading to a wide lactation gap. Moreover, limited genetic improvement calls for more genomic work to be done and a better understanding of the genetics of some important dairy traits. Besides, milk production calls for intensification, increased feeding requirements and limited space for animals coupled with mechanisation of milking which remains empirical in most cases. Further, diversifying camel dairy products and prolonging its shelf life remains a wide area of research and yet to enhance. To overcome these difficulties, the Tunisian strategy relied on combining the efforts made by scientific research, public development organisations and partnership with private initiatives. Our vision is betting on the small camel stakeholders to promote small-scale dairy industry to accomplish sustainable development and permanent economic and social impacts.

CONCLUSION:

The camel dairy industry benefits from the motivator framework to promote agricultural investments and the incentives provided by the national strategy for the development of camel sector. It also benefits from the technical support of breeders and industrials to introduce the latest scientific advances in terms of breeding, mechanization of milking, hygiene and quality of milk, processing and packaging of dairy products. Thus, some camel milk collection centres, pasteurization, and packaging units has been created in the last few years.

KEYWORDS

Camels, Dairy industry, Value chain, Machine milking, Sustainable development

CITATION

Hammadi, M., Atigui, M., Brahmi, M., Sboui, A., Seddik, M.M., Sghaier, M. and Khorchani, T. (2023). Launching the camel dairy industry in Tunisia: Challenges and opportunities. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Cam-B-NGF on Mass Motility and Membrane Integrity of Camel Sperm (Camelus Dromedarius) After Short Storage at 4°C

Lamia Doghbri^{1,2*}, Imed Salhi^{1,2,3}, Meriem Fatnassi¹, Mohamed Dbara¹, Adriana Casao⁴, Salma Bessalah¹, Rosaura Pérez-Pé⁴ and Mohamed Hammadi^{1,2,3}

¹ Livestock and Wildlife Laboratory, Arid Lands Institute, 4100 Médenine, University of Gabès, Tunisia.

² Faculty of Sciences of Gabes, Erriadh City 6072, Zrig, University of Gabès-Tunisia.

³ Institution for Agricultural Research and Higher Education (IRESA), 30, Rue Alain Savary 100 Tunis Belvédère, Tunisia.

⁴ Grupo BIOFITER, Departamento de Bioquímica y Biología Molecular y Celular, Facultad de Veterinaria, Instituto Universitario de Investigación en Ciencias Ambientales de Aragón (IUCA), Universidad de Zaragoza, C/ Miguel Servet, 177, 50013 Zaragoza, Spain.

* lamia.doghbri@gmail.com

AIM:

The aim of this work was to study the effect of Cam β -NGF on mass motility and membrane integrity of dromedary (Camelus dromedaries) semen after storage 24h at 4°C.

INTRODUCTION:

Fatnassi et al. (2017) identified the cam- β -NGF in camel sperm. The NGF functions on spermatozoa was evaluated in animal model research indicating its role in promoting the formation and development of testis, the spermatozoon differentiation, maturation, viability, and motility.

METHODS:

Ten ejaculates were collected from male dromedary (n = 6) using a bovine artificial vagina. After washing by HBSS buffer, Sperm was suspended in Tris-citrate-fructose-egg yolk diluent for a final concentration of 200 × 10⁶ /ml and cooled at 4°C for 24 h. After refrigeration, the extended sperm samples were equilibrated for 5 min at 36°C and divided into the following subgroups: sperm samples without treatment (control) and sperm samples supplemented with Cam- β -NGF (10, 100, 500, and 1000 ng/ml). At 5, 30, and 60 min of incubation, the mass motility of sperm was evaluated under light microscopy and was scored using a 0 (immotile)–5 (highly motile) scale. The membrane integrity was evaluated with the swelling test. The Data were analyzed by one-way ANOVA followed by Tukey's Multiple Comparison Test (P < 0.05).

RESULTS:

The treatment of camel sperm with 500 and 1000 ng/ml of Cam- β -NGF increased significantly the sperm motility after 30 min of incubation (p < 0.05). However, after 60 min, only the dose of 1000 ng keeps the higher sperm motility (≥ 3). NGF supplementation with 1000 ng/ml, 500 ng/ml and 100 ng/ml in semen extender show the superior percentage of the swilled spermatozoa after 60 min of incubation.

CONCLUSION:

These results demonstrate that Cam- β -NGF could be implicated in dromedary sperm motility and membrane integrity after cooling.

KEYWORDS

Camelus dromedaries, Cam- β -NGF, sperm motility, membrane integrity

CITATION

Doghbri, L., Salhi, I., Fatnassi, M., Dbara, M., Casao, A., Bessalah, S., Pérez-Pé, R. and Hammadi, M. (2023). Effect of Cam- β -NGF on mass motility and membrane integrity of camel sperm (Camelus dromedarius) after short storage at 4°C. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Physical and Physiological Changes of Dromedary Camels as Parturition Approaches Under Semi-Intensive System

Imen Hammadi^{1,2*}, Mouldi-Mabrouk Seddik¹, Wiem Ben Selem³ and Mohamed Hammadi¹

¹ Arid Lands Institute, 4100 Medenine, University of Gabès, Tunisia.

² Faculty of Sciences, Cité Erriadh 6072 Zrig, University of Gabès, Tunisia.

³ Office de l'Élevage et des Pâturages, 30 rue Alain Savary, 1002 Tunis, Tunisia.

* imen.mohamed1290@gmail.com

AIM:

This study aimed to describe the physical and physiological changes before calving in camels.

INTRODUCTION:

Physical and physiological changes at the approach of parturition represent the first initiating factors for parturition and are used to detect it.

METHODS:

The rectal (RT) and vaginal (VT) temperatures, sacro-sciatic ligaments and plasma progesterone and estradiol were assessed for 15 camels. Fifteen days before the expected date of parturition and until one day postpartum, RT and VT were recorded on 15th, 10th, 9th, 8th, 7th, 6th, 5th, 4th, 3rd, 2nd and 1st day before, at parturition and 1 day after. The relaxation of sacro-sciatic ligaments was assessed and were carried out daily from 30 days before the expected date of parturition until the first day postpartum. To determinate the plasma progesterone and estradiol, blood were taken in 3rd, 6th and 9th months of gestation, on 7th, 3rd, 1st day before parturition, at parturition, 12 h and 24 h postpartum.

RESULTS:

The RT decreased 4 days before parturition to reach a minimum ($35.47 \pm 0.2^\circ\text{C}$) on the day of parturition. Rewrite the sentence. VT decreased on the 6th day before and on the day of parturition with 36.11°C , then the increase ($P=0.005$) was recorded on the day after. For the right and left sacro-sciatic ligaments, the relaxation increases ($P < 0.0001$) when approaching parturition. Progesterone increased from the 3rd month of gestation to reach a maximum in the 6th month then decreased until 1 day before parturition to drop below 0.5 ng/ml on the day of parturition. The estradiol was low during the first 9 months of gestation, it peaked 7 days before parturition ($378.5 \pm 69.7 \text{ pg/ml}$), then decreased below 50 pg/ml on the day of parturition.

CONCLUSION:

The decrease of RT and VT, the relaxation of sacro-sciatic ligaments and the decrease in progesterone are the most indicators to predict imminent parturition in camel.

KEYWORDS

Rectal and vaginal temperatures, sacro-sciatic ligaments, progesterone, estradiol, camels

CITATION

Hammadi, I., Seddik, M.-M., Ben Selem, W. and Hammadi, M. (2023). Physical and physiological changes of dromedary camels as parturition approaches under semi-intensive system. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

The Non-DNA Sequence Variations of Experimentally Camel-Derived *Trichinella Spiralis* in Domestic Cats

Hussein Mohamed Omar

Department of Parasitology, Faculty of Veterinary Medicine, Cairo University
*vetdromar@gmail.com or vetdromar@cu.edu.eg

AIM:

To check unusual host/parasite factors affect morphometric variations of *Trichinella spiralis*.

INTRODUCTION:

More than 12 *Trichinella* species were described from different hosts. Variants of *Trichinella spiralis* were intraspecifically described but those from unusual hosts need to be recovered.

METHODS:

Experimental infection of a camel (foreign host) with *Trichinella spiralis* larvae of swine origin. Experimental infection of two cats with larvae from the camel. Western blotting for protein profile. DNA sequence analyses.

RESULTS:

Larvae were collected from camel muscles 17 days post-infection. Adults *T.spiralis* were morphologically described from two cats. Adult worms were significantly large (Males 2.9-3.3 mm and Females 8.2—9.5 mm). DNA analyses were very similar to that previously reported, however, Western blotting against positive swine sera revealed different protein profiles.

CONCLUSION:

Significant morphometric variations seem to be non-DNA dependent.

Further studies are necessary to prove the role of epigenetic host or parasite factors responsible for such variation.

KEYWORDS

Camel, Cats, *Trichinella spiralis*, DNA, Epigenetic

CITATION

Omar, H.M. (2023). The non-DNA sequence variations of experimentally camel-derived *Trichinella spiralis* in domestic cats. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Prevalence of Anti-Toxoplasma Gondii Antibodies in The Sera of Camels (Camelus Dromedarius) Owned by Nomadic Population from Tribal Areas of Pakistan

Muhammad Mudasser Nazir¹ and Jamal Muhammad^{2,*}

¹ Department of Parasitology, Faculty of Veterinary and Animal Sciences, The Islamia University of Bahawalpur, Bahawalpur 63100, Pakistan

² Department of Parasitology, Faculty of Veterinary and Animal Sciences, Cholistan University of Veterinary and Animal Sciences, Bahawalpur, 63100, Pakistan

*jamalikh3@gmail.com

AIM:

The current study was conducted to determine the seroprevalence of Toxoplasma gondii in the serum of camels from tribal areas of Pakistan.

INTRODUCTION:

Toxoplasma gondii infection is widely prevalent in domestic as well as in wild animals, especially in dairy animals. Camels can also act as intermediate host for the Toxoplasma gondii.

METHODS:

The serum samples from 184 camels were collected and processed for the presence of anti-Toxoplasma gondii antibodies using a commercially available Enzyme Linked Immunosorbent assay (Indirect multi-species ELISA) diagnostic kit (ID Screen Toxoplasmosis Indirect® ID-VET Company, France).

RESULTS:

The overall seropositivity rate of Toxoplasma gondii was 15.76% (29 of 184) in 184 camel subjects. A significant ($P < 0.05$) difference of prevalence was noticed among camel subjects reared by native and nomadic population. The number of Toxoplasma gondii positive samples were 16 (13.67%) of 117 camels owned by native population and 13 (19.41%) of 76 owned by nomadic population. Female subjects 20% (21/105) was found to be more prone to Toxoplasma infection that of male subjects 10.12% (8/79) with a significant ($P < 0.05$) difference of prevalence between two genders. Trend toward the positivity to Toxoplasma gondii was recorded as an increasing pattern with the age of camel subjects indicating horizontal transmission of the pathogen. However, this pattern of increasing positivity with the age of camel subject was statistically non-significant ($P > 0.05$).

CONCLUSION:

The current study indicates that that Toxoplasma gondii is prevalent in the study area and further studies are required to examine the exposure of this pathogen and its impact in terms of productivity losses on camel population in Pakistan.

KEYWORDS

Toxoplasma gondii, antibodies, Camelus dromedarius, Horizontal

CITATION

Nazir, M.M. and Muhammad, J. (2023). Prevalence of anti-Toxoplasma gondii antibodies in the sera of camels (Camelus dromedarius) owned by nomadic population from tribal areas of Pakistan . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Suckling Behaviour Early After Birth in Housed Dromedary Camel

Imen Hammadi^{1,2*}, Mohamed Chniter³, Mofida Atigui¹, Frédéric Lévy⁴, Raymond Nowak⁴ and Mohamed Hammadi¹

¹ Arid Lands Institute, 4100 Medenine, University of Gabès, Tunisia

² Faculty of Sciences, Cité Erriadh 6072 Zrig, University of Gabès, Tunisia

³ National Institute of Agronomy, 43 Avenue Charles Nicolle, Tunis 1082, University of Carthage, Tunisia

⁴ 7 PRC, INRAE, CNRS, IFCE, Université de Tours, 37380 Nouzilly, France

* mohamed1290@gmail.com

AIM:

This study aims to investigate the suckling behaviour and the interactions between mother and calf before and at suckling during the first week postpartum in housed Maghrebi camels.

INTRODUCTION:

Maternal care is important to promote investment by the mother in her progeny and stimulates the neonate to stand up, helps to focus on the maternal body and guides the calf to find the udder.

METHODS:

Seventeen pregnant females (primiparas N = 6; multiparas N = 11) were surveyed for 24 h/day, during the first 7 days postpartum to assess the preparation to suckle, suckling and the naso-anal behaviors during suckling.

RESULTS:

In the first day of calf's life, female circles around her neonate in 60 % of suckling bout cases, this proportion was declined in the 3rd day ($P < 0.0001$). This behaviour was affected by both mother parity ($P < 0.0003$) and calf sex ($P = 0.010$). Vigilance frequency of dam was decreased ($P < 0.0001$) during the first 7 days postpartum. The duration of suckling bout was declined ($P < 0.0001$) during the 1st week of calving. Contrariwise, the mean suckling bout frequency was increased in the 2nd day then it declines ($P < 0.0001$). Parity affects the suckling duration ($P = 0.0001$) and frequency ($P = 0.0001$). Calf sex had a significant effect ($P = 0.0134$) on suckling bout duration. The initiator of suckling event tended to affect the suckling bouts duration ($P = 0.054$). Calf age had a significantly effect on the duration between two successive suckling bouts ($P = 0.001$). Duration ($P < 0.0001$) and frequency of naso-anal contact ($P < 0.0001$) were decreased with the calf age. In addition, parity had a significant effect on duration ($P < 0.0001$) and frequency of naso-anal contact ($P = 0.0007$) during suckling. Similarly, the initiator of suckling affected ($P < 0.0001$) the naso-anal contact duration and frequency.

CONCLUSION:

This captive data can begin to fill an important gap the understanding of the suckling behaviors in camels and continue the observed period until the calf weaning.

KEYWORDS

Suckling, Mother-young bond, Maghrebi camel.

CITATION

Hammadi, I., Chniter, M., Atigui, M., Lévy, F., Nowak, R. and Hammadi, M. (2023). Suckling behaviour early after birth in housed dromedary camel. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of The Enzymatic Hydrolysis on Anti-Oxidant and Anti-Obesity Activities of Camel Whey Proteins Compared to Cow, Goat, Ewe and Equine Species

Ben Yagoub Meriem^{*1,2}, Jrad Zeineb⁴, Oussaief Olfa¹, Azabou Samia² and El-Hatmi Halima^{1,3}

¹University of Gabes, Arid Land Institute of Medenine, LR16IRA04 Livestock and Wildlife Laboratory, 4100 Medenine, Tunisia.

²Analytical, Valorization and Food Safety Laboratory, National Engineering School of Sfax, Sfax, Tunisia.

³University of Gabes, Food Department, Higher Institute of Applied Biology of Medenine, 4119 Medenine, Tunisia.

⁴Institute of Higher Tourist Studies of Sidi Dhrif, University of Carthage, Tunisia.

*meriem.benyagoub@stud.enis.tn

AIM:

Throughout the present work, a comparative study was conducted to assess the effect of digestive enzymes (pepsin and pancreatin) on anti-oxidant and anti-obesity activities of whey proteins from camel milk compared to that of four different animal species: cow, goat, ewe and mare.

INTRODUCTION:

Camel milk is known for its therapeutic values in medicine and nutrition, which can be attributed in part to its distinctive protein composition. This distinction can contribute to interesting biological activities. Numerous authors have reported that bioactive peptides can be released from the milk proteins by proteolytic enzymes.

METHODS:

Whey proteins from camel, cow, goat, ewe and mare milk were hydrolysed by pepsin and pancreatin using in vitro protocol simulating the gastrointestinal digestion. The profile of different whey proteins and their hydrolysates were characterized by electrophoresis (SDS-PAGE). Peptide concentration and hydrolysis degree were determined by ortho-phthalaldehyde method. The Anti-obesity activity was estimated by determining pancreatic lipase inhibitory activity and the anti-oxidant activities were tested using DPPH assay, ABTS assay, ferrous ion chelating and β -carotene bleaching test.

RESULTS:

The SDS-PAGE analysis revealed the presence of homologous proteins between the five dairy species except that camel whey, which is characterized by the lack of β -lactoglobulin and the presence of two specific proteins (CWBP and PGRP). Two whey proteins, α -lactalbumin and β -lactoglobulin, were more resistant to the digestive proteolytic enzymes than other proteins. After the simulation of gastrointestinal digestion using pepsin and pancreatin, the highest levels of hydrolysis degree and peptide concentration were observed in the digested ewe whey sample (97.03 and 75.298%, respectively).

Undigested camel whey proteins exhibited the highest anti-obesity activity (87.32%). While, the highest antioxidant activity was found in ewe whey sample (51.46%) using the DPPH assay.

CONCLUSION:

Enzymatic hydrolysis had a positive impact, demonstrating the importance of peptides that can become active after their release from whey proteins.

KEYWORDS

Whey proteins; Enzymatic hydrolysis; anti-oxidant activities; anti-obesity activity.

CITATION

Meriem, B.Y., Zeineb, J., Olfa, O., Samia, A. and Halima, E. (2023). Effect of the enzymatic hydrolysis on anti-oxidant and anti-obesity activities of camel whey proteins compared to cow, goat, ewe and equine species. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Dromedary urine impacts on human tumour and non-tumour renal cell lines viability in serum-reduced media

Maria Noemi Sgobba^{1*}, Carlos Iglesias Pastrana², Nikola Schlosserová^{1,3}, Francisco Javier Navas González², Juan Vicente Delgado Bermejo², Taher Kamal Sayed Osman⁴, Lorenzo Guerra¹ and Elena Ciani¹

¹ Department of Biosciences, Biotechnologies and Environment, University of Bari 'Aldo Moro', Bari, Italy.

² Department of Genetics, Faculty of Veterinary Sciences, University of Cordoba, Cordoba, Spain.

³ Department of Chemistry and Biochemistry, Mendel University in Brno, Brno, Czech Republic.

⁴ Salam Veterinary Group, Kingdom of Saudi Arabia.

* maria.sgobba@uniba.it

AIM:

The aim of this work is the assessment of dromedary urine antiproliferative effects in different in-vitro-setups.

INTRODUCTION:

The widespread ethnomedical practice of dromedary urotherapy as a remedy against various illnesses is well recognized in traditional dromedary countries. Several studies tried to unravel urines' therapeutic potential, but they often overlooked important factors, such as the urine osmolarity or the impact of concentration/composition of serum used in cell cultures, which could both deeply influence the in vitro tests results.

METHODS:

In this work, we tested the bioactivity of a set of dromedary urines, derived from eleven animals of different sex and age, on human non-tumour (HK2) and tumour (Caki-1) renal cells. The possible influence of the samples' osmolarity and the foetal bovine serum (FBS) added to the cell culture medium were considered prior to antiproliferative testing. We determined the hyperosmolarity tolerance threshold (<500mOsm/L in both the tested cell lines) in 1% (serum-reduced) and 10%FBS-supplemented hyperosmolar media. In addition, we assessed the antiproliferative activity of urines diluted in 1% and 10%FBS medium towards HK2 and Caki-1, through cell viability measurements performed after 24, 48, and 72 hours of treatment.

RESULTS:

When exposed to dromedary urine solutions 10%FBS, no viability decline was observed for any of the tested samples, neither in HK2 nor in Caki-1 cells. Interestingly, when the same urine samples were diluted in 1% FBS (serum-reduced) cell culture media, we observed a progressive decrease in tumour cell viability in three out of eleven samples. Conversely, four out of eleven samples exhibit a strong and time-dependent cytotoxic effect on non-tumour cells, compared to the control condition.

CONCLUSION:

Taken together, our results indicate that dromedary urines effects on cell viability are animal-specific, and the use of serum-reduced medium can further highlight the in vitro bioactivity of the small molecules contained in urines.

KEYWORDS

Dromedary urotherapy, in vitro tests, human renal cells, hyperosmolarity, serum-reduced medium

CITATION

Sgobba, M.N., Pastrana, C.I., Schlosserová, N., González, F.J.N., Bermejo, J.V.D., Osman, T.K.S., Guerra, L. and Ciani, E. (2023). Dromedary urine impacts on human tumour and non-tumour renal cell lines viability in serum-reduced media. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Investigation of the Role of Gd T Cells in Dromedaries Using 3D Comparative Modeling Approaches

Salvatrice Ciccicarese^{1*}, Giovanna Linguiti¹, Vincenzo Tragni², Elena Ciani¹ and Ciro Leonardo Pierri²

¹ Dipartimento di Bioscienze, Biotecnologie e Ambiente, Università degli Studi di Bari “Aldo Moro”, Bari, Italy.

² Dipartimento di Farmacia – Scienze del Farmaco, Università degli Studi di Bari “Aldo Moro”, Bari, Italy.

* salvatricemaria.ciccicarese@uniba.it

AIM:

The aim of this research is to investigate the role of gd T cells in *Camelus dromedarius*.

INTRODUCTION:

In dromedary adaptive immune response, the gd T cells repertoire turns out to be diversified both for the somatic hypermutation (SHM) in productively rearranged T cell receptor gamma (TRG) and delta (TRD) genes and for the high diversity in sequence and length of the third complementarity determining region (CDR3) of the TR delta chain.

METHODS:

In our research we have developed a computational protocol, which overcomes the traditional 3D comparative-modeling based approaches. First, we have estimated the interaction energies at the interface within the human crystallized paired TRG/TRD chains and quantified interaction energies within the same human TRG/TRD chains in complex with the CD1D, an RPI-MH1-LIKE antigen presenting glycoprotein. Then, we used the human TRG/TRD-CD1D complex as template for the 3D structure of the dromedary TRG/TRD-CD1D complex and for guiding the 3D human/dromedary comparative analysis.

RESULTS:

A combination of hypermutated gamma cDNA clones were paired to delta clones having a very long CDR3 never found before in any mammal; both types of clones were isolated from the spleen of a single camel. The obtained 3D models inferred from the cDNA sequences were investigated for their binding interactions both at the Vg-Vd and at the TR gd – CD1D interface. We identified the CDR and framework (FR) positions of the interacting amino acids according to the IMGT unique numbering. Moreover, we identified which amino acid residues are crucial for the inter-chain binding affinity.

CONCLUSION:

In summary, the energetically stabilized protein complexes proposed in our experimental setting of TRG and TRD dromedary cDNA clones, led us to deduce that the analyzed cDNAs derive from transcripts of a population of CD1D-restricted gd T cells.

KEYWORDS

T cell receptor, *Camelus dromedarius*, TRG and TRD loci, 3D modelization, IMGT unique numbering.

CITATION

Ciccicarese, S., Linguiti, G., Tragni, V., Ciani, E. and Pierri, C.L. (2023). Investigation of the role of gd T cells in dromedaries using 3D comparative modeling approaches. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Induction of Estrus and Ovulation in Dromedary Camels (*Camelus Dromedarius*) in Sudan

Ashwag E. MUSAAD^{1*}, Husna M. ELBASHEIR², Duriya F. 3 and Salih O. ADAM⁴

¹ Faculty of Veterinary Medicine, University of Al Butana, Sudan.

² Tumbool Camel Research Center, TCRC, Animal Resources Research Corporation, Sudan.

³ SAFARI Institute of Animal Reproductive Technologies, Ministry of Livestock, Sudan

⁴ Al Shula Veterinary Pharmacy, Qatar.

musaadashwag@gmail.com

AIM:

To achieve estrus synchronization and induce ovulation by using Gonadotropin Releasing Hormone (GnRH) and Human Chorionic Gonadotropin (hCG) in Dromedary She-camels.

INTRODUCTION:

To improve the production characteristics of various domestic animal species reproductive biotechnologies like Estrus Synchronization, Artificial Insemination, and Embryo Transfer are being utilized extensively, but these techniques are not well developed and thus are not being used as routine breeding procedures in camels. Camels are induced ovulators, the induction of ovulation may be hormonally or mechanically.

METHODS:

This study was carried out at the Faculty of Veterinary Medicine, University of Al Butana, and Tumbool Camel Research Centre (TCRC), Sudan. Seven mature and healthy non-pregnant one-humped she-camels were used in this study. One dose (2.0 ml) of Prostaglandin F_{2α} was injected intramuscularly. Then after seven days, 2.5 ml GnRH was administered intramuscularly. The developing estrus signs were closely observed throughout 24 hours for three days and all signs were recorded. Developing follicles were recorded and measured using ultrasonography. On day three, 2000 IU hCG was administered intravenously. Ovulation was detected 12 hours after the hCG injection.

RESULTS:

The estrous rate was 100% in she camels on day three after the injection of GnRH. Ovulation was found to occur in all she camels. In five animals, corpus luteum was seen and in the other two animals, the observed large follicles disappeared indicating the occurrence of ovulation.

CONCLUSION:

It can be concluded that ovulation can be induced using hormones in she-camels which can facilitate artificial insemination.

KEYWORDS

Camel, estrous synchronization, ovulation induction, GnRH, hCG.

CITATION

Musaad, A.E., Elbasheir, H.M., Duriya, F. and Adam, S.O. (2023). Induction of estrus and ovulation in dromedary camels (*Camelus dromedarius*) in Sudan.. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Cystic Echinococcosis in Dromedary Camels and Their Potential Role in The Epidemiology of Echinococcus Spp. in Some Regions of Algeria and Egypt: Genotyping and Phylogenetic Study

Mohammed Mebarek BIA^{*1}, Said Amer², Seongjun Choe¹, Dongmin Lee¹, Hansol Park¹, Mohammed Hocine benaissa³, Ki-Jeong Na⁴ and Keeseon S. Eom¹

¹Department of Parasitology, Parasitology Research Center and International Parasite Resource Bank, Chungbuk National University, South Korea.

²Department of Parasitology, Faculty of Veterinary Medicine, University of Sadat City, Menoufia, Egypt.

³CRSTRA, Experimental Station of Touggourt, Touggourt, Algeria.

⁴Chungbuk National University, Department of Veterinary Medicine, Cheongju, South Korea.

* biamebarek@chungbuk.ac.kr

AIM:

This study aims to identify the Genotyping and phylogenetic of Echinococcus spp. infected camel in Algeria and Egypt.

INTRODUCTION:

Cystic echinococcosis (CE) is a zoonotic parasitic disease caused by the larval stage of Echinococcus spp. affecting health problems for humans and livestock including camels that lead to economic loss. Echinococcus spp.

METHODS:

Fifty-eight cysts samples from camel were collected during a general inspection from the slaughterhouses in Beheira, Cairo, and Monufia governorates in Egypt. Twenty cysts samples from camel were collected from Touggourt and Eloued governorates in Algeria. The DNA extracted from the germinal layer of each cyst was subsequently analyzed by comparing the PCR-amplified DNA sequences of target mitochondrial genes: the cytochrome c oxidase subunit 1 (cox1), followed by automated sequencing.

RESULTS:

Based on the phylogenetic analysis, genotype G1 (*E. granulosus* (s.s.)), G5, and G6 were obtained from a camel in Egypt, however, in Algeria genotype G1 was obtained from all the samples except one case identified by the genotype G6.

CONCLUSION:

The results of this study provide the genetic diversity of *E. granulosus* s.l. in the area and show the camel's role in transmitting CE in Algeria and Egypt. To understand the epidemiology of CE in Algeria and Egypt, we would like to suggest a more thorough study related to camel cases from different geographical areas.

KEYWORDS

Echinococcus granulosus sensu lato, Algeria, Egypt, Molecular characterization, Camel.

CITATION

BIA, M.M., Amer, S., Choe, S., Lee, D., Park, H., benaissa, M.H., Na, K.-J. and Eom, K.S. (2023). Cystic echinococcosis in dromedary camels and their potential role in the epidemiology of Echinococcus spp. in some regions of Algeria and Egypt: Genotyping and phylogenetic study. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Serological Survey of some viral and bacterial pathogens Infection Among Slaughtered Camels in Southern east of Algeria

Mohammed Hocine Benaissa^{1*}, Nora Mimoune² and Rachid Kaidi³

¹Scientific and Technical Research Centre for Arid Areas (CRSTRA), Biophysical Station, PB 30240, Nezla, Touggourt, Algeria.

²Clinical Department, Animal Health and Production Laboratory, National High School of Veterinary Medicine, Algiers, 16000, Algeria.

³Institute of Veterinary Sciences, LBRA, University of Blida 1, PB 270, Soumaa, Blida, 09000, Algeria.

* ben.medhocine@gmail.com

AIM:

This study aimed to survey the seroprevalence, risk factors and thus the risk posed to public health, of one viral, one protozoan parasite, and three bacteria pathogens in Algerian dromedaries.

INTRODUCTION:

The five Pathogens have been known to primarily infect camels and small ruminants and are considered an important cause of abortion in camels.

METHODS:

Serum samples (n = 450) were collected over a period of 3 years from 2012 to 2014. The samples were screened using the Enzyme-Linked Immunosorbent Assay (ELISA), Rose Bengal plate test and CATT test. The results were statistically analyzed using Statistical Package for the Social Sciences version 20.

RESULTS:

The highest seroprevalence rates were for *Coxiella burneti* (65%) and *Trypanosoma Evansi* (57%). The other pathogens (*Brucella Sp*, *Chlamydia Abortus*, *BHV1*) had seroprevalence rates $\leq 5\%$. Overall, seropositivity was related to age and sex. There were no significant differences in seroprevalence detection of most pathogens according to breed and abattoirs ($p > 0.05$).

CONCLUSION:

These results highlight the presence of a risk infection by different pathogens in camels. For preventing infection, further studies are needed to improve our knowledge about the epidemiology of abortive diseases in North Africa.

KEYWORDS

camelids, *Brucella*, *C. abortus*, ELISA, South Algeria

CITATION

Benaissa, M.H., Mimoune, N. and Kaidi, R. (2023). Serological survey of some viral and bacterial pathogens infection among slaughtered camels in southern east of Algeria. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Oxytocin release during machine milking of dromedary camels: Importance of the milking environmental surroundings

Atigui M.^{1*}, Marnet P.G.², Brahmi M.^{1,3}, Barmat A.¹ and Hammadi, M.^{1,4}

¹Livestock and Wildlife Laboratory, Arid Regions Institute, IRESA, Medenine 4100, Tunisia.

²Animal Sciences and Products Department, Institut Agro Rennes-Angers, F-35042 Rennes, France.

³Higher Institute of Agricultural Science of Chott Mariem, Sousse 4042, Tunisia.

⁴Ecole Doctorale SIS, Université de Gabès, Cité Erriadh, 6072 Gabès, Tunisie.

* atigui2009@gmail.com

AIM:

The effect of the manual pre-stimulation and stressful stimulus applied before and after milk ejection occurrence on milk related oxytocin release in dromedary camels were investigated.

INTRODUCTION:

Camels are very sensitive to environmental stimuli before and during milking that could lead to disturbed milk ejection and incomplete udder emptying.

METHODS:

Four Maghrebi she-camels (2nd to 6th lactation, 475.0 ± 16.4 kg, 12.8 ± 3.8 year) were subjected to immediate attachment of milking clusters (RM), a 30 s of manual pre-stimulation (MS) and environmental perturbation before (SBM) or after (SAM) the start of the milking process in a 4 × 4 Latin square experimental design. Milking was performed by a portable machine set on 48 kPa vacuum level, a pulsation rate of 80 cycle/min and 60:40 pulsation ratio. Camels were intravenously catheterized in the jugular vein days prior to sampling to avoid perturbation during serial sample collection. Blood was collected at -2, -1, 0, 0.5, 1, 1.5, 2, 3, 6, and 12 min of clusters attachment. Milk flow curves were recorded using Lactcorder®.

RESULTS:

All camels showed a significant release of endogenous oxytocin during all treatments. No effect has been detected on base line levels between treatments. Oxytocin profiles peaked between 97.1 and 137.8 pg/mL for all treatments, and the peak was significantly higher and occurred sooner in manually pre-stimulated camels (MS); however, we detected no difference in oxytocin concentration beyond 2 min after milking unit attachment. Although one camel had no milk ejection when stressed at the start of milking (SBM), she presented a well defined oxytocin discharge, suggesting that milk ejection blockade could be either due to a restricted blood irrigation of the udder or a possible obstruction of milk flow into the cistern caused by contracted milk ducts.

CONCLUSION:

A 30 s pre-stimulation is a very suitable to enhance oxytocin release in camels, however possible milk ejection inhibition during stressful milking could not be based on a central milk ejection blockage.

KEYWORDS

Oxytocin, Pre-stimulation, Stress, Milking environment

CITATION

Atigui, M., Marnet, P.G., Brahmi, M., Barmat, A. and Hammadi, M. (2023). Oxytocin release during machine milking of dromedary camels: Importance of the milking environmental surroundings. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

A Novel Camel Yoghurt Process Using Camel Gelatin as A Texturizing Agent

Imen Fguiri^{1*}, Salma Bessalah¹, Amel Sboui¹, Samira Arroum¹, Mohamed Dbara¹, Mohamed Hammadi¹ and Touhami Khorchani¹

¹Laboratory of livestock and Wild life Institute of Arid lands (IRA Medenine). 4119. Médenine, Tunisia.

²University of Gabes. Av. Omar Ibn El Khattab, Zrig Eddakhlania. 6029 Gabès, Tunisia.

³Institution of Agricultural Research and Higher Education IRESA Tunisie. Rue Alain Savary -1002 Tunis Belvédère, Tunisia.

* imen.fguiri@yahoo.com

AIM:

This work aims to transform camel milk into a yogurt-type fermented product using gelatin as an emulsifying agent while using two breeding systems (intensive system and semi-intensive system) and comparing with the reference milk (cow milk).

INTRODUCTION:

Camel milk has limited aptitudes for the various technological transformations compared to milks from other species (goats and sheep). On the other hand, camel yogurt has the texture of a drinkable yogurt, which prompted us to find solutions to improve this texture.

METHODS:

A physicochemical characterization (pH, acidity, viscosity, proteins, etc.), microbiological (total mesophilic flora, yeasts and moulds, lactic acid bacteria, etc.) and subsequently a sensory analysis (profile test and preference test) were carried out.

RESULTS:

The physicochemical composition affected by the species and the farming system. Cow yogurt is more viscous (3166.6 ± 115.47 cP) while camel yogurt is more acidic ($130 \pm 0.57^\circ\text{D}$) and richer in protein (36.8 ± 0.02 g/l). Camel yoghurt has a more adequate microbiological quality (more lactic acid bacteria ($9.9 \cdot 10^6 \pm 7.36$ CFU) and less total mesophilic flora ($2.68 \cdot 10^4 \pm 1.98$ CFU) than that of cow yoghurt. From a sensory point of view, camel yogurt in the intensive system (63%) more appreciated by the consumer than the other two types of yogurt.

CONCLUSION:

A firm yoghurt was produced with good organoleptic and nutritional quality.

KEYWORDS

Camel milk, yoghurt, cow milk, physicochemical composition, sensory evaluation.

CITATION

Fguiri, I., Bessalah, S., Sboui, A., Arroum, S., Dbara, M., Hammadi, M. and Khorchani, T. (2023). A novel camel yoghurt process using camel gelatin as a texturizing agent. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Isolation and Molecular Identification of E. Coli on 157:H7 in Dromedary Camels

Ali kadhim Altaee and Afaf Abdulrahman Yousif *

Department of Internal and Preventive Veterinary Medicine, College of Veterinary Medicine, University of Baghdad, IRAQ.

*afaf.a@covm.uobaghdad.edu.iq

AIM:

To isolate the E. coli O157:H7 serotypes from camels and detection of the Rfb E O157, FliC H7stx1, stx2 virulence genes by PCR with sequencing.

INTRODUCTION:

E. coli O157:H7 can cause enterohemorrhagic colitis and hemolytic uremic syndrome. This bacterium is capable of producing large quantities of toxins (Shiga toxins) that severely damage the intestinal lining, causing hemorrhagic colitis. It is now well established that E. coli O157:H7 can be found in healthy animals and that the organism is associated with meat contaminated during slaughter.

METHODS:

Fecal samples were collected from 250 camels of different ages and sex located in three provinces (Karbala, AL Najaf and AL Muthanna) in Iraq. After primary cultivation of the samples, E. coli isolates were identified biochemically and serologically. Then conventional PCR were done for detection of the Rfb E O157, FliC H7stx1, stx2 virulence genes followed by sequencing.

RESULTS:

Bacteriological results revealed identification of 4 isolates of E. coli O157:H7 from 135 isolates of E. coli, from 4 camels showed illness, with diarrhea and loose feces mixed with mucous or blood flakes). The sequences of RfbE gene were made available at NCBI GenBank under the following accession numbers: E.coli O157H7; LC74356.1, LC743562.1, LC743563.1 and LC743564.1. Variation in taxonomic identification depended on query coverage, A phylogenetic tree showed that the 4 isolates clustered in one clades: Clade 1 (CP103864.1 and CP038496.1) with 79% similarity between isolates, 81% similarity with other clade 2, which include all our sequence isolates with 100% similarity.

CONCLUSION:

This study approved that E. coli O157:H7 is an important pathogen in camels. The isolated strains showed sequencing of RfbE O157 gene and identity 99%-100% with previously reported isolated in the world.

KEYWORDS

PCR, E.coli O157H7, Camel, Diarrhea.

CITATION

Altaee, A.K. and Yousif, A.A. (2023). Isolation and molecular identification of E. coli on 157:H7 in dromedary camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Comparative Study between Nisin extracted from Camel, Cow and Goat Milk

Suzan Aziz Awla* and Hanan Mohawia Ibrahim

Central Laboratory, Khartoum, Sudan and Research Center Koya University, Erbil, Iraq.

*suzan.aziz@koyauniversity.org

AIM:

Aim of this study is to obtain a new type of nisin as preservative material from Camel milk, by compare between wild type nisin produced by *Lactococcus lactis* sub.sp *lactis* isolated from camel, cow and goat milk.

INTRODUCTION:

Nisin is antibacterial peptide produced by the bacterium *Lactococcus lactis* sub.sp *lactis* that is used as a food preservative. Addition of chemical or artificial compounds as food preservative is a big hazard to human-beings in worldwide. The need for the industry to extend the shelf life of food and safety of food products has increased the research interest in explaining new natural effective preservatives.

METHODS:

Application of partial purified nisin extracted from camel, cow and goat source to preserve pasteurized milk in 4°C and room temperature. Sensory evaluation, pH evaluation and bacteriological evaluation (SPC).

RESULTS:

Sensory analysis indicated significant variances when using nisin extracted from different sources. The results showed that the applied treatments markedly decreased in pH, SPC of bacteria that is found in pasteurized milk when compared with the control samples throughout cold storage at 4°C and at room temperature, when used separately, but the preservative activity is highly increased in camel source. Shelf life of samples treated with nisin from camel source is increased and reached 23 days of storage at 4°C, and 3 day of storage at room temperature. Samples treated with nisin from cow source increased and reached only 18 days of storage at 4°C, and 0 day of storage at room temperature. Samples treated with nisin from goat source increased and reached 20 days of storage at 4°C and one day of storage at room temperature, compared with control sample, which reached 12 days of storage at 4°C, and 0 day of storage at room temperature.

CONCLUSION:

It could be concluded that the potential nisin from camel source because it is more effective than other types that inhibit the growth of common food spoilage bacteria. This opens up new perspectives for the bio preservation of food products.

KEYWORDS

Nisin, Bacteriocin, Probiotic, Camel milk, Preservative

CITATION

Awla, S.A. and Ibrahim, H.M. (2023). Comparative study between nisin extracted from camel, cow and goat Milk . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Use of Artichoke (*Cynara Scolymus*) Flower Extract as A Substitute to Rennet in the Manufacture of Camel Milk Cheese

Imen Fguiri^{*1,2,3}, Moufida Atigui^{1,2,3}, Amel Sboui^{1,2,3}, Samira Arroum^{1,2,3}, Mohamed Dbara^{1,2,3}, Mohamed Hammadi^{1,2,3} and Touhami Khorchani^{1,2,3}

¹Laboratory of livestock and Wild life Institute of Arid lands (IRA Medenine). 4119. Médenine, Tunisia.

² University of Gabes. Av. Omar Ibn El Khattab, Zrig Eddakhlania. 6029 Gabès, Tunisia.

³ Institution of Agricultural Research and Higher Education IRESA Tunisia. Rue Alain Savary -1002 Tunis Belvédère, Tunisia.

* imen.fguiri@yahoo.com

AIM:

The present study aims to improve coagulation abilities of camel milk using enzyme extracts from artichoke.

INTRODUCTION:

Camel milk has limited aptitudes for the various technological transformations compared to milks from other species (goats and sheep) and more particularly its aptitude for cheese processing.

METHODS:

The optimal characteristics of the extract were determined (pH, temperature and CaCl₂ concentration), a fresh cheese was produced and the physicochemical and organoleptic qualities of the product were determined.

RESULTS:

The properties of purified extracts were studied in this research. It showed an extraction yield of 38.83 % and optimum coagulation conditions of the artichoke enzyme extract were: pH=5; temperature= 55°C; CaCl₂ concentration= 0.01M and optimal enzyme concentration= 1%. The physicochemical characteristics of camel cheese with artichoke enzymatic extracts showed a significant difference on ash and protein content depending on the type of extract (artichoke vis chymosin). The curd obtained with artichoke extract showed the lowest water content over all (64.34±2.75) and higher proteins content (31.42±0.13). The sensory quality showed that the adding of enzymatic extract had significant effect on taste, smell, acidity and color of camel cheese. However, camel cheese with artichoke was more acid than with chymosin and that with artichoke have the best texture. The cheeses obtained are characterized by a slightly bitter taste whatever the extract used.

CONCLUSION:

A fresh cheese made from camel milk with a particular nutritional quality, consistency. The artichoke proteases displayed chymosin-like properties and thus hold the best potential for use as a milk coagulant in cheese production.

KEYWORDS

Camel milk cheese, plant enzymes, clotting activity, proteolytic activity

CITATION

Fguiri, I., Atigui, M., Sboui, A., Arroum, S., Dbara, M., Hammadi, M. and Khorchani, T. (2023). Use of artichoke (*Cynara scolymus*) flower extract as a substitute to rennet in the manufacture of camel milk cheese. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

A Comparative Study of the Mineral Status of Camels in El Oued Region: Gender, Age, and Season Effects

Titaouine Mohammed^{1,2}

¹ Laboratory Diversity of Ecosystems and Dynamics of Agricultural Production Systems in Arid Zones (DEDSPAZA) University of Biskra BP 68 Biskra 07000 Algeria.

² Laboratory Genetic, Biotechnology and Valorization of Bioresources (LGBVB) University of Biskra BP 68 Biskra 07000 Algeria.

* m.titaouine@univ-biskra.dz

AIM:

This study aims to estimate the mineral status of camels in Taleb El Arbi region at El Oued, in relation to their age, season (summer and autumn), and their gender through the measurement of plasmatic values of calcium (Ca), phosphorus (P), magnesium (Mg), sodium (Na), and potassium (K).

INTRODUCTION:

Camel blood mineral levels can be used as indicators of health problems in these animals. For example, in female mineral substances play an important role in the regulation of the physiological functions of the puerperal period and even before and after this period. Their blood concentrations represent homeostatic mechanisms closely related to neurohumoral regulation. Mineral deficiencies and imbalances are often cited as causes of poor reproduction.

METHODS:

Blood samples were taken from 26 camels (*Camelus dromedarius*), 11 males and 15 females. They aged between 1 to 18 years old. The camels belong to different farms at El Oued province (precisely Taleb Al Arbi region).

RESULTS:

Our results showed values that are in accordance with literature and have allowed us to define maximal and minimal threshold values as well as their physiological variations. Results analysis showed that age strongly influences calcaemia, phosphoraemia, kaliemia, and magnaesimia however the plasmatic concentrations of sodium Na were not of a significant difference ($p > 0.05$). Results also showed that gender influences plasmatic values of sodium with a significant increase in females ($p < 0.05$). Whereas season showed no significant effect on most of the studied minerals.

CONCLUSION:

Further studies would be needed to complete the present study notably the research of the effect of reproduction stage in females, physical activity, feeding and geographic area on camels kettles.

KEYWORDS

Mineral status, camels, age, Season, gender.

CITATION

Mohammed, T. (2023). A comparative study of the mineral status of camels in El Oued region: gender, age, and season effects. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Efficiency of Arabic Gum, Red Pepper and Salt on increasing shelf life of Dry Camel Meat

Egbal .S . Abu shulukh^{*1}, Ghada A. Ibrahim², Sheikheldin A Abdelgader², Mohammed M³, Adam E³, Iman D³, Ghufraan I³ and Moawia Y³

^{1,2,3} Department of Meat Production ,Department of Milk Production College of Animal Production, University of Bahri, Khartoum . Sudan

* Egbal121@gmail.com

AIM:

The aim of the study is to investigate the effects of Arabic Gum, Red Pepper and Salt on total bacterial count (TBC) and Escherichia Coli (E. coli) count from dried camel meat .

INTRODUCTION:

Camel meat production is becoming more important because of its low fat content and relatively high polyunsaturated fatty acid. The shelf life of meat products is limited to enzymatic and microbial spoilages.

METHODS:

The study was conducted at College of Animal Production, University of Bahri, Sudan, August 2021. Total of 5kg of camel meat were chipped into slices form and divided into four groups, three of them were treated by 40gm of Red Pepper, Arabic gum and salt, the fourth group left as a control. All groups then covered with a mesh and left for drying for one day, seven days and thirty days, under laboratory condition. Sterile containers were used for samples preservation. Isolation and Identification of Bacteria was done at day one, seven and thirty. A complete randomize design, with 3 replicated was used. The TBC and E. coli count were determined at the mentioned days.

RESULTS:

The results revealed significant differences ($P < 0.05$) between day one, seven and thirty between control and other treatments on TBC (Cfu/g) and E. coli (Cfu/g) count. Salt was found to be the most effective one compared to other treatments. It decreases the TBC and E. coli, significantly. The TBC were found to be (1416.17±10), (766.67±25) and (436.67±14), in the control, while on Red pepper (1200.00±50), (533.33±20) and (266.67±37), Arabic Gum (1166.67±11), (666.67±25) and (296.67±73) and Salt (933.33±57), (466.77±6) and (143.33±45) respectively. E-Coli decrease significantly ($P < 0.05$) in control (500.00±36), (149.67±13) and (345.67±56). Red paper (321.67±16), (56.67±74) and (14.00±9). Arabic Gum (413.33±26), (106.41±16) and (10.00±5) and salt (35.67±30), (15.67±10) and (9.67±5) respectively.

CONCLUSION:

Is that, salt improved dried camel meat by minimizing contamination and increasing the shelf life .

KEYWORDS

Dry Camel Meat, Arabic Gum, Red Pepper, Escherichia coli, shelf life

CITATION

Abu shulukh, E.S., Ibrahim, G.A., Abdelgader, S.A., Mohammed, M., Adam, E., Iman, D., Ghufraan, I. and Moawia, Y. (2023). Efficiency of Arabic gum, red pepper and salt on increasing shelf life of dry camel meat . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Parity Effect on Camel Milk Composition under Intensive and Traditional Management Systems in Butana Area-Sudan

M.H.M.Elbashir* and Sijoud. F. Elhassan

Tumbool Camel Research Center, Animal Resources Research Corporation, Khartoum, Sudan.

*m0122662711@gmail.com

AIM:

This study was conducted to investigate the effect of parity on some chemical components of camel's milk from intensive and traditional management systems in Butana area – Sudan .

INTRODUCTION:

The literature data mainly concerns cow milk, which represents 85% of the milk consumed in the world and, to a lesser extent, goat and sheep milk. Studies on other dairy animals like camel are rather scarce, inspite of their nutritional interest and medicinal properties. In addition, unlike other milk-producing animals, camels can thrive under extreme hostile conditions of temperature, drought, and lack of pasture, and still produce milk.

METHODS:

A total of 147 camel milk samples from healthy she-camels (*Camelus dromedaries*) in different (parity numbers (one to fifth), different breeds and seasons) were randomly collected. Data obtained were analyzed with SPSS version 21 software using analysis of variance and independent-sample- T. Test. Chemical component of milk as percentages of fat, protein, solids not fat, total solids, lactose content and density, were measured twice using Lactoscan milk Analyzer (Milkotronic LTD, Europe) according to the manufacturer's instructions.

RESULTS:

Results revealed that parity had significant effect ($P > 0.05$) on camel milk components that were collected from traditional management system. Wherein proteins, lactose, free fatty acid (FFA) and solid not fat (SNF) were markedly affected by parity. Protein content in 2nd parity recorded highly significant differences ($P < 0.01$) when compared to 5th one.

CONCLUSION:

The study concluded that parity had significant effect on some chemical components of camel milk under traditional management system in Butana area of Sudan .

KEYWORDS

Camel, milk analysis, parity, system

CITATION

Elbashir, M.H.M. and Elhassan, S.F. (2023). Parity Effect on camel milk composition under intensive and traditional management systems in butana Area-Sudan . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Antibacterial Activity of Retama Raetam Against E.Coli F17+ Isolated From Diarrheic Camel Calves

Salma Bessalah*, Mohamed Debara, Touhami Khorchani and Mohamed Hammadi

Livestock Wildlife Laboratory -Arid land Institute (IRA), University of Gabes-Tunisia

*bessalahsalma@yahoo.fr

AIM:

The objective of this study is to evaluate the effect of Retama raetam extract on E.coli F17+ activities.

INTRODUCTION:

E.coli is among the major pathogens affecting camel calves less than 3 months. E.coli expressing F17 fimbriae was detected in more than 40% of diarrheic camel calves in Tunisia. In the other hand, the emergence of antibiotic-resistant bacteria explains the failure of treatment of neonatal diarrhea in camel calves.

METHODS:

Aqueous extract of Retama raetam (RR) was prepared by dissolving 5g of dried leaves in 20 ml of distilled water. The mixture was placed in a water bath (50°C) for 30 min and centrifuged for 20 min at 4000xg. The supernatant was centrifuged and filtered.

Agar diffusion method, integrity of cell membrane, motility and biofilm assays were used to evaluate the antibacterial activity of RR extract against E.coli F17+ isolated from diarrheic camel calves.

RESULTS:

Our results showed that RR extract inhibits growth of bacteria by blocking its motility after 18 hours of contact (more than 90% of inhibition). In addition, biofilm assay demonstrated that extract inhibits biofilm formation after 24 hours of incubation. Our results showed that RR extract has some potential for biofilm removal from surfaces, since up to 90% of E.coli biofilm was removed. Interestingly, incubation of bacteria with RR extract enhances the release of nucleic acids. The UV absorption of E.coli F17+ treated with RR extract increased after 6 hours.

CONCLUSION:

Our findings demonstrate that Retama raetam may be a good alternative to antibacterial treatment to mitigate neonatal diarrhea in camel herds.

KEYWORDS

E.coli, diarrhea, Retama raetam, antibacterial, natural product, biofilm

CITATION

Bessalah, S., Debara, M., Khorchani, T. and Hammadi, M. (2023). Antibacterial activity of Retama raetam against E.coli F17+ isolated from diarrheic camel calves. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Camel Urine (*Camelus dromedaries*): Initiatory Pharmacological Exploration

Sara A. M, Salwa M.E. Khogali, Samia H. Abdalrahman, Baragob A.E. A and Elhassan A.M.

sarah_biochem@hotmail.com

AIM:

The present study was performed to study the pharmacological effect of crude camel urine (CU), camel urine protein precipitate (PP), diluted urine (DU) and the chloroform extract of camel urine (CE); on tissue strips isolated from rats, rabbits and chicks.

METHODS:

Urine samples were collected from naturally grazing camels throughout normal urination process, or by using (Tashweel) technique. Physiological saline solutions were prepared to mount the isolated tissue strips. She-camel urine protein precipitate (PP); prepared using ammonium sulphate method, while chloroform extract (CE), was liberated; using equal volumes of urine and chloroform, meanwhile; the diluted urine (DU), was prepared by adding distilled water to urine in ratio 1:3. Bioassay was done on tissue strips of duodenum and fundus isolated from Wister albino rats, jejunum isolated from local rabbits, and rectum strips from 15 day old chicks.

RESULTS:

Introducing (PP) to isolated rat duodenum at dose (0.1ml/bath), resulted in inhibition of its spontaneous movement. 0.4ml/bath of diluted urine or its precipitate (0.8ml/bath), on rat fundus and rabbit jejunum showed effect that simulate the serotonin one, which was provoked by serotonin antagonist (cypohyptadine) at dose (0-2 ml/bath). The crude female camel urine triggered temporary relaxation on rabbit jejunum, and then the contractions were amplified on the first wash. The chloroform extract (CE) of camel urine left no effect on rat duodenum, fundus and rabbit jejunum, while the effect on rabbit and chicks rectum was minor alteration on the strength and the occurrence of contractions.

CONCLUSION:

: She-camel urine, weather it was crude or in different preparations forms, represents a pharmaceutical treasure, need to be hint, to explore its effects; those mimic different available drugs, in order to provide natural alternative medications.

KEYWORDS

Camel urine, Tissue strips, Bioassay

CITATION

Sara, A.M., Salwa, M.E., Khogali, Samia, H., Abdalrahman, Baragob, A.E.A. and Elhassan, A.M. (2023). Camel urine (*Camelus dromedaries*): Initiatory pharmacological exploration. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effects of Probiotics Isolated from Shubat on The Meat Quality of Broiler Chickens

Begdildayeva Nazerke^{1,2}, Kudaibergenova Aliya⁴, Nurgazina Alina^{2,4}, Akhmetsadykova Shynar^{1,2,3} and Akhmetsadykov Nurlan²

¹Almaty Technological University, Department of Food Safety and Quality

²LLP “Research and Production Enterprise “Antigen””, Department of Microbiology

³LLP “Kazakh Research Institute for Livestock and Fodder Production”, Department of Camel breeding

⁴Al-Farabi Kazakh National University, Department of Biotechnology

* nzhumankyzy@mail.ru

AIM:

To determine the effects of probiotics isolated from fermented camel milk (shubat) on the broiler chickens’ meat productivity and meat composition.

INTRODUCTION:

The microorganisms found in camel milk and shubat may be a good source of probiotics. Using probiotics could improve meat water-holding capacity, tenderness, lipid oxidation stability, and sensory properties, therefore, could decrease used antibiotics quantity through affecting positively on the immune response, intestinal microflora, disease resistance.

METHODS:

Lactobacillus Paracasei B 5.2, Lactobacillus Plantarum SH1, Lactobacillus Plantarum K2, Kazachstania unispora Y 2.2 were used as the probiotics. In an arbitrary design, 240 one-day-old Ross 308 chicks were randomly assigned to four treatment groups of three replicates (20 birds per replicate). For the control group, birds were fed by basal diet and drinking water (DW). Chicks in the experimental groups were fed by BD, DW and probiotics 0.25 mL, 0.5 mL, and 1.0 mL of per bird (groups Pro1, Pro2, and Pro3, respectively), during 42 days. The carcass characteristics included the weights of the carcass and organs. Organoleptic analysis, proximate composition, pH, drip loss, and cook loss were used to determine meat quality properties.

RESULTS:

The carcass and carcass trait weights increased in groups Pro2 and Pro3. Organoleptic parameters were similar in supplemented and control groups, but in the control group spoilage process was slightly faster. The protein and ash contents in the meat of the control group were significantly lower than those of the Pro2, Pro3 groups. The moisture and fat content were higher in the control group meat samples. Cooking loss was significantly higher in the Pro2 and Pro3 samples compared to the control group. No significant difference in pH and drip loss data between the control and probiotic groups was observed.

CONCLUSION:

Shubat probiotics could be a useful management tool for improving broiler production and meat quality.

KEYWORDS

Shubat, probiotics, broiler, meat productivity

CITATION

Nazerke, B., Aliya, K., Alina, N., Shynar, A. and Nurlan, A. (2023). Effects of probiotics isolated from shubat on the meat quality of broiler chickens. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Effects of the Dromedary's Varied Diets on Ecosystem Preservation

Chehma A.¹, Mahma H.¹ and Huguenin J.²

¹ Université Kasdi Merbah Ouargla, Laboratoire de : «Bioressources sahariennes. Préservation et valorisation». Ouargla, Algeria

² CIRAD, UMR SELMET, F-34398 Montpellier, France.

* Corresponding author: Chehma A. : achehma@gmail.com

AIM:

The aim of this work is to study the impact of the dromedary's diet on the preservation of its Saharan floristic cover .

INTRODUCTION:

The dromedary is the only domestic animal capable of exploiting the very thin and lignified Saharan pastures. Its ambulatory feeding behavior during grazing allows it to cover its daily needs, regardless of the quality and variations of the forage supply, while respecting the balance of its environment.

METHODS:

Video sequences of 03 adult dromedaries on Saharan rangelands were recorded and analyzed thereafter to recognize: the grazed species, the parts of the plant, the taken quantities...etc. The ingested rations were reconstituted (by simulation) and analyzed.

RESULTS:

The results obtained showed us that the dromedary generally grazed almost all the present species (82%) and that its diet in spring and autumn was more diversified than in winter and summer. The most abundant species were generally the most grazed. The choice of the grazed parts of the plant differed according to the season. The duration of grazing, per plant, depends on its structure. The dromedary can move up to 47 km/day taking small bites of each plant. The daily amount of grazing varied from 0.42 to 3.71 kg of dry matter/100 Kg of live weight/day. The dromedary was able to self-sufficiently meet its nutritional requirements (UFL and PDI) irrespective of spatial and temporal variation. In this respect, seasonal and spatial variations were not significant for the nutrient intake of the consumed rations.

CONCLUSION:

The dromedary's diet contributes largely to the preservation and renewal of its floristic cover, by grazing the majority of the available plants and taking small aerial quantities of each of them while respecting the size and availability. This grazing method seems to cover, generally, the needs of the animals.

KEYWORDS

Dromedary, diet, preservation, spontaneous flora, arid rangeland

CITATION

Chehma, A., Mahma, H. and Huguenin, J. (2023). Effects of the dromedary's varied diets on ecosystem preservation . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Evaluation of the Physicochemical and Sensory Properties of Burger Made from Camel Meat and Beans (Phaseolus)

Rajaa M.M. Ahamed, Egbal S. Abu shulukh, Ghada A. Ibrahim*, Mohamed A. Abdalkarem, Insaf M. Abaker

College of Animal Production, University of Bahri, Khartoum . Sudan

*igadah33gmail.com

AIM:

The study was conducted to evaluate the physicochemical and sensorial properties of burgers made from camel meat with beans (Phaseolus) .

INTRODUCTION:

Camel meat can be successfully processed into many products that are currently manufactured from beef and other red meat. Fresh camel meat were, purchased from Libya market Abu-zed , Khartoum, Sudan, and immediately was transported in the icebox to the laboratory (The Regional Training Center for Meat Inspection, Hygiene and Grading) for processing, kept in a plastic bag and frozen at 18c until used. Beans (Phaseolus) was, purchased from the local market, (Kadro), Khartoum, Sudan, and transported to the laboratory and was put in the water overnight to moist .

METHODS:

Spices mixture, Black pepper, Coriander, Cubeb China, Nutmeg, Garlic, Onions and Salt was purchased from the local market (Bahri) at Khartoum, Sudan The burger formula according to Sudanese Standards and Metrology Organization (SSMO) .

RESULTS:

The results of the chemical composition of burgers processed from camel meat with Soybean and that burger processed from camel meat with beans (Phaseolus) revealed that there were significant differences ($p<0.05$) between the moisture contents of the burgers made from the two types, the moisture content was $75.50\pm 0.54\%$ and $73.41\pm 0.26\%$ respectively. The Protein was higher in the burgers processed from camel meat with soybean than that processed from camel meat with beans (Phaseolus) $21.19\pm 0.11\%$ and $17.05\pm 0.06\%$ respectively. Also, there were significant differences ($p<0.05$) on cooking loss between the burgers processed from camel meat with Soybean than that processed from camel meat with beans (Phaseolus) $28.71\pm 0.38\%$ and $22.85\pm 0.09\%$ respectively.

CONCLUSION:

The research showed similar results with higher moisture content, protein content and cooking loss when we used Soybean and there are no differences in sensory properties.

KEYWORDS

Camel meat, Physicochemical, Soybean, beans (Phaseolus), burgers

CITATION

Ahamed, R.M.M., Abu shulukh, E.S., Ibrahim, G.A., Abdalkarem, M.A. and Abaker, I.M. (2023). Evaluation of the Physicochemical and sensory properties of burger made from camel meat and beans (phaseolus). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Experimental Infection of Camel With local isolate of Camel Pox Virus

Fatima Abdelazeem Taha Elshekh

Central veterinary research laboratory (CVRL), Sudan

*fatmaabdelazim@yahoo.com

AIM:

To describe the experimental clinical, post-mortem and histopathological features of the camel pox virus isolate .

INTRODUCTION:

Camels are important livestock adapted to hot and arid environments. They have been utilized for meat, milk, hides, transportation as well as for other purposes. Camel pox (CP) occurs throughout the camel- breeding areas causing significant economic impact through loss of production, death and disease outbreaks. In Sudan, CP is considered one of the most contagious diseases. Camel pox infections range from in apparent to severe systemic infections, possibly reflecting differences between the strains of the virus.

METHODS:

CPV isolate was used to infect healthy camel, camel was injected subcutaneously and intra muscle by CPV local isolate 105.6 TCID50 and then inoculated. Animal was monitored to assess appearance of clinical sign then Pathological features.

RESULTS:

After 7 days injected camel developed clinical signs which started by high temperature reached 41.3oC at day 14 , lacrimation and red papule appeared under tail then skin lesions diffused around the skin , eyes, mouth which lead to generalized pox nodules .The post mortem revealed hemmorrhage in conjunctiva , subcutis , muscle and lung . Eruptions and nodules in mucous membranes of the lips and tongue. Diffused nodules like in oesophagus and intestine. Then histopathological changes were seen from tissues that preserved in formalin .

CONCLUSION:

camel pox virus locally isolated in Sudan developed sever and generalized camel pox infection.The local isolate saved as challenge virus and for other future studies .

KEYWORDS

Camel pox virus

CITATION

Elshekh, F.A.T. (2023). Experimental Infection of camel with local isolate of Camel Pox Virus . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Extraction and Characterization of Gelatin from Camel Bone

adamou Abdelakader*, 1redejb Ayad and KALLA Asma

Laboratory of Saharan bioresources preservation and valorization, university of KasdiMerbah, Ouargla–Algeria

*adamoudz@yahoo.fr

AIM:

The present work aims to optimize the conditions for the extraction of gelatin from camel bone in order to obtain a better quality gelatin with a high yield.

INTRODUCTION:

Gelatin is an important protein produced through partial hydrolysis of collagen from animal parts and by-products such as cartilages, bones, and hides.

METHODS:

The camel bone was demineralized by an acidulation process with HCl with a concentration of (6.0%) for 5 days. The ossein will undergo an alkaline treatment with a 1.5% NaOH solution with a ratio of skin to alkaline solution of 1:10 * at a temperature of 25°C for 48 h. in the extraction step the duration of the operation is significantly shorter compared to conventional processes. In which we made a coupling between the two acid and thermal treatments in order to reduce the whole extraction operation. The osseinsmixing with acetic acid in a ratio of 1:4. Samples should be incubated in a water bath with continuous agitation. The gelatin extraction process was carried out in different temperatures (60 and 70°C), for different durations (8 and 16 hours).

RESULTS:

The results showed that the highest yield is 18.27%, obtained with a temperature of 60°C and a duration of 12 hours. However, the lowest yield is 7.33% and corresponds to the lowest extraction conditions (extraction temperature of 60°C for 8 hours). The protein content increases significantly when the extraction conditions are milder, the highest protein content (86.18%) with gelatin extracted at 60°C for 8 hours. The gelatins obtained have very low water absorption capacities which do not exceed 20%. No difference recorded between the gelatins studied with respect to foaming ability, foam stability and emulsifying activity. Concerning the color, the values of a* and b* are negatively correlated respectively with the time and the extraction temperature.

CONCLUSION:

This work, which has shown positive results will shed light on this pure protein that can meet the global demand for halal foods.

KEYWORDS

Camel bone, extraction, optimization, characterization

CITATION

Abdelakader, A., Ayad, R. and Asma, K. (2023). Extraction and characterization of gelatin from camel bone . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Impact of Management on Progesterone Level in She-Camels' Milk in Central Sudan

Ahmed Osman Mohammed Idris 1*, S.A. Bakheit and A.A. Hassabo3

¹ Department of Animal Production and range, Faculty of Natural Resources and Environmental studies, Peace University, Sudan.

² Department of Animal Production, Faculty of Natural Resources and Environmental studies, University of Kordofan, Box 160 Elobeid, Sudan.

³ Faculty of Agriculture, Nileen University, Sudan.

* abuelgoni2003@gmail.com

AIM:

The Objective of this study was to investigate the impact of management system on camel reproductive potentials, to assess progesterone hormone level in camel milk as pregnancy indicator and to calculate the calving interval days in different husbandry systems.

INTRODUCTION:

Camels are an important livestock species in Asia and Africa. Camels contribute significantly to the livelihood of the pastoralists and agro-pastoralists living in the fragile environments of the deserts and semi deserts of Asia and Africa. Camel population in Sudan was estimated to be 4.623 million heads.

METHODS:

Thirty six of lactating she-camels and three mature male were selected, the animals were divided into three equal groups, the first group was managed in intensive system, all animals were kept in experimental farm and fed individually with concentrate and roughages. The second group was managed in a semi-intensive system; she-camels were grazed and supplemented with concentrate. The third group was served as a control under traditional system in this system animals graze grasses, agriculture's residues and browse the shrubs. Milk samples were collected at monthly intervals beginning at 4th month until the animal was confirmed pregnant. Milk samples were assayed for progesterone concentrations. Progesterone level in milk was also used to monitor ovarian activity during the service period and early pregnancy diagnosis.

RESULTS:

The result showed that progesterone concentration attained a higher value in intensive and semi-intensive systems as compared with the traditional system. In intensive system the lowest value of progesterone. The progesterone level within traditional system was recorded the lowest value in the fifth month postpartum and the highest value in eighteen month postpartum, the lowest value under semi-intensive was recorded in the fifth month and the highest value was in thirteen month postpartum.

CONCLUSION:

It concluded That, farming system has great effect on the progesterone level in extensive and semi-extensive system.

KEYWORDS

Milk, progesterone, different systems, Sudan

CITATION

Idris, A.O.M., Bakheit, S.A. and Hassabo, A.A. (2023). Impact of management on progesterone level in she-camels' milk in central Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Morphology of the Spleen in the Camel's Foetus (*Camelus Dromedarius*); Gross Anatomy, Histology and Scanning Electron Microscopy Studies

Marwa-Babiker A.M.^{1,2,*}, ALkhoodair K.M., Althnaian T.A.¹, Elseory A.M.A.^{1,3}, Zolain H.B.⁴, AlRamadan S.Y.¹ and Abdelhay A. Ali¹

¹ Department of Anatomy, College of Veterinary Medicine, King Faisal University, P.O. Box 400 Al-Ahsa 31982, Saudi Arabia

² Department of Anatomy, College of Veterinary Medicine, University of Bahri, Khartoum-North, Sudan.

³ Department of Anatomy, Faculty of Veterinary Medicine, University of Khartoum- Sudan

⁴ Department of Anatomy, Faculty of Veterinary Science, University of Nyala- Sudan

* mbabakr@kfu.edu.sa

AIM:

The study aimed to investigate the gross anatomy, topography, histology and scanning electron microscopy of the spleen in the dromedary camel foetus (*Camelus dromedarius*).

INTRODUCTION:

The spleen is essential for immunological responses to infections that are carried in blood .

METHODS:

Five foetuses were fixed with 10% formalin and dissected to study the gross anatomy and the topography of the spleen. Specimens from ten spleens were fixed and then processed for histological and scanning electron microscopy.

RESULTS:

Anatomically, the spleen was situated medially to the ribs, caudally to the stomach, and on the caudolateral side of the abdominal cavity. It had C-shaped, rough surfaces and serrated edges. At the first trimester, it was dark brown in colour and grayish in the third trimester. Histologically, the capsule was made of very thin connective tissue and the parenchyma had a sporadic distribution of many cell types in the first trimester. It displayed thick, dense, irregular connective tissue with descending trabeculae made up of collagen fibres and bundles of smooth muscle. The parenchyma in the second and third trimesters was presented as white and red pulps. Megakaryocytes were present in the red pulp during the first, second, and third trimesters of pregnancy. Scanning electron microscopy revealed that the spleen was lined with mesothelial cells, separated by reticular connective tissue fibres. The reticular cells in the cordal gaps, marginal zones, and parietal sheath were relatively small in the first trimester of gestation. In the second and third trimesters, the reticular cells formed a network where dendritic macrophages and lymphoblasts were present. Medium and tiny lymphocytes were seen.

CONCLUSION:

The results revealed that the spleen of the dromedary camel foetus was shown to have well-developed characteristics in the second and third trimesters of gestation.

KEYWORDS

Anatomy, Camel foetus, Histology, Scanning electron microscopy

CITATION

Marwa-Babiker, A.M., ALkhoodair, K.M., Althnaian, T.A., Elseory, A.M.A., Zolain, H.B., AlRamadan, S.Y. and Ali, A.A. (2023). Morphology of the spleen in the camel's foetus (*Camelus dromedarius*); gross Anatomy, histology and scanning electron microscopy studies . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Sandwich-Based Immunosensor for Detection of Pathogenic F17–Positive Escherichia coli Strains isolated from diarrheic camel calves

Imed Salhi^{1,*}, Asma Dhehibi¹, Amal Rabti², Noureddine Raouafi² and Mohamed Hammadi¹

¹ Livestock and Wildlife Laboratory (LR16IRA04), Arid Lands Institute (IRA), University of Gabès, IRESA, Medenine 4117, Tunisia

² Analytical Chemistry and Electrochemistry Lab (LR99ES15), Sensors and Biosensors Group, Faculty of Science, University of Tunis El Manar, Tunis El Manar 2092, Tunisia

* salhi_imed@yahoo.fr

AIM:

our study aimed to determine the prevalence of virulence genes of Escherichia coli strains isolated from diarrheic and healthy camel calves in Tunisia and to develop diagnosis methods based on immunosensors.

INTRODUCTION:

Neonatal diarrhoea in camel calves can be the cause of high mortality, so a rapid diagnosis is necessary for a quick therapeutic decision. F17 fimbriae are produced by pathogenic strains involved in diarrhoea and septicaemia outbreaks in calves and lambs. Purification and detection of F17A, the major subunit of F17 fimbriae, is regarded as an interesting field of investigation due to its important role as a therapeutic target, such as vaccines, and as a diagnostic tool.

METHODS:

From 120 faecal samples (62 healthy and 58 diarrheic camel calves aged less than 3 months), 70 E. coli isolates (53 from diarrheic herds and 17 from healthy herds) were examined by PCR for detection of the virulence genes associated with pathogenic E. coli in animals. Polyclonal rabbit antibodies recognizing F17A protein (anti-F17A antibody) were developed and used for its detection. In fact, sandwich biosensor using anti-F17A/gold nanoparticles conjugates as capture probe and anti-F17A antibody labelled with horseradish peroxidase as signal amplification probe was developed for electrochemical and fluorescent detection of purified F17A protein and live F17–positive E. coli bacteria.

RESULTS:

A significantly greater frequency of the f17 gene was observed in individual camels and in herds with diarrhoea, this gene being found in 44.7% and 41.5% of isolates from camels and herds with diarrhoea versus 22.5% and 11.7% in camels ($p = 0.05$) and herds without diarrhoea ($p = 0.02$).

Good specificity and sensitivity for detection of F17–positive E. coli strains were obtained. The dynamic range for the biosensor varies from 1×10^2 to 1×10^9 CFU/mL ($R^2 = 0.998$) and the detection limit (LOD) and the IC50 value were estimated to be 37 CFU/mL and 75 CFU/mL, respectively.

CONCLUSION:

Our study demonstrates the role of F17 positive E. coli strains in diarrhoea and the usefulness of F17A protein as a good and specific target for the development of a specific biosensor.

KEYWORDS

Escherichia coli, Diarrhea, camel calf, biosensor

CITATION

Salhi, I., Dhehibi, A., Rabti, A., Raouafi, N. and Hammadi, M. (2023). Sandwich-Based immunosensor for detection of pathogenic f17–positive escherichia coli strains isolated from diarrheic camel calves. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Causes of Camel Calves Mortality in Butana Area, Sudan

Mohamedzain Musa Eisa*, Galal Aden Alazhary, Mohamed Abdoslam, Husna Mohamed Albashir, Nadia Mohamed Osman, Ali Algdal

Tumbool Camel Research Center, Animal Resources Research Corporation, College of Veterinary sciences, Department of Preventive Medicine, University of Khartoum, P.O. Box 610 Khartoum – Sudan

* zain.camel@gmail.com

AIM:

The study was to identify the causes of mortality, assess camel calves' health constraints and knowledge gaps among the camel herders in disease prevention and control, Investigate the occurrences of major diseases affecting camel calves with other factors, identify and propose possible disease control measures that could be implemented and Lobby advocacy works to draw attentions of policymakers, development planners and researchers to consider camels in future development and research agenda.

METHODS:

Data relating to camel diseases is collected, from both a clinical and pathological point of view. Thus, an epidemiological study was designed to study camel diseases based on clinical signs methods. A total of 632 living camels of different sex, age and breeds in four different areas in Butana were used. These areas include Al-gadref, Kassla, Zurga and Tumbool. After a general clinical examination, blood, fecal and skin samples were taken. Also, samples were taken from death camels with lesions for bacteriological and histopathological examinations.

RESULTS:

According to the results, the study showed that major diseases that affect young camel calves are eye infections, pulmonary inflammation, scabies, fungal skin inflammation, digestive disorders and intestinal infections. The main causes of mortality among camel calves are diarrhea, smallpox, ectoparasites, pneumonia and sudden death. The main causes of deaths among the adult camels are pneumonia, trypanosomosis, sudden death, smallpox, scabies and digestive disorders. Finally the study showed that the most common types of born congenital defects in the small camel included mouth deformities, blindness, and lack of lower jaw, neck back and deformities.

CONCLUSION:

It would be possible to reduce mortality rates among camel calves through studying and defeating the causes of these mortalities followed by implementing the appropriate interventions leading to controlling the problem, increasing camel population and, consequently, improving the incomes and livelihood of the camel breeders.

KEYWORDS

Camel, Calves, mortality, Sudan

CITATION

Eisa, M.M., Alazhary, G.A., Abdoslam, M., Albashir, H.M., Osman, N.M. and Algdal, A. (2023). Causes of camel calves mortality in Butana area, Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Farming Systems on Camel Milk Production in Western Sudan

Bakheit Sallam A.^{*1}, Hassabo Ali A.², Idriss Ahmed O.³ and Eissa Amani I.¹

¹ Dept. of Animal Production, Faculty of Natural Resources and Environmental studies, University of Kordofan, P.O.Box 160 Elobeid, SUDAN.

² Dept. of Dairy Production, Faculty of Animal Production, University of West Kordofan, Elnohud, SUDAN.

³ Dept. of Nutrition, Faculty of Natural Resources and Environmental studies, Peace University, SUDAN.

* sallam.camelin@yahoo.com

METHODS:

Thirty-six lactating she-Camels were selected, from the Sudanese Arabi type. The lactating she-camels were monitored and divided into two equal groups 18 she-camels in each. Group one (G1) was handled in a semi intensive system; supplementation consisted of concentrates and roughages and Ad libitum watering was offered, the other group (G2) was hand out as a control, experimental animals managed traditionally within the same site of the experimental work. The collection of milk samples started on the tenth day postpartum and continued for 12 successive months during biweekly interval period. Hand milking was applied and Milking was practiced twice a day, approximately 12-hours interval; to prevent calf from suckling Sorar technique was used. Daily milk yield was estimated using different volume of graded cylinders. The data were statistically analyzed using SIGMA- STAT. Software computer Package described as Analysis of Variance (ANOVA).

RESULTS:

The results indicated that the means daily milk yield for both farming systems were 9.72 ± 1.54 lit/day and 3.64 ± 0.68 lit/day for semi-intensive and traditional, respectively. There was a highly significant difference ($P < 0.01$) between the two groups in both daily and monthly milk yield. This difference may be due to the farming system adopted for average daily milk yield obtained from the camels under semi-intensive system increase of 75% compared to camels managed under traditional system. The maximum average daily milk yield was attained on the (3rd) third month post-partum in both systems, which were 15.6 ± 1.78 lit/day and 4.68 ± 0.76 lit/day in semi-intensive and traditional system respectively. Milk yield decreased in the traditional system after reaching the peak if compared with semi-intensive system which has a good persistency or stable for long time after reach the peak. The results indicated that the trend of daily milk yield seemed to increase significantly ($P < 0.05$) from the first day post-partum until reaching the peak at third month and then declined gradually through the lactation period.

CONCLUSION:

The study concluded that the farming and management systems were highly significant impacts on camel milk production.

KEYWORDS

Camel, Management, Farming System, Milk Production, Daily Milk, Sudan

CITATION

Bakheit Sallam A.B., Ali A.H., Ahmed, O.I. and Amani, I.E. (2023). Effect of farming systems on camel milk production in western Sudan . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

The dromedary in the Algerian Northern Sahara; What impact do breeding systems have on its welfare? Case of the Ouargla region

Senoussi A. *, Abazi A. and Kaddad A.

aSaharan Bioresources Laboratory. Preservation and Valuation. PRIMA Project: CAMEL-SHIELD Kasdi Merbah University - Ouargla (Algeria).

* senoussi.hakim@univ-ouargla.dz

AIM:

Vocation of livestock systems and their impact on camel welfare in the Algerian Northern Sahara .

INTRODUCTION:

The dromedary, reputed to be the ship of the desert, embodying par excellence a hyper-extensive breeding system, very undemanding but undeniably a source of proven poly-functions, converting meagre vegetation into vital products and transforming uncultivated spaces into fertile territories through authentic services.

METHODS:

A field survey was carried out in 86 camel farms in the Ouargla region, based on a semi-directive life story approach .

RESULTS:

The field reveals that livestock farms depend on the feeding system through which the camel breeders adopt three distinct modes: grass-fed, stall-fed or mixed. Each of the systems responds to specific functions, the analysis of which gave rise to four types of livestock farming according to their purpose: i) 51% dairy type, ii) 27% meat type, iii) 11% poly-vocational type and iv) 11% meharis for socio-cultural and sporting purposes.

CONCLUSION:

The main conclusion of the study is that there is a diversity of livestock farms, but there are many shortcomings that have a negative impact on the animal's comfort. The sequestration of the latter in stressful enclosures, to which are added with deplorable hygiene conditions, make this space an unsuitable, even inhospitable environment.

From this, animal welfare was established, via the three Bs; Good Reception, Good Feeding and Good Health.

KEYWORDS

Ouargla - Breeding - Dromedary - Vocation - Welfare

CITATION

Senoussi, A., Abazi, A. and Kaddad A. (2023). The dromedary in the algerian northern sahara, what impact do breeding systems have on its welfare? case of the ouargla region. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Development strategy of camel Sector in Tunisia

ben Salem Wiem, Ben Jamaa Omran and Chalghaf Ezdine

Office of Livestock and Pasture, Tunisia

* Corresponding author: bensalem.wiem@gmail.com

AIM:

Development of camel Sector in Tunisia .

INTRODUCTION:

Aware of the importance and socio-economic role of camel breeding; The Ministry of Agriculture has put in place a national strategy for the development of camel breeding which aims to gradually increase the herd and improve the production performance of the herd in harmony with the potential of the regions concerned.

METHODS:

- Establishment and maintenance of pastoral infrastructure – watering points, animal gathering centres, shade for shepherds
- Support for health coverage programs.
- Free animal identification.
- Support for artificial feeding of camels.
- Support for the acquisition of broodstock.
- Development of investment in the sector
- Carrying out specific research and development actions
- Technical supervision of breeders
- The organization of the profession .

RESULTS:

Development of the herd and improvement of its performance

- Promotion of camel products
- The promotion of camel products
- Upgrading of stakeholders in the camel sector
- strengthening the capacity of stakeholders in the camel sector
- Strengthening the use of camelids in the tourism sector and sports activities.

CONCLUSION:

The National Strategy has contributed to the development of the camel sector in Tunisia, in fact the number of animals has increased with the intensification of breeding for dairy production .

KEYWORDS

Development, Camel, Tunisia

CITATION

Wiem, B. Omran, B. and Ezdine, C. (2023). Development strategy of camel Sector in Tunisia. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Contribution to the Study of Camel Mastitis in Southern Algeria

Nora Mimoune^{1*}, Radhwane Saidi², Mohamed Hocine Benaissa³, Nassima Ait Issad¹ and Djamel Khelef¹

¹ Higher National Veterinary School, Animal Health & Production Laboratory, Algiers, Algeria

² Department of Agronomy, Telidji Amar University, 03000 Laghouat, Algeria

³ Scientific and Technical Research Center for Arid Areas, Biophysical Station, Touggourt, Algeria

* n.mimoune@ensv.dz

AIM:

The present study aimed to determine the nature and frequency of mastitis, and the nature and frequency of the responsible bacteria in each type of mastitis in southern Algeria .

INTRODUCTION:

In Algeria, camel breeding participates in the national milk production. However, this breeding faces significant health problems, including mammary pathologies. This disease is a major public health threat due to the existence of human pathogens in milk. Several species are associated with this mastitis. Unlike cow's milk, camel milk are most often consumed in the fresh raw state, thus escaping any official control.

METHODS:

A total of 62 camels were subjected to clinical examination and screening for subclinical mastitis and the presence of Brucella using the California Mastitis Test (CMT) and ring test, respectively. CMT positive samples were then further subjected to bacteriological analysis.

RESULTS:

Clinical and subclinical mastitis were present with frequencies of 4.44% and 95.55%, respectively. Bacteriological analysis isolated a total of 73 samples of 45 seeds. Staphylococci were most commonly isolated, with a frequency of 63.01%. Staphylococcus aureus were more frequent (35.61%), while Staphylococcus SCN (coagulase negative staphylococci) represented only 27.39%. Streptococci were the second most isolated group, with 28.77%. Gram+ were in third place, accounting for 6.85% of all isolates. Gram- (enterobacteria) were isolated in 1.36%. Brucella was present with a frequency of 4.44%.

CONCLUSION:

An extended study on a larger sample of camels is required in the future .

KEYWORDS

Camel milk; bacteria; CMT; Mastitis

CITATION

Mimoune, N., Saidi, R., Benaissa, M.H., Issad, N.A. and Khelef, D. (2023). Contribution to the study of Camel mastitis in Southern Algeria. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Genotypic Detection of Pathogenic Genes in Escherichia Coli (*E. Coli*) Isolated from Diarrheic Camel Calves in Sudan

Muna E. Ahmed^{1*}, Sabiel Y.A.², Abeer A.M.³, Manal H. Salih⁴, Marmar A. El Siddig⁵, Twasul M. Mohammed⁶, Abeer M. Abass⁷, El-gadal A.A.⁸, Hind E.A.⁹

^{1,3,7,9} Department of Bacteriology, Central Veterinary Research Laboratory, Al-Amarat, Animal Resources Research Corporation, Khartoum, Sudan

^{4,8} Department of Pathology, Central Veterinary Research Laboratory, Al-Amarat, Animal Resources Research Corporation, Khartoum, Sudan

^{5,6} Department of Botany, Faculty of Science, University of Khartoum, Sudan

* mna2tt@gmail.com

AIM:

The study conducted to assess the presences of Escherichia coli (*E.coli*) and its association with diarrhea in camel calves in Sudan and detection of pathogenic genes encoded the isolates.

INTRODUCTION:

E.coli is a bacterial strain lives as commensal in the digestive tract of humans and animals. Nevertheless some strains have evolved the capability to cause both intestinal and extra intestinal illnesses. The different pathogenic *E. coli* strains are characterized by particular subsets of genes associated with the virulence. of the strains that cause diarrheal diseases, six pathotypes are now recognized. These pathotypes are: verocytotoxigenic *E. coli* (VTEC), enterotoxigenic *E. coli* (ETEC), enteroinvasive *E. coli* (EIEC), Enteropathogenic *E. coli* (EPEC), enteroaggregative *E. coli* (EAggEC) and diffusely adherent *E. coli* (DAEC).

METHODS:

Two hundred (200) fecal samples were collected from camels calves suffering diarrhea in Gezira, West Kordofan and North Kordofan States. The samples subjected to bacteriological examination for isolation and identification of *E. coli*. Conventional bacteriological methods, Api 20 E strips were used for more confirmation of *E. coli*, then Multiplex PCR was used for characterization of virulent factors of isolated *E. coli*.

RESULTS:

60 (30%) *E. coli* were isolated and characterized, Then tested for the presence of virulence genes using multiplex PCR for fimbriae f41, f5, eae, heat-labile (lt) and heat-stable (sta), enterotoxins stx1, saa and hly. 72 virulent genes were detected from 60 isolates carried genes for at least one of the virulence factors tested. The gene encoding for eae was the most prevalent 20(27.78%) followed by those encoding for stx 15 (20.83%), f5 14(19.44%), f4 7(9.74%), lt 6(8.34%), sta 5(6.94%), saa 4(5.55%) and hly 1(1.38%). Different pathogenic *E.coli* from camel calves were detected containing various pathogroups this indicated the important role of *E.coli* in contamination of environment .

CONCLUSION:

The study concluded that, camel calves considered as a reservoir of *E.coli* isolates that carrying pathogenic genes specially STEC strains which are potentially pathogenic for other farm animals and humans. Enterohaemorrhagic *E. coli* (EHEC) was isolated in only one sample, this may indicated that it could be a human pathogens. These findings provide further evidence that pathogenic *E. coli* of zoonotic origin can contaminate the environment as a result of the discharge of untreated abattoir particularly when bad hygiene practices applied.

KEYWORDS

Camel calves, *E. coli*, Diarrhea, Resistance genes, PCR

CITATION

Ahmed, M.E., Sabiel, Y.A., Abeer, A.M., Salih, M.H., El Siddig, M.A., Mohammed, T.M., Abass, A.M., El-gadal, A.A., Hind, E.A. (2023). Genotypic detection of pathogenic genes in Escherichia coli (*E. coli*) isolated from diarrheic camel calves in Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Portable MPS Device for the Highly Sensitive Detection of Viral Antibodies in Camel Sera

Bernhard Friedrich¹, Patrick Vogel², Martin A Rückert², Stefan Lyer^{1,5}, Johanna Günther², Ulrich Wernery³, Sunitha Joseph³, Judith Müller⁴, Volker C. Behr², Christoph Alexiou¹ and Rainer Tietze^{1*}

¹ Department of Otorhinolaryngology, Head and Neck Surgery, Section of Experimental Oncology and Nanomedicine (SEON), Else Kröner-Fresenius-Stiftung Professorship, Universitätsklinikum Erlangen, Erlangen, Germany.

² Department of Experimental Physics 5 (Biophysics), Julius-Maximilians-University Würzburg, Germany.

³ Central Veterinary Research Laboratory, P.O. Box 597, Dubai, UAE.

⁴ Generatio - Center for Animal Genetics, Heidelberg, Germany.

⁵ Department of Otorhinolaryngology, Head and Neck Surgery, Section of Experimental Oncology and Nanomedicine (SEON), Professorship for AI-Controlled Nanomaterials, University Hospital Erlangen, Erlangen, Germany.

* rainer.tietze@uk-erlangen.de

AIM:

Camels are known reservoirs and carriers of various coronavirus strains (Kandeel and Al-Mubarak 2022).

INTRODUCTION:

Camels are known reservoirs and carriers of various coronavirus strains (Kandeel and Al-Mubarak 2022). At the outbreak of MERS (Middle East Respiratory Syndrome) in 2012 the dromedary was identified as the intermediate host from which the spillover of the virus to humans originated (Zhu, Zimmerman et al. 2019). Prolonged droughts and unfavorable forage conditions increase the need for camels as an enduring farm animal. The growing trade of camels and camel products further enhances the risk of virus transmission to humans and other animals (Zhu, Zimmerman et al. 2019). Therefore, early detection of antibodies is an important parameter. Screening for antibodies against certain infections, especially viral infections in large animal and human populations, is usually done in the laboratory using immunochemical methods like ELISA that are expensive and, above all, time-consuming. This unnecessarily delays the need for acute action.

METHODS:

The work presented here shows a rapid testing of camel serum for coronavirus antibodies using a very recently developed modified magnetic particle spectroscopy (MPS) device based on the highly sensitive critical point method (COMPASS) (Vogel, Rückert et al. 2022). This method is sensitive to minimal changes in mobility of magnetic nanoparticle (MNP) ensembles and exploits the magnetization response of functionalized MNP ensembles to assess specific information about the conjugations of chemical or biological compounds on their surface. By controlled engineering of specific surface properties (functionalization), MNPs become special features for the detection of binding compartments, e.g., antibodies.

RESULTS:

In our work we confirm that specifically coated MNP could be functionalized with viral proteins.

CONCLUSION:

The use of functionalized MNPs together with COMPASS offers a fast, reliable and, on top of that, very cost-effective method to rapidly detect viral infections .

KEYWORDS

Camel, MPS Device, antibodies, sera

CITATION

Bernhard Friedrich¹, Patrick Vogel², Martin A Rückert², Stefan Lyer^{1,5}, Johanna Günther², Ulrich Wernery³, Sunitha Joseph³, Judith Müller⁴, Volker C. Behr², Christoph Alexiou¹ and Rainer Tietze^{1*}. (2023). Portable MPS device for the highly sensitive detection of viral antibodies in camel sera . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Profile of Some Trace Elements in The Liver of Camels, Sheep, and Goats in the Sudan

Mohamed Hussein

moh200432@hotmail.com

AIM:

Assessment of some trace elements in the liver of camels, sheep, and goats.

METHODS:

One hundred camels (*Camelus dromedaries*) and fifty sheep and goats being adult, male, and apparently healthy field animals were studied to provide data regarding the normal values of some hepatic trace elements. Liver samples were collected during postmortem examination, digested, and analyzed for Cu, Zn, Fe, Co, and Mn using atomic absorption spectrophotometry.

RESULTS:

The results showed that the differences in mean liver concentrations of Cu, Zn, Fe, and Co between camels, sheep, and goats were statistically significant ($P < 0.05$). Hepatic Cu, Fe, and Co concentrations were higher in camels than in sheep and goats. All liver samples were adequate for Fe and Co, whereas only camel liver was adequate for Cu. In camels, hepatic Zn concentration was inadequately lower than that in sheep and goats. No difference in Mn concentration was detected between camels, sheep, and goats. All liver samples were inadequate compared to free-ranging herbivores.

CONCLUSION:

In camels, significant correlation ($r^2 = -0.207$, P value = 0.04) was detected between Zn and Co, whereas in sheep significant correlation ($r^2 = -0.444$, P value = 0.026) was detected between Zn and Mn. No significant correlation between trace elements was detected in goats.

KEYWORDS

Camels, Trace elements, Liver, sheep, goats

CITATION

Hussein, M. (2023). Profile of some trace elements in the liver of camels, sheep, and goats in the Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

The use of Cannabis sativa Extract as Trypanocide against Experimental Trypanosoma evansi infection (camel trypanosomosis)

Samia H. Abdelrahman¹, Israa M. Mousa¹, Salwa M.E. Khojali¹ and A.A. Ismail²

¹ Department of Biochemistry, Central Veterinary Research Laboratory, Animal Resources Research Corporation, Khartoum Sudan.

² Faculty of Veterinary Medicine, Sudan University of Science and Technology, Khartoum Sudan.

* Email: samiah11@gmail.com

AIM:

The objective of this study is to evaluate trypanocidal activity of certain plant extracts compared to standard drugs.

METHODS:

Six groups of 6 rats each aged 6-8 weeks were used. Aqueous and methanolic extracts of the whole plant were administered orally at dose rates of 125 and 250 mg/kg BW for 10 consecutive days. The parasitaemia in each rat was followed for 60 days.

RESULTS:

Both aqueous and methanolic extracts cleared the parasite on the second day of treatment for the dose 125 and 250 mg/kg BW. Relapse occurred at day 48 of treatment for both doses of methanolic extract. The parasitaemia appeared after 18 days of treatment with 125 mg/kg water extract. Trypanocide the standard drug cured the parasite for 20 days only were relapse occurred at day 11.

CONCLUSION:

The obtained result indicates the trypanocidal effect of Cannabis sativa against T.evansi (camel trypanosomosis).

KEYWORDS

Cannabis sativa, Trypanosoma evansi, trypanocide

CITATION

Abdelrahman, S.H., Mousa, I.M., Khojali S.M.E. and Ismail, A.A. (2023). The use of cannabis sativa extract as trypanocide against experimental trypanosoma evansi infection (camel trypanosomosis). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Gas Chromatography-Mass Spectrometry Analysis and Antifungal Activity of Camel Faeces

Elham A., Suleiman¹ and Salwa M. Elbashir²

¹Mycology Department, Central Veterinary Research Laboratory, Khartoum, Sudan

²Biochemistry, Toxicology and Nutrition Department, Central Veterinary Research Laboratory, Khartoum, Sudan

*salwamuhammed@hotmail.com

AIM:

The current study appears to be the first that pointed up the antifungal activity of camel faeces. The outcome of Gas Chromatography.

INTRODUCTION:

Mass spectrometry analysis of chloroform extracts revealed presence of many bioactive complex compounds which can act as antifungal agent.

MATERIALS AND METHODS:

Camel faeces: Camel faeces were collected from Camel Research Station, located in Tamboul city, Gezira State, central of the Sudan. Clinical isolates of dermatophytes: *Trichophyton rubrum*, *T. verrucosum*, *T. mentagrophytes*, *T. schoenleinii* were obtained from Mycology Department, Central Veterinary Research Laboratory, located at Soba District, Khartoum, Sudan.

Extraction of Camel Faeces: Ethanol, hexane, butanol, chloroform and water extracts of camel faeces were carried out.

RESULTS:

The determination of antifungal activity of the extracts of camel faeces was determined by agar incorporated or poisoned food technique (Singh 2005).

CONCLUSION:

This finding indicated that, the inhibition of growth may be due to camel faeces rather than the solvent used. Thus, efficacy of camel faeces depends on the solvent used for the extraction. Although, the antifungal compounds of camel faeces are not yet determined, in the present study analysis extracts revealed presence of multiple compounds such as fatty acids, sterols, aldehydes, phenols and others which have antifungal activity. The presence of such novel compounds might determine the antifungal activity by interaction with the membrane constituents and their arrangement. The retention time, molecular weights, formulae and peaks are, percentage of detected compounds of ethanol and chloroform extract were shown in this study in addition to bioactivity of some compounds.

KEYWORDS

Gas chromatography, camel, faeces, antifungal

CITATION

Suleiman, E.A. and Elbashir, S.M. (2023). Gas chromatography-mass spectrometry analysis and antifungal activity of camel faeces. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Adding Different Level of Cowpea on the Camel Meat Burger

Ghada A. Ibrahim^{1*}, Egbal S. Abu shulukh¹, Nafiisa M.A.Y.², Dima F.¹, Hadia I.¹, Safiya M.¹ and Shima K.h.¹

¹ Department of Meat Production, College of Animal Production, University of Bahri – Khartoum - Sudan PO Box 1660

² Department of Nutrition, College of Animal Production, University of Bahri – Khartoum - Sudan PO Box 1660

* igadah33@gmail.com

AIM:

In the light of the rising price of red meat, both globally and locally, scientists have thought to find alternatives to meat and animal protein used in different meat industries.

INTRODUCTION:

The suitability of these alternatives in terms of abundance and nutritional value and cost is the vegetable protein represented in pulses of different kinds. This research was conducted at the Laboratory of Animal Production, College of Animal Production, University of Bahri, Kadaro, Khartoum North by mixing the cowpea with meat by 10%, 20% and 30%.

METHODS:

Using the mixture in the camel burger industry to studying the effect of adding cowpea on sensory, physical and chemical properties of the burger.

RESULTS:

Taste tests showed a positive effect on the sensory properties, as well as on the improvement of juiciness and tenderness and there was no significant difference at ($p>0.05$) between 10% 20%. The chemical analysis showed that there was significant different at ($p<0.001$) and addition of cowpea to the meat led to reduced humidity and fat percentage while the proportion of protein and ash and this positive effect. For water holding capacity and loss of weight during cooking, the addition of cowpea resulted in a significant increase in water binding and reduction of loss during cooking, which is considered positive.

CONCLUSION:

It is clear to us that cowpea can be mixed with meat by 10-20% with no negative effect on its properties.

KEYWORDS

Camel Meat Burger, Cowpea, chemical, physical, sensory

CITATION

Ibrahim, G.A., Abu shulukh, E.S., Nafiisa, M.A.Y., Dima, F., Hadia, I., Safiya, M. and Shima, K.H. (2023). Effect of adding different level of cowpea on the camel meat burger. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Adaptation of Feeding Behavior of Dromedaries to Seasons Change in the Northern Saharen Rangeland of Algeria (Ouargla and Ghardaïa)

Slimani Noureddine^{1*}, Chehma Abdelmadjid² and Mahboub Nasma¹

1 Department of Biology, Faculty of Natural Sciences and Life, university of El Oued Algeria.

2 Laboratory of Saharan bioresources preservation and valorization, university of Kasdi, Merbah- Ouargla, Algeria

pub_slimanin@yahoo.fr

AIM:

The present work aimed to study the ecological role of camel that can be play in the Algerian Saharan pastoral.

INTRODUCTION:

This pastoral space was unbalanced by climatic conditions and overgrazing of sheep and goats. which constitutes a threat that may increase the phenomenon of desertification.

METHODS:

Our approach was to make a floristic study courses and monitor the behavior of the camel in its natural environment, and quantitative and qualitative measures of diet using micro-histological analysis of faces.

RESULTS:

The floristic study of different sites grazing camel showed a richness of 33 species belonging to 17 families with 20 perennial and 13 ephemeral. A remarkable seasonal variability was observed. However, the diet of camel studied by field observation and stool analysis has shown that it was very diversified composed of 23 species, 17 perennial species and 06 ephemeral species belonging to 13 botanical families with large seasonal variations. The quantitative study of ingested rations allowed to count from 1 to 4 mouthfuls maximum for each species, and to estimate an amount of mouthfuls ranged from 0.72 to 3.9 g. This allowed us to estimate the total quantities ingested between 2.94 and 17.2 kg DM / day, equivalent to 0.58 to 3.4 kg DM / 100 kg BW / day. The dromedary traveled long distances daily ranged from 20.2 to 50.46 km, allowing seeds dispersal content in feces in large areas and thus improving the biodiversity of Saharan pastures. The potluck index was between 0 and 0.6 confirming that this animal pastures the plants with a scattered way.

CONCLUSION:

All these behaviors put the camel in the first rank compared to other domestic species in terms of their positive impact on the pastures of Saharan rangeland.

KEYWORDS

Dromedary, feeding behavior, feed intake, spontaneous plants, Saharan rangeland

CITATION

Noureddine, S., Abdelmadjid, C. and Nasma, M. (2023). Adaptation of feeding behavior of dromedaries to seasons change in the Northern Saharen rangeland of Algeria (Ouargla and Ghardaïa). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

First Ethogram for Evaluation of Dairy Camel Behaviour During Training on Machine Milking

M. Brahmi^{1,2*}, M. Atigui¹, P.G. Marnet³ and M. Hammadi^{1,4}

¹ Livestock and Wildlife laboratory, Arid Regions Institute, Medenine, Tunisia

² Higher Institute of Agricultural Science of Chott Mariem, Sousse, Tunisia

³ Animal Sciences and Products Department, INSTITUT AGRO Rennes - Angers, F-35042, Rennes - France

⁴ Ecole Doctorale SIS, Université de Gabès, Cité Erriadh, 6072 Gabès, Tunisie

* marwa.mounir01@hotmail.com

AIM:

This work aimed to establish a specific ethogram to evaluate behavioural responses of dairy camels during training on machine milking.

INTRODUCTION:

Milking behaviour is considered as one of the most important behavioural traits in dairy species. Although studies of milking behaviour for conventional dairy species are numerous, little information has been published about dairy camels. Added to this, camel's adaptation to machine milking procedures remains difficult and successful habituation of camels to machine milking requires understanding their behaviour. One of the most scientific tools for the study of this behaviour is ethogram.

METHODS:

Eleven dairy camels housed in free stall (aged from 5 to 19 years, 95,5 ± 8,6 DIM, average BW= 429.1 ± 24.2 kg) were used. In average, each camel received daily 4 kg of oat hay, 4 kg of alfalfa hay, and 4 kg of wilted green alfalfa and 2 kg of concentrate with free access to water. Milking was ensured using a milking pot adjusted according to the recommendations of our team published elsewhere. Direct monitoring of the animals during milking and video recordings (by two experienced handlers) were simultaneously used for ethological data's collection.

RESULTS:

The development of the ethogram went through three steps: observation, description and organization into categories. Thus, the behavioural traits most manifested by camels during the first machine milkings were selected and a preliminary ethogram was developed. Each observed behaviour was objectively defined and classified into stress (vocalization, forced entry, trembling, urination, liquid defecation, tail position, stepping, kicking, unhooking milking cup with posterior leg, bite, spit, jump, decubitus and vigilance) or welfare (rumination, solid defecation, milk ejection) category. Stress behaviours were divided into two types: fear or defence behaviours depending on camel's temperament. In opposition to welfare behaviours, those considered as acute stress behaviours were mostly recorded at the beginning of the training period. Then, they decreased over time in favour of welfare behaviours, which indicates the acceptance of machine milking.

CONCLUSION:

This study aims to develop the first ethogram for monitoring dairy camels during training on machine milking. While there are no specific guidelines for training dairy camels on machine milking, it remains a basic tool for studying their behavioural responses in an intensive system for a better understanding and improving welfare conditions.

KEYWORDS

Camels; ethogram; machine milking; welfare; stress

CITATION

Brahmi, M., Atigui, M., Marnet, P.G. and Hammadi, M. (2023). First ethogram for evaluation of dairy camel behaviour during training on machine milking. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Potential Effects of Syrup and Seeds Powder of Tunisian Pomegranate (*Punica Granatum L.*) on Characterization and Sensory Properties of Camel Milk Yogurt.

Jrad Zeineb^{1,2*}, Ousseiaif Olfa^{2,4}, Merkhi Sofian³, Khorchani Touhami² and El-Hatmi Halima^{2,4}

¹ Institute Of Higher Tourist Studies Of Sidi Dhrif, University of Carthage, Tunisia

² Livestock And Wildlife Laboratory Arid Land Institute, University of Gabes, Tunisia

³ Soci t  Cr merie G n ral, Djerba, Tunisia

⁴ Higher Institute of Applied Biology of Medenine, University of Gabes, Tunisia

* jradzeineb@yahoo.fr

AIM:

This study aimed to improve the acceptability and physico-chemical qualities of camel milk yogurt by adding pomegranate dried seeds powder and syrup.

INTRODUCTION:

Camel milk has started gaining interest from scientists and consumers due to its health benefits. The fermentation of camel milk can further increase its nutritional and therapeutic virtues. However, fermented camel milk and especially yogurt is known by a weak texture and poor consumer acceptance. Hence, incorporation fruits in camel milk formulation lead to health-promoting camel dairy product with an acceptable taste.

METHODS:

Three formulations of camel yogurt were prepared with different proportion of pomegranate dried seeds powder (P) and syrup (S). Enumeration F1, F2 and F3 has been assigned to each batch formulation. Formulation F1 contains an equal weight of the two ingredients (P/S=1), F2 is richer in syrup (P/S<1) and F3 is richer in powder (P/S>1). A control formulation T was prepared without the addition of pomegranate derivative for a comparative study. Sensory properties of different formulations were assessed using a 9-point hedonic test. Titrable acidity, dry matter, syneresis, and viscosity of different formulations were examined during 21 days of storage at 4 °C.

RESULTS:

The results showed that the addition of pomegranate seeds and syrup reduced pH and modified viscosity of yogurt samples. The formulation F3 (the richest in powder) has the highest dry matter and mineral 2 content. The formulation F2 (S=P) exuded less water than other formulations. Whereas, incorporation of pomegranate syrup with a high proportion (F3) offers the most desirable formulation (F3) regarding sensory and color evaluation.

CONCLUSION:

Pomegranate syrup and dried seeds have demonstrated their effectiveness as novel and attractive additives in camel milk processing by serving as natural coloring, sweetening and flavoring compounds.

KEYWORDS

Camel milk, yogurt, pomegranate syrup, dried seeds

CITATION

Zeineb, J., Olfa, O., Sofian, M., Touhami, K. and Halima, E. (2023). Potential effects of syrup and seeds powder of Tunisian Pomegranate (*Punica granatum L.*) on characterization and sensory properties of camel milk yogurt.. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Perspectives of Using Maldi-TOF Mass Spectrometry for Lactic Acid Bacteria Identification Isolated from Shubat and Koumiss

Kudaibergenova Aliya¹, Nurgazina Alina², Begdildayeva Nazerke², Akhmetsadykova Sh.³

¹ al-Farabi Kazakh National University, Almaty, Kazakhstan,

² LPP “Antigen” Almaty district, Kazakhstan.

³ Kazakh Research Institute for Livestock and Fodder Production, Almaty, Kazakhstan.

* Aliya.kuday@gmail.com

AIM:

The thesis presents the research results of using mass spectrometric method in identification of lactic acid bacteria (LAB) isolated from Kazakh traditional fermented milk beverages.

INTRODUCTION:

Diary fermented products include Shubat and Koumiss (fermented camel and horse milk) have a wide range of useful and health-promoting properties that are beneficial to the host body. One of the highly accurate analytical methods of phenotypic study is identification using MALDI-TOF Biotyper based on mass spectrometry of ribosomal proteins of microorganisms.

METHODS:

Microflora of four samples daily shubat and koumiss from one of the rural farms of Astana city (Kazakhstan). Pure cultures of LAB isolates on MRS agar plates were exposed to MALDI-TOF MS analysis. The MALDI Biotyper 3.1 program was used to evaluate the mass-peak spectra of ribosomal proteins. The spectrum of microbial proteins was used for mass spectrometric identification of microorganisms (protein profiling).

RESULTS:

LAB of shubat microflora are presented by: *Lactobacillus plantarum*, *Enterococcus durans*, *Lactococcus lactis*, *Enterococcus faecalis*, *Enterococcus faecium*, *Lactobacillus paraplantarum*, *Streptococcus gallolyticus*.

The microflora of Koumiss colonies is represented predominantly by *Enterobacteriaceae*, among which *Enterococcus durans*, *Enterococcus faecalis*, *Enterococcus faecium*, *Lactobacillus paraplantarum*, *Lactobacillus plantarum*, *Lactobacillus casei*.

CONCLUSION:

Bacterial identification using MALDI-TOF MS is described as a technique that is dependable, affordable, and well suited for data management. Overall, MALDI-TOF MS bacterial identification is a simple, quick, high-throughput method with exceptional specificity and minimal operating costs. In this study, we have demonstrated the value of Maldi-TOF identification as a tool for a variety of tasks.

KEYWORDS

LAB, Mass Spectrometry, Koumiss, Shubat, probiotics.

CITATION

Aliya, K., Alina, N., Nazerke, B. and Sh., A. (2023). Perspectives of using Maldi-TOF mass spectrometry for lactic acid bacteria identification isolated from Shubat and Koumiss. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Nutritional Related Diseases in Camels

Ishraga G. Ibrahim^{*1}, Osman H.¹, Amna, E. Khalafalla²

¹Department of Biochemistry, Pharmacology and Toxicology, Central Veterinary Research Laboratory, Khartoum, Sudan

²Department of Pharmacology and Toxicology, Faculty of Veterinary Medicine, University of Khartoum, Sudan.

*ishragaibrahim0@gmail.com

AIM:

This article will provide a review using available evidence-based researches of different aspects of nutritional disorder in camels that may contribute to emergence and appearance of different clinical symptoms of nutritional diseases.

INTRODUCTION:

Camels (*Camelus dromedarius* and *Camelus bactrianus*) are considered one of the main sources of healthy, high-quality meat and milk for human consumption within most of the countries in the semi-arid regions. Camels are adapted to the ecosystems of dry and arid zones where they are subjected to harsh conditions in addition to severe fluctuations in nutritional status which influence camels' production and reproductive efficiency, as well as many aspects of their growth and metabolism.

METHODS:

Searches were done in PubMed data base, Google scholar, and Google to find articles review nutritional disorders with potential to contribute to appearance of clinical symptoms of nutritional diseases in camels. Content found to be relevant for the study was extracted and the findings were presented in review format.

RESULTS:

Nutritional related diseases have received little attention in camels compared with other livestock in regard to the prevalence, causes, epidemiology and clinical findings. They have been suspected often, but investigated little. Several investigators reported that a deficiency, toxicities and imbalances of nutrients in camels, causes a variety of pathological problems and metabolic defects. The major problem is the suboptimal deficiency which can reduce growth rates and may cause low calving rates but is not readily apparent due to lack of specific clinical signs.

CONCLUSION:

The arid lands of Africa and Asia are under pressure due to global environment changing, which is affecting the rangelands' productivity and the feed resources for camel. To overcome severe nutritional deficiencies, the means of meeting the nutrient requirements of camel is needed.

KEYWORDS

Camels, nutritional disorder, Nutritional disease.

CITATION

Ibrahim, I.G., Osman, H. And Khalafalla, A.E. (2023). Nutritional related diseases in camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Physicochemical and Microbiological Characterization of Camel Kefir

Arroum Samira^{1,2}, Sboui Amel¹, Fguiri Imen¹, Tlig Siwar³, Dbara Mohamed¹, Hammadi Mohamed¹, Khorchani Touhami¹

¹Wildlife and Livestock Laboratory, Arid Land Institute, Médenine / university of Gabes/ Institution of Agricultural Research and Higher Education (IRESA), Tunisia

²Higher Agronomic Institute Chott Meriem, University of Sousse, Tunisia

³The National School of Engineers of Sfax

* arroumsamira2017@gmail.com

AIM:

This work is conducted aiming to determine the physicochemical and microbiological composition of camel kefir.

INTRODUCTION:

Kefir is a fermented milk product. It has its origins in the Caucasus Mountains and it is made traditionally from milk using kefir grains as inoculums.

METHODS:

A traditional preparation of camel kefir was made by inoculating milk with kefir grain (2%) at 25°C for 18 hours. bovine kefir was used for comparison. Gross composition (total solids, ash, proteins, fat) and microflora content were determined for both kefir.

RESULTS:

The physicochemical analysis of camel milk showed 117.75±6.64 g/l total solids, 37.36±0.06 g/l protein, 8.37±0.54 g/l ash, 21.6 ± 5.94°D for acidity and a pH of 6.47 ± 0.1. The FAMT and total coliform load is higher in bovine milk. Whereas, camel milk is richer in lactic acid bacteria (1.34±1.33) 10⁵ cfu/ml and yeasts (1.03±0.02) 10⁴cfu/ml).

Camel kefir presented the highest amounts in fat (21.63±6.38 g/l), protein (28.75 g/l), total solids (102,87±6.51 g/l), ash (8.11±0.59 g/l) and lactic acid bacteria (1.28±2.1)10⁹ cfu/ml than bovine kefir.

Camel kefir fatty acids composition showed that stearic acid was the major FA (31.9 g/100g Fat). Unsaturated FA are mainly presented by oleic acid (C18:1, 43.35 g/100 g fat) and linoleic acid (C18: 2, 2.6 g/100 g fat).

CONCLUSION:

Camel milk, due to its chemical composition and physicochemical properties is an excellent raw material for the production of Kefir.

KEYWORDS

Camel Milk, Kefir, composition, fermentation

CITATION

Arroum Samira, A., Amel, S., Imen, F., Siwar, T., Mohamed, D., Hammadi Mohamed¹, Khorchani Touhami¹. (2023). Physicochemical and microbiological characterization of camel kefir. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Polyphenol content and Antioxidant Activity of Camel Milk Soft Cheese Made with Carob Extract

Abir Omrani^{1,2*}, Amel Sboui¹, Maha Hamouda¹, Mohamed Dbara¹, Mohamed Hammadi¹, Touhami Khorchani¹

¹ Arid Land Institute (IRA), Livestock and Wild Life Laboratory, University of Gabes, Institution of Agricultural Research and Higher Education (IRESA), Tunisia

² Higher Institute of Biotechnology of Monastir (ISBM), University of Monastir, Tunisia

*Corresponding author: abyromrani@gmail.com

AIM:

This study aimed to explore the impacts of the use of carob extract for the manufacture of soft cheese from camel milk on the polyphenol content and antioxidant activity.

INTRODUCTION:

Dairy products such as soft cheese are consumed all over the world, and incorporating high-quality foods such as carob into the cheese-making process could help enrich these products with antioxidants and polyphenols.

METHODS:

The total polyphenol content was determined using Folin-Ciocalteu method. The antioxidant activity was evaluated by DPPH (2,2-diphenyl-1-picrylhydrazyl), ABTS (3-ethylbenzothiazoline-6-sulfonic acid) and FRAP (Ferric Reducing Antioxidant Power) tests.

RESULTS:

The total polyphenol content of soft camel cheese prepared with carob extract is higher than that of cheese prepared with commercial rennet with 0.34 ± 0.03 mg GAE/g and 0.78 ± 0.08 mg GAE/g, respectively. The antioxidant activity of soft camel cheese prepared with carob extract is higher than that made with commercial rennet by using the DPPH (88.4 ± 1.3 %), ABTS (96.1 ± 2.7 %), and FRAP (1.9 ± 0.2 DO) tests.

CONCLUSION:

The combination of camel milk and carob extract could help to provide functional dairy products like soft camel cheese rich in compounds with antioxidant activity and biological properties.

KEYWORDS

Camel milk, soft cheese, carob extract, polyphenol content, antioxidant activity

CITATION

Omrani, A., Sboui, A., Hamouda, M., Dbara, M., Hammadi, M. and Khorchani, T. (2023). Polyphenol content and antioxidant activity of camel milk soft cheese made with carob extract. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

A Comparison Between Camel and Cow Milk Fermentation Using Autochthone *Enterococcus faecium* LEFS20

K. Belguith^{1*}, O. Ousseif², Z. Jrad² and H. Elhatmi²

¹ Physiopathology, Food and Biomolecules Laboratory, LR17ES03, Higher Institute for Biotechnology Sidi Thabet, University of Manouba, Tunisia; ² Livestock and wildlife laboratory, LR16IRA04, Institute of Arid Land (IRA), Medenine, Tunisia.

*khaoula.belguith@isbst.uma.tn

AIM:

Comparison of camel and cow milk fermentation using autochthone *Enterococcus faecium* LEFS20.

INTRODUCTION:

Dromedary camel form a part of Tunisian livestock, specifically in arid area. Several studies described camel milk as comparable to human milk and including various nutrients and bioactive compounds. Nevertheless, few dairy products exist in the national and international markets. In this study, a comparison of cow (CoM) and camel (CaM) milk fermentation using *Enterococcus faecium* LEFS20.

METHODS:

Physico-chemical properties (pH, acidity, viscosity, density, dry matter) and chemical composition (proteins, fats, minerals, lactose) were performed before and after fermentation. Evolution of acidity, pH, viscosity and lactose concentration were monitored during fermentation with *Enterococcus faecium* LEF20 (NCBI accession number MN176627) previously isolated from raw fermented camel milk.

RESULTS:

A lower pH, viscosity, density and dry matter were observed in camel milk compared to cow milk. Same behaviour was deduced for camel and cow fermented milk in presence of *E. faecium* for physico-chemical properties, specially, decrease of pH and lactose concentration. During fermentation, acidification rate of cow milk in presence of *E. faecium* was more important. Isoelectric pH (4.5) of cow milk was reached more rapidly (8h) than camel one (pHi=4.2), which take 14h, despite camel milk origin of *E. faecium*. Fermented camel milk was slightly viscous and had less dry matter.

CONCLUSION:

Regarding low viscosity, obtained camel fermented milk can offer an innovative lighter beverage regarding nutrients and benefits components of such product. Mainly in arid area, where camel livestock.

KEYWORDS

Camel, cow, milk, viscosity, *Enterococcus faecium*.

CITATION

Belguith, K., Ousseif, O., Jrad, Z. and Elhatmi, H. (2023). A Comparison between camel and cow milk fermentation using autochthone *Enterococcus faecium* LEFS20. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Camel Milk Protein Hydrolysates Displayed Inhibitory Activity Towards A Key Enzyme Linked to Obesity

Olfa Oussaief^{1,*}, Zeineb Jrad^{1,2}, Touhami Khorchani¹ and Halima El Hatmi^{1,2}

¹ Livestock and Wildlife Laboratory, Arid Lands Institute of Medenine, University of Gabes, Tunisia

² Department of Food, High Institute of Applied Biology of Medenine, University of Gabes, 4119 Medenine, Tunisia

* olfa.loussaief@hotmail.fr

AIM:

This study aimed to investigate the anti-obesity activity of camel milk proteins before and after hydrolysis by several proteolytic enzymes.

INTRODUCTION:

Camel milk differs in the composition and structure of its protein components from the milk of other dairy animals. Milk contains bioactive peptides sequences encrypted within the intact proteins. Generally, these peptides are inactive in the native protein, and could be released from precursor proteins through enzymatic hydrolysis, which is an efficient way to generate bioactive peptides.

METHODS:

Camel milk proteins were hydrolysed by six proteolytic enzymes from animal (pepsin, trypsin and α -chymotrypsin), plant (papain) and microbial (pronase) origin. The degree of hydrolysis was measured for camel milk protein hydrolysates. Both undigested and digested camel milk proteins were assessed in vitro for their anti-obesity potential using the pancreatic lipase inhibitory assay.

RESULTS:

The results showed that camel milk protein hydrolysates exhibited different degrees of hydrolysis ranging from 17.69 to 41.86 % which demonstrate the heterogeneity of the generated peptides. Pronase-treated hydrolysates showed the highest degree of hydrolysis value, whereas pepsin-treated hydrolysates showed the lowest one. Camel milk protein hydrolysates displayed significantly higher anti-obesity capacities than the native proteins at all the tested concentrations ($P < 0.05$). Pepsin-treated hydrolysates showed the highest anti-obesity potential (40.02 %).

CONCLUSION:

The results suggest that camel milk protein hydrolysates could be used as a natural source of anti-obesity peptides to formulate functional foods. Further work is needed to identify bioactive peptides from fermented camel milk.

KEYWORDS

Camel milk, enzymatic proteolysis, degree of hydrolysis, anti-obesity activity.

CITATION

Oussaief, O., Jrad, Z., Khorchani, T. and El Hatmi, H. (2023). Camel milk protein hydrolysates displayed inhibitory activity towards a key enzyme linked to obesity. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Seasonal Variations of Testosterone and Body Weight in Stabled Dromedary Camels (*Camelus dromedarius*)

Lamia Doghbri^{1,2}, Meriem Fatnassi¹, Matthieu Keller⁴, Mabrouk Seddik¹, Adriana Casao⁵, Rosaura Pérez-Pé⁵ and Mohamed Hammadi^{1,2,3}

¹ Livestock and Wildlife Laboratory, Arid Lands Institute, 4100 Médenine, University of Gabès, Tunisia

² Faculty of Sciences of Gabes, Erriadh City 6072, Zrig, University of Gabès-Tunisia

³ Institution for Agricultural Research and Higher Education (IRESA), 30, Rue Alain Savary 100 Tunis Belvédère, Tunisia

⁴ Physiologie de la Reproduction et des Comportements, CNRS, IFCE, INRA, Université de Tours, Agreenium, 37380 Nouzilly, France.

⁵ Grupo BIOFITER, Departamento de Bioquímica y Biología Molecular y Celular, Facultad de Veterinaria, Instituto Universitario de Investigación en Ciencias Ambientales de Aragón (IUCA), Universidad de Zaragoza, C/ Miguel Servet, 177, 50013 Zaragoza, Spain

*Corresponding author: lamia.doghbri@gmail.com

AIM:

The aim of this work was to detect the variation of the testosterone levels and body weight of camel (*Camelus dromedarius*) during the rut and beyond the breeding.

INTRODUCTION:

The dromedaries are classed as seasonal breeders. In Tunisia, the rut lasts from December to March (Hammadi, 2003). The body weight of the animal can be affected during the breeding due to a lack of appetite and making all attention to sexual activity.

METHODS:

Five clinically healthy males (6 to 13 years) were used in this study. Sires were reared under an intensive system at the Arid Lands Institute's artificial insemination centre in Medenine, Tunisia. Males have been housed separately in a single box. Monthly, blood sampling was taken from the jugular vein on heparinized tubes to detect the seasonal fluctuations of testosterone during the rut (From November to March) and beyond the season. Body weight of the animals was monitored every 15 days during the year. Testosterone levels were measured by EIA assay. Data were analysed by one-way ANOVA followed by Tukey's Multiple Comparison Test ($P < 0.05$).

RESULTS:

Testosterone concentration in plasma increased during the breeding season. In fact, testosterone attempt the pic in January (20.57 ± 9.28 ng/ml, $P < 0.05$) and the low means in July and August. On the other hand, the body weight of the males showed 13% of a decrease in parallel with the peak of rut compared to the weight during the off-season period ($638,5 \pm 29,35$ kg vs $556,7 \pm 25,19$ kg, in July and January respectively, $P < 0.0001$). Testosterone and body weight of sires was negatively correlated ($r = -0.90$, $P = 0.013$).

CONCLUSION:

Male body weight loss during the rut has been associated with increased testosterone.

KEYWORDS

Camelus dromedarius, testosterone, body weight, rut.

CITATION

Doghbri, L., Fatnassi, M., Keller, M., Seddik, M., Casao, A., Pérez-Pé, R. and Hammadi, M. (2023). Seasonal variations of testosterone and body weight in stabled dromedary camels (*Camelus dromedarius*). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

The Effect of Supplementary Feeding and Farming System on Young Camel Daily Gain

Sallam A. Bakheit^{1*}, Idriss A. Idriss, 1Jumaa B.Jadalla¹, Ali A. Hassabo² and Ahmed O. Idriss³

¹Dept. of Animal Production, Faculty of Natural Resources and Environmental studies, University of Kordofan, P.O.Box 160 Elobeid, SUDAN.

²Dept. of Dairy Production, Faculty of Animal Production, University of Alnileen, Khartoum, SUDAN.

³Dept. of Nutrition, Faculty of Natural Resources and Environmental studies, Peace University, SUDAN

*Corresponding author. E-Mail: sallam.camelin@yahoo.com

AIM:

This study aimed to investigate the effect of supplementary feeding and management system on Sudanese Young camel growth rate and daily gain

INTRODUCTION:

Energy and protein supplementation of Young camel can increase growth rates and reduce the time taken to attain market weight in finishing.

METHODS:

Twenty four (24) young camel (12 males and 12 females) at the same age one year old proximately were selected, from the Sudanese Arabi (Shanabla) bred. The young camel was maintained under semi-intensive and Traditional management system for 12 successive months. Young camels in semi-intensive system in addition of their grazing and browsing during midday they take supplementation diets (two kg of concentrate/head/day), ad libitum watering, health care and spraying weekly against ticks and external parasite. The other group was providing as a control, experimental animals managed traditionally within the same site of the experimental work. The live body weight of experimental young camels were obtained through direct weighing in 6 months interval, through three periods including initial body weight at 12 months, 18 months and last body weight at 24 months.

RESULTS:

The results indicated that there were non-significant difference ($P>0.05$) in preliminary weight of young camels raised under semi-intensive and traditional system. In both systems the male (134 ± 0.31 kg) is significantly ($P<0.05$) heavier than the female (112 ± 0.34 kg). The body weight of the young camel under semi-intensive system during 18 and 24 months of age are 231 ± 2.17 and 352 ± 2.42 kg respectively, on the other hand the body weight of the young camel under traditional system are 156 ± 2.35 and 212 ± 2.53 kg, respectively.

CONCLUSION:

The results showed highly significant difference ($P<0.01$) between systems of management, The over all mean daily gain of young camels under semi-intensive and traditional system were 558 ± 9.83 gram and 287 ± 5.46 gram, respectively.

Concentrate supplementation improved daily gain and final body weight in semi intensive system.

KEYWORDS

Young Camel, Growth Rate, Daily Gain, Farming system, Supplementary feeding, Sudan.

CITATION

Bakheit, S.A., Idriss, I.A., Jadalla, J.B., Hassabo, A.A. and Idriss, A.O. (2023). The Effect of Supplementary Feeding and Farming System on Young Camel Daily Gain. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Assessment of Management Systems and Production Constraints of Camel Herds in North Darfur State, Sudan

Amasaib E.O.^{*}, Saby M.T.A., Mahala A.G., Musa I.M.A. and Al bashir A.H.

Faculty of Animal Production, University of Khartoum, Sudan.

*samaniamasuib@gmail.com

AIM:

The study aimed to identify and evaluate the production systems, management, rearing practices and production constraints applied in dromedary camel (*Camelus dromedarius*) husbandry in Millet and Koma localities in North Darfur State during the period from June to August 2013. In these localities, camels and sheep as a mixture are reared under tradition nomadic system.

INTRODUCTION:

The one-humped camel (*Camelus dromedarius*) plays an important role as a primary source of subsistence in the desert and semi desert land in Sudan. It lives in areas which are not suitable for crop production and where other livestock species hardly thrive, and because of its outstanding performance in the arid and semi-arid areas of Sudan where browse and water are limited, pastoralists rely mainly on camels for their livelihood.

METHODS:

A detailed questionnaire was designed to survey and collect data from 100 camel owners in the study area. The questionnaire was designed to obtain information on general household characteristics, herd structure herd management, breeding practices, disease prevalence, production objectives, feeding management, and production constraints. The obtained data were subjected to analysis of variance (ANOVA) for a completely randomized design.

RESULTS:

The results showed that 40% of the camel owners were illiterate, 100 % of the respondents were not practicing cultivation. A 32 % of respondents stated that feeding and milking processes are provided by the husbands, a little more than half (54%) of camel owners are practicing a mixed activity of milk and meat. About half (50%) of the disease prevalence is dermatomycosis. A 100 % of the respondents said the water and feed supply is a constraint, while more than two thirds (70%) of constraints is a lack of security. A 52 % of the owners keeping camels as prestige, most of the owners preferred raising camels and sheep. She-camels were served naturally and were kept within the herd for all reproduction performance.

CONCLUSION:

In conclusion, the adoption of proper husbandry practices and provision of adequate health services can play significant roles in the improvement of camel production in North Darfur State. Moreover, supporting camel producers with educational facilities in their villages and introducing of new technology such as artificial insemination could improve camel production.

KEYWORDS

North Darfur, Camels, Production systems

CITATION

Amasaib, E.O., Saby, M.T.A., Mahala, A.G., Musa, I.M.A. and Al bashir, A.H. (2023). Assessment of management systems and production constraints of camel herds in North darfur state, Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Season, Management System and Pregnancy on Some Minerals Status in the Serum of She-camels (*Camelus dromedarius*) at Tumbool Area-Sudan

Husna Mohammed ElBasheir^{1*}, Amira Salih Eisa² and El Sir Abd Elhai Babiker²

¹Tumbool Camel Research Centre (TCRC, ARRC), Sudan.

²Faculty of Veterinary Medicine, University of AL Butana, Sudan.

*tumbool2015@gmail.com, husname98@hotmail.com

AIM:

To assess some minerals status (Calcium, Phosphorus, Manganese and Zinc) in the serum of she-camels (*Camelus dromedarius*) at Tumbool area, Sudan, from August 2017 to October 2018.

INTRODUCTION:

Assessment of mineral status in camels can often provide valuable information regarding health and production of animals. Traditionally, camels do not usually receive mineral supplementation.

METHODS:

Blood samples were collected from 120 she-camels; eighty she-camels were raised under traditional system and slaughtered at Tumbool slaughterhouse and forty samples from she-camels raised under intensive system at Tumbool Camel Research Centre (TCRC). The samples were analyzed by spectrophotometer for Calcium (Ca), Phosphorus (P), Manganese (Mn) and Zinc (Zn). The variation factors included season, system of management and pregnancy status.

RESULTS:

The obtained results showed that only Mn and Zn levels were significantly ($P<0.01$) affected by both season and management system. While serum Ca and Zn levels were significantly affected by pregnancy.

CONCLUSION:

Variations in season, type of management and physiological status significantly affected the minerals level in camel sera.

KEYWORDS

She-camel, Minerals, Serum, Season, Management system, Pregnancy

CITATION

ElBasheir, H.M., Eisa, S.A. and Babiker, E.A. (2023). Effect of season, management system and pregnancy on some minerals status in the serum of she-camels (*camelus dromedarius*) at tumbool Area-Sudan . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Sex, Age and Time of Blood Collection on Some Blood Constituents in Racing Camels

Fad Elseed, A.M.A, Amasaib, E.O. *, Balgees, A. Atta Elmanan and Ismail, H.B.

Department of Animal Nutrition, Faculty of Animal Production, University of Khartoum, Sudan.

* samaniamasai@gmail.com

AIM:

The study aimed to investigate the effect of sex (male vs. female), age (old "≥5 years" and young "<5 years"), and time of blood collection (pre – vs. post-racing) on blood constituents of racing camels (*Camelus dromedarius*).

INTRODUCTION:

In Sudan camels are used for meat and milk production, they are also used as race animals or exported to the neighboring Arab countries for the same function especially the light race camel types as Anafi and Beshari. Racing camels are regularly clinically checked, hematological and biochemical analysis of blood often provides valuable information for general health.

METHODS:

Sixteen racing camels in National Camel Racing in East Nile Locality (El-Shaikh Zaid Camel Race Track) were used in this study. A total of 32 blood samples were collected, under veterinarian supervision, 24 hours before racing (pre-racing) and 30 minutes after racing (post-racing) for some blood biochemical analysis. The experiment was arranged as a complete randomized design with a factorial arrangement (2×2×2). The Concentration of blood glucose, triglycerides, and urea were measured. Data was subjected to analysis of variance using Statistics 9 program.

RESULTS:

The results revealed that, blood glucose was higher ($P<0.05$) in female (122.39 mg/dl) than male (111.92 mg/dl), and in old animals (126.18 mg/dl) than young animals (108.13 mg/dl) and in pre-racing (166.84 mg/dl) than post-racing (67.47 mg/dl). However, blood triglyceride was higher ($P<0.05$) in female (59.89 mg/dl) than male (54.64 mg/dl) and in young animals (61.24 mg/dl) than old animals (53.30 mg/dl) and in pre-racing (87.72 mg/dl) than post-racing (26.81 mg/dl). Blood urea was higher ($P<0.05$) in male (50.11 mg/dl) than female (47.49 mg/dl) and in old animals (50.68 mg/dl) than young animals (46.92 mg/dl) and pre-racing (67.47 mg/dl) than post-racing (26.81 mg/dl).

CONCLUSION:

It could be concluded that, all the values of blood biochemical was found to be within the normal range, in addition to that for short distance, high intensity races camels need high energy feeds to meet the additional energy demand.

KEYWORDS

Racing camels, blood metabolites, age, sex, collection time

CITATION

Fad Elseed, A.M.A, Amasaib, E.O., Balgees, Elmanan, A.A. and Ismail, H.B. (2023). Effect of sex, age and time of blood collection on some blood constituents in racing camels . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Methods for Graphitic Biochar and Carbon Nanoparticles Create New Veterinary Application

Saleh Alluqmani¹, Musaed Hakami¹, Nadiyah M. Alabdallah^{2*}, Aslah Al-Zahrani, Hana´a Al-Marri and Ahmed Alshehri^{3,4}

¹ Faculty of Applied Science, Department of Physics, Umm Al-Qura University, Makkah, 21955, Saudi Arabia.

² Department of Biology, College of Science, Imam Abdulrahman Bin Faisal University, P.O. Box 1982, Dammam, 31441, Saudi Arabia.

³ Center of Nanotechnology, King Abdulaziz University, Jeddah 21589, Saudi Arabia

⁴ Department of Physics, Faculty of Sciences, King Abdulaziz University, Jeddah 21589, Saudi Arabia

* nmalabdallah@iau.edu.sa

AIM:

We synthesize and produce graphitic micro/nanoparticles based on sustainable waste sources using eco-friendly, low-cost, and scalable methods. The morphological and structural properties of the synthetic samples will be studied for further veterinary application in the camel sector.

INTRODUCTION:

The growth of camel has been a significant trend in Saudi Arabia. Its reaches about 53% of the total in KSA and around 1.6 million camels in the Arab Peninsula. According to Saudi Vision 2030, the scope of technology for the environment and economy meets the KSA plans. Therefore, nanoscience and nanotechnology offer innovative strategies in nanomedicine and veterinary and animal production to develop camel's economic value using various kinds of nanoparticles, including carbon nanomaterials.

METHODS:

First, samples of rose waste were prepared and synthesized by slow pyrolysis at 300 °C with a limited oxygen content for carbon microparticles. To control the morphology, the annealing period was optimized for 2, 5, and 10 h. Second, carbon nanostructures of large surface area and porous structures were prepared via a high-energy ball-milling method system (PM 400; Retsch, Germany). The physical and chemical properties were subsequently studied using scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), Raman spectroscopy (RS), X-ray photoelectron spectroscopy (XPS) and UV-vis spectroscopy

RESULTS:

The results show the successful production of renewable graphitic carbon. SEM results demonstrate the morphological and structural features, including high surface area, smaller particle size and microporous structures. Further, the synthetic optimization of produced graphitic material could be employed as a host matrix for drug delivery, antimicrobial composite, sensors, and imaging in camel veterinary medicine.

CONCLUSION:

Micro/nanoparticles of graphitic carbon were successfully produced with Morphological, structural, and spectroscopic features by low pyrolysis and high-energy ball-milling. The results confirmed that our methodology could be considered an effective potential stratagem for carbon materials for camel veterinarians

KEYWORDS

Nanotechnology, Carbon nanomaterials, Sustainable manufacturing, Camels, Veterinary

CITATION

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“The Role of Camel in Food Security and Economic Development”

Antimicrobial Properties based on Green Synthesis of Nanoparticles Promotes Applications of Camel Leather

Nadiyah Alabdallah^{1*}, Musaed Hakami², Abdullah Al Harthi², Taif Naif Aldajani², Hana Mohammad Almarri³, Saleh Alluqmani²

¹ Department of Biology, College of Science, Imam Abdulrahman Bin Faisal University, P.O. Box 1982, Dammam, 31441, Saudi Arabia.

² Faculty of Applied Science, Department of Physics, Umm Al-Qura University, Makkah, 21955, Saudi Arabia.

³ Medical Physics, Umm Al-Qura University, Makkah, 21955, Saudi Arabia.

³ Department of Physics, College of Science, Imam Abdulrahman Bin Faisal University, P.O. Box 1982, Dammam, 31441, Saudi Arabia.

* nmalabdallah@iau.edu.sa

AIM:

Camel hides have an important economic value being considered as a source of raw material for the footwear industries. Nanotechnology one the most promising strategies developing leather industry. Therefore, nanomaterials (metals, polymers, carbon nanostructures) can be attached to leather surfaces to improve the antimicrobial properties. Thus, there are calls for advanced manufacturing methods to produce effective nanocomposites with antimicrobial activity. Respectively, we study the possibility of using tanned camel leather treated with nanomaterials as an eco-friendly and antimicrobial wearable material employed in footwear industry.

INTRODUCTION:

The camel (Family: Camelidae) has crucial value in a desert environment and the different social for thousands of years. Since the leather industry plays a role in the economy in the world, there a considerable concern to valorize the camel hides. However, nanotechnology has a great potential to add innovative solutions and treatments. For example, the broad-spectrum antimicrobial performance of TiO₂, Ag, FeO, ZnO, CuO lead to develop the leather production and getting rid of microbes responsible for skin problems, offering new opportunities in footwear industry. Thus, our study aims to synthesize nanomaterials including TiO₂, Ag, Fe₂O₃ and carbon nanoparticles, and also to examine camel leather treated with nanomaterials as an eco-friendly and antimicrobial wearable material employed in the footwear industry.

METHODS:

Tanned camel leather will be collected from a local leather factory. It is then coated with different treatments of nanomaterials after characterizations, and will expose to study the antimicrobial activity of the leather and nanocomposite in preventing or reducing the microbes and skin infections.

RESULTS:

Synthesis of nanoparticles and new composites by low cost, sustainable, and eco-friendly methods including dry and wet high-energy ball-milling route with recycling of waste, and the fabrication of advanced wearable leather materials by innovative technologies to utilize it in footwear and textile applications. It is expected that these treatments and applications will give new promising results that may be useful in the field of protection from microbes and skin problems.

CONCLUSION:

We carry out sustainability and environmental positive impact, extensive research work on nanomaterial manufacturing with antimicrobial activity. We make an effort to make this nanotechnology suitable with leather production, which may lead to potential economic value.

KEYWORDS

Camel leather valorization, nanomaterials, leather surface, green synthesis, characterization, antimicrobial activity.

CITATION

Alabdallah, N., Hakami, M., Al Harthi, A., Aldajani, T.N., Almarri, H.M., Alluqmani, S. (2023). Antimicrobial properties based on green synthesis of nanoparticles promotes applications of camel leather . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Immunohistochemical Expression of the Atrial Natriuretic Peptide in the Fetal Heart of Dromedary Camel (*Camelus Dromedarius*)

Marwa-Babiker A.M.^{1,2*}, Ibrahim Z.H.^{3,4}

¹ Department of Anatomy, College of Veterinary Medicine, King Faisal University, KSA

² Department of Anatomy, College of Veterinary Medicine, University of Bahri, Khartoum-North, Sudan.

³ Department of Anatomy, College of Agriculture and Veterinary Medicine, Qassim University, KSA.

⁴ Department of Biomedical Science, College of Veterinary Medicine, Sudan University of Science and Technology, Khartoum-North, Sudan.

* z.ibrahim@qu.edu.sa

AIM:

The study aimed to investigate the immunohistochemical expression and distribution of ANP in developing camel heart which could reveal its possible role in dromedary camel protection and adaptation. A complementary histological investigation has also been performed.

INTRODUCTION:

The family of natriuretic hormones (NHs) includes atrial natriuretic peptide (ANP) and B-type natriuretic peptide (BNP) which are primarily produced in the heart, and C-type natriuretic peptide (CNP) is synthesized in other tissues including vascular endothelial cells and brain. NHs are involved in regulation of blood pressure, extracellular fluid volume, cardiovascular hemostasis, cardiac muscle growth regulation, anti-ischemic protective function and vascular smooth muscle contractility. Unlike dromedary camels, ANP has been identified in many small and large mammalian species. Owing to its role in control of extracellular fluid volume, identification of ANP in dromedary camels could be of more interest than other domestic mammals because of their unique water preservation mechanism in their dry habitat.

METHODS:

Samples of hearts from fifteen fetuses during the first trimester (1-130 days), second trimester (131-260 days) and third trimester (261 days- birth) obtained from a local slaughterhouse in Sudan were used for the general histological technique. ANP immunohistochemistry was performed considering the manufacturer's instructions.

RESULTS:

ANP was immunoreactive in both camel fetal heart atria and ventricles. The reaction was more abundant in the cardiac muscle cells than in the sub-endothelial and sub-mesothelial regions; the immunoreactivity increases with the progress of fetal age in the different cardiac regions. The immuno-labelled cardiac muscle cells were uniformly scattered in each region and were characterized by the presence of immunoreactive granular deposits in the blood vessels and conducting fibers.

CONCLUSION:

It could be concluded that the ANP is identified in the different compartments of dromedary camel fetal heart and its expression appears to be developmentally regulated.

KEYWORDS

ANP, Expression, Fetal, Dromedary camel.

CITATION

Marwa-Babiker, A.M., Ibrahim, Z.H. (2023). Immunohistochemical expression of the atrial natriuretic peptide in the fetal heart of dromedary camel (*Camelus dromedarius*). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Microbiological and Physicochemical Study of Different Ruminants Meats (Camel, Sheep, Goat, and Cow) in the Region of Biskra- Algeria

Titaouone Mohammed^{1,2} and Chergui Moussa¹

¹Laboratory Diversity of Ecosystems and Dynamics of Agricultural Production Systems in Arid Zones (DEDSPAZA) University of Biskra BP 68 Biskra 07000 Algeria.

²Laboratory Genetic, Biotechnology and Valorization of Bioresources (LGBVB) University of Biskra BP 68 Biskra 07000 Algeria.

* m.titaouine@univ-biskra.dz

AIM:

This study aims to compare different red meats sold at the region of Biskra (cow, sheep, goat, and camel meats) through the evaluation of their microbiological, physicochemical and organoleptic quality.

INTRODUCTION:

Red meat presents an important food resource for Man, being a great animal proteins resource and its high nutritional value. In this context, camel meat is an alternative for consumers in desert and arid regions

METHODS:

Our study focused on twelve samples of each animal species slaughtered at the Biskra slaughterhouse. Animal carcasses of different ages are randomly sampled of each meat type were taken from random butcher shops of the city between April and October 2020.

RESULTS:

Based on the three main axes studied to assess the quality of red meat from different ruminants (cattle, sheep, camels and goats), we found that: On the bacteriological level, we could not detect the presence of pathogenic germs (Clostridium, Staphylococcus aureus and Salmonella) in the different types of meat analyzed, but the latter were unfit for consumption because of their very high load. In FTAM and in faecal coliforms, especially for camel meat, which requires knowledge of the sources of contamination at different levels to consider appropriate means of control for each in order to reduce the load of these contaminants. For nutritional characteristics, all the meats analyzed had similar levels of copper, potassium and sodium. While beef was the richest in protein and calcium but was low in zinc, while sheep, goat and camelina meat showed similar levels of these. According to the sensory examination carried out, sheep meat was ranked first followed by beef, camelina and goat meat respectively. Indeed, the physiological and histological differences between these four types of meat have an almost definitive influence on the marketability of goat and camel meat, in favor of sheep and beef meat. However, ethnic and geographic culinary differences could reverse this balance.

CONCLUSION:

Finally, this work deserves to be completed in the future by examining a larger number of samples at various sites in Biskra. The search for metabolic residues and antibiotics should be carried out, as these substances can have adverse effects on public health.

KEYWORDS

Red meat, microbiological, physicochemical, organoleptic, Biskra.

CITATION

Mohammed, T. and Moussa, C. (2023). Microbiological and physicochemical study of different ruminants meats (Camel, Sheep, Goat, and Cow) in the region of Biskra- Algeria . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Comparison of Physicochemical Properties of the Camel Milk at the end Lactation Stage Raised in two Different Arid Regions: Biskra and El Oued, Algeria

Moussa Chergui^{1*}, Mohamed Titaouine^{1,2} and DjaleEddine Gherissi³

¹ Laboratory Diversity of Ecosystems and Dynamics of Agricultural Production Systems in Arid Zones (DEDSPAZA).SE/SNV Faculty. University of Mohamed Kheider, BP 68 Biskra 07000 Algéria.

² Laboratory of Genetics, Biotechnology and Biological Valorization (LGBVB).SE/SNV Faculty. University of Mohamed Kheider, BP 68 Biskra 07000 Algéria.

³ Laboratory of Animal Production, Biotechnology and Health. University of Mohammed ChérifMessaadia , BP 1 53, rue de Annaba, Souk-Ahras Algeria.

*moussa.chergui@univ-biskra.dz

AIM:

The objective of this study is to give a general overview of the basic composition on the macronutrients (proteins, fats, lactose) and micronutrients (minerals) of camel milk, during the end of lactation, raised under similar conditions in a semi-extensive system in two different regions: Biskra and El Oued.

INTRODUCTION:

Camel milk represents an important food source for desert populations in many Asian and African countries. Previous research has revealed that milk in general varies due to the difference in geographical areas and lactation periods. Other factors such as diet, physiological stage, seasonal conditions or physiological variations and the genetic or health status of the camels are of paramount importance.

METHODS:

The following parameters were measured using an automate named “Lactoscan®” (SAP50; CB-011052): pH, density, fat (g/l), non-fat solids (g/l), salts (%), proteins (%), lactose (%) and freezing point (C°).

RESULTS:

The results of comparing the means of the various parameters studied showed very highly significant differences between the two regions ($P < 0.05$) except for the fat and the freezing point ($P > 0.05$). Camel milk from El Oued proved to be the most acidic ($\text{pH} = 5.23 \pm 0.11$; $P < 0.05$), the densest ($\rho = 1029 \pm 0.002$; $P < 0.05$) and the richest in protein and lactose ($3.07\% \pm 0.25$; $P < 0.05$: $4.61\% \pm 0.38$; $P < 0.05$) compared to the milk collected in Biskra. Moreover; camel milk raised in Biskra is the richest in fat ($33.08 \text{ g/l} \pm 4.27$; $P > 0.05$), in non-fat solids (106.12 ± 7.55) and with a higher freezing point ($-0.493 \pm 0.32 \text{ C}^\circ$; $P < 0.05$).

CONCLUSION:

Our results represent an initiation to the determination of the essential factor of variability of the physicochemical and nutritional quality of milk in the Algerian south. In-depth knowledge in this sense is essential for understanding the transformations that take place in it and its derivatives during the various traditional or industrial treatments.

KEYWORDS

Arid region, Camel milk, Lactation stage, Physicochemical properties.

CITATION

Chergui, M., Titaouine, M. and Gherissi, D. (2023). Comparison of physicochemical properties of the camel milk at the end lactation stage raised in two different arid regions: Biskra and El Oued, Algeria. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Descriptive Typology and Structural Analysis of Camel Farms in the El Qued Region, Algeria

Moussa Chergui^{1*}, Mohammed Titaouine^{1,2} and DjaleEddine Gherissi³

¹ Laboratory Diversity of Ecosystems and Dynamics of Agricultural Production Systems in Arid Zones (DEDSPAZA).SE/SNV Faculty. University of Mohamed Kheider, BP 68 Biskra 07000 Algérie.

² Laboratory of Genetics, Biotechnology and Biological Valorization (LGBVB).SE/SNV Faculty. University of Mohamed Kheider, BP 68 Biskra 07000 Algérie.

³ Laboratory of Animal Production, Biotechnology and Health. University of Mohammed ChérifMessaadia , BP 1 53, rue de Annaba, Souk-Ahras, Algeria.

*Corresponding Author Email: moussa.chergui@univ-biskra.dz

AIM:

The purpose of the present study is to determine the different dromedary breeding systems in the El Oued region, located in the southeast of Algeria.

INTRODUCTION:

In the past, dromedary was used for transport and field work, and today it meets the multiple needs of the population by supplying it in addition to hair, skin, meat and milk. So the question arises whether camel farming has undergone a change due to changes in the politics of the indigenous population and/or to changes in bioclimatic conditions?

METHODS:

To do this, 42 camel farms containing 1,406 camels represent 2.57% of the total population of the study region were studied. The studied farms are distributed over the four regions of the Wilaya of El Oued, namely MihOuansa (19), El Oued (11), Guemar (05), and Magrane (07), with a sampling rate of approximately 46% of the estimated total number of camel herds in these regions. The Single-Visit Multiple-Subject Diagnostic Survey (SVMSDS) method, supplemented by field observations, was used.

RESULTS:

The study showed three types of camel drivers according to their mode of habitation and the mobility of the animals, namely, nomads (69.05%), sedentary (16.67%), and semi-sedentary (14.29%). The composition of the herds is largely dominated by females mainly adult she-camels aged more than 36 months (52.84%) followed by sub-adult females; 16.79% (24-36 months) and 15.71% (12-24 months), at the end 11.74% of juvenile females (less than 12 months). Concerning the share of spawning males is the least represented (02.92%). The study of the age hierarchy of the animals showed that 55.76% of the animals are older than 36 months, 16.79% are aged between 24 and 36 months, 37.45% are younger than 36 months, and at the end, 27.45% are young camels (calves) aged less than 24 months. The survival of the camel herd depends exclusively on the free supply of fodder from natural pastures.

CONCLUSION:

This study highlighted indications that the traditional aspect remains dominant. In addition, we have noticed that there is a perhaps timid and silent trend towards improving driving and productivity.

KEYWORDS

Camel driver, Dromedary, Investigation, Livestock system.

CITATION

Chergui, M., Titaouine, M. and Gherissi, D (2023). Descriptive typology and structural analysis of camel farms in the El Qued region, Algeria. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Exopolysaccharides from Lactic Acid Bacteria on Microbial Properties of Camel Milk Yogurts During Refrigerated Storage

Zammouri Amal¹, Ziadi Manel², Fguiri Imen¹, Arroum Samira¹ and Khorchani Touhami¹

¹ Laboratory of livestock and Wild life Institute of Arid lands (IRA Medenine). 4119. Médenine, Tunisia.

² Laboratory of Microbial Ecology and Technology (LETMi). National Institute of Applied Sciences and Technology (INSAT), BP 876, 1080 Tunis, Tunisia.

*zammouriamal@yahoo.fr

AIM:

The main objective of this study is the evaluation of the microbiological quality of a camel milk yogurt prepared using an exopolysaccharide derived from lactic acid bacteria at different percentages.

INTRODUCTION:

Exopolysaccharides (EPS) are metabolites synthesized and excreted by a variety of microorganisms, including lactic acid bacteria (LAB). During the last decade, the production of EPS by lactic acid bacteria has aroused particular interest in view of their functional properties and their recognized harmless GRAS character. Under specific growth conditions, lactic acid bacteria species generate a wide range and diversity of EPS structures that can be used in the food and pharmaceutical industries. In our case study, the purpose of adding EPS is to improve the quality of a camel milk yogurt.

METHODS:

After the preparation of yogurt from fresh camel milk and the addition of exo-polysaccharide extracts at different concentrations: 0.5%, 0.75% and 1.25% (w/v). The prepared yogurts were refrigerated at 4°C and stored for 21 days. Microbiological analyses were carried out four times after an interval of 7 days to confirm the quality of the yoghurts containing the different EPS fractions as well as on the control yoghurt containing 1% gelatin. During this study, the germs that were sought are: Yeasts and molds on Sabouraud agar at 25°C, total coliforms on VRBL (Crystal violet and neutral red) Agar at 30°C, Total aerobic mesophilic bacteria on Plate Count Agar at 30°C and lactic acid bacteria on MRS Agar at 37°C.

RESULTS:

The results showed that the addition of 0.75 to 1.25% of exopolysaccharides from lactic acid bacteria makes it possible to obtain a camel yogurt of good hygienic quality (in accordance with the standards relating to total coliforms, yeasts and molds and thermo-tolerant coliforms) as well as stimulation of the growth and activity of probiotic bacteria.

CONCLUSION:

To conclude, we can say that the addition of EPS extract in camel yogurt can improve its microbial stability during cold storage (4°C).

KEYWORDS

Exopolysaccharides- Camel milk - yogurts - lactic acid bacteria

CITATION

Amal, Z., Manel, Z., Imen, F., Samira, A. and Touhami, K. (2023). Effect of exopolysaccharides from lactic acid bacteria on microbial properties of camel milk yogurts during refrigerated Storage . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Impact of the Camel Breeding System on the Quality of the Milk Produced: Nutritional and Technological Aspects

Saliha Boudjenah-Haroun^{1*}, Safia Mekkaoui², Saïd Mosbah¹, Imène Felfoul³ and AbdelKader Adamou²

¹ Laboratory of Research on Phoeniculture, Kasdi Merbah University, Ouargla, 30000, Algeria.

² Saharan Bioresources Laboratory: Preservation and Valorization, Université Kasdi Merbah Ouargla 30.000 Algérie.

³ Laboratory of Analysis, Valuation and Food Safety (LAVASA), National School of Engineers of Sfax, 3038 Sfax, Tunisia.

* salihaboudjenahharoun@yahoo.fr

AIM:

The objective of this study was to determine the influence of the diet of dairy camels on the quality of milk produced from two farming systems: extensive and semi-intensive, as well as its ability to transform into artisanal cheese: kemia.ria.

INTRODUCTION:

The milk of the camel raised on the natural courses, is famous for its therapeutic virtues and its richness in nutritive elements. However, its consumption is reserved for the camel and the family of the camel driver. In recent years, its marketing has begun to develop in Algeria, especially with the emergence of a new type of breeding; the peri-urban system with the introduction of coarse fodder and concentrated feed in the diet of dromedaries.

METHODS:

Physicochemical and biochemical analyses were carried out on 30 milk samples collected from the two systems. Subsequently, the two types of milk were transformed into kemaria cheese for a study related to the characteristics.

RESULTS:

Physico-chemical and biochemical analyses show that the pH, total protein and casein content are significantly higher in milk from semi-intensive farming than that from extensive farming. The higher casein content had an impact on the cheese yield, with (24.85%) for semi-intensive breeding against 17.91% for extensive breeding. In parallel, the results of the analysis of the profile of the texture indicate no difference between the two cheeses and this on the four parameters: hardness, cohesion, elasticity and adhesiveness. The sensory evaluation showed that the fabricated kemaria was accepted by the tasters.

CONCLUSION:

The study show that the feed supplementation used in semi-intensive farming increases milk production with an influence on the protein level, which may have an effect on cheese processing technology.

KEYWORDS

Breeding system, camel, cheese, extensive, milk.

CITATION

Boudjenah-Haroun, S., Mekkaoui, S., Mosbah, S., Felfoul, I. and Adamou, A. (2023). Impact of the camel breeding system on the quality of the milk produced: Nutritional and technological aspects. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Camel's Digestive Tract Treatment on Breaking Seed Germination of *Argyrobium uniflorum* (Decne.) Jaub. and Spach from the Northern Sahara in Algeria

Hafida Trabelsi*, Abdelmadjid Chehma and Abdelhakim Senoussi

Laboratoire de Bioressources sahariennes. Préservation et valorisation. Université Kasdi Merbah- Ouargla, Algeria.

*trabelsi.ha@univ-ouargla.dz

AIM:

To determine the effect of passage through the digestive tract of camel on breaking seed dormancy compared to various pretreatments (98% H₂SO₄ soaking, 37% HCL soaking, soaking intact seeds in distilled water for 24h at ambient temperature) and intact seeds without pre-soaking treatments were considered as the control.

INTRODUCTION:

Argyrobium uniflorum (Decne.) Jaub. & Spach a desert perennial shrub plant which belongs to the Fabaceae family, it is a rangeland species presents an important pastoral, medicinal, ecological and economical interest. The effects of pretreatments on seed germination of *A. uniflorum* provide information regarding germination requirements of this species, which could be used for management and conservation of the camel rangeland.

METHODS:

Camel faeces were collected from different rangelands. Seeds were extracted from camel faeces and were quantified. Germination experiments were conducted in petri dishes lined with filter paper.

RESULTS:

The results obtained from this study indicate that 122 seeds were recovered from camel's faeces. Seeds remain intact and undamaged after passing through the digestive system. Chemical scarification by H₂SO₄ boosted the germination (100% vs. 6% of control treatment), indicating that the seeds have a potentially high germination rate if the coat is eroded. HCL soaking did not improve germination. Seed passage through the camel's digestive tract increases seed survival by influencing seed germination, Germination percentage increased from 4±3.26 to 100%, with values up to twenty five- fold higher than in non-ingested seeds.

CONCLUSION:

Germination in *A. uniflorum* may be enhanced by camel ingestion. We conclude that it is necessary to better understand the role of camel in the maintenance and conservation of the studied species by endozoochory.

KEYWORDS

Physical dormancy; Germination; Camel digestion; Conservation; Algeria

CITATION

Trabelsi, H., Chehma, A. and Senoussi, A. (2023). Effect of Camel's Digestive tract treatment on breaking seed germination of *Argyrobium uniflorum* (Decne.) Jaub. and Spach from the northern Sahara in Algeria. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Anatomopathological Profile, Microscopic and Molecular Diagnosis of Paratuberculosis/ John's Disease in Naturally Infected Dromedary Camels (Camelus Dromedaries)

El Tigani Ahmed El Tigani-Asil, Ghada Ahmed El Derdir, Abdelnasir Mohammed Adam Terab, Hassan Zackaria, Nasareldien Altaib Hussein Khalil, El Hadi Ahmed Mohamed Abdu, Zhaya Jaber Mohammed Al Marri, Abd Elmalik Ibrahim Khalafallah Fadel Elmola and Asma Mohamed Shah

Abu Dhabi Agriculture and Food Safety Authority (ADAFSA), UAE

AIM:

Paratuberculosis (PTB) or John's disease (JD) is a chronic and debilitating disease of ruminants impeding the reproduction and productivity of the livestock sector worldwide. Since there is a lack of pathological studies explaining the nature and development of the disease in camels, this study aimed to highlight the anatomopathological changes of paratuberculosis in camels, which may help in verifying and validating of some diagnostic tests used to detect the etiology of the disease in camel tissues.

METHODS:

Different analytical methods, including clinical, microscopic, pathological, and molecular parameters, were applied to investigate anatomopathological profile of PTB in naturally affected dromedary Camel. In 2017 at Alsela border Veterinary Clinic of Al Dhafra Region, Abu Dhabi, UAE one culled she-camel of 2 years old subjected to clinical, microscopic and anatomopathological investigations along with real-time quantitative PCR (q-PCR), to correlates between clinical signs and pathological lesions of the PTB in dromedary camels.

RESULTS:

Clinically, typical clinical signs compliant with the pathognomonic gross and histologic lesions of PTB were seen in naturally infected dromedary camel. As presumptive diagnosis microscopically, acid-fast coccobacillus bacterium clumps were demonstrated in direct fecal smears as well as in scraped mucosal and crushed mesenteric lymph node films, and in histopathological sections prepared from necropsied animal and stained by Zeel Nelsen's stain. Free and intracellular acid-fast clump phagosomes was further confirmed as *Mycobacterium avium* subsp. Paratuberculosis by (q-PCR).

CONCLUSION:

PTB's clinical signs and pathological lesions in dromedary camels were found to be like those of the other susceptible hosts.

KEYWORDS

Paratuberculosis, Dromedary Camels, acid-fast bacteria, *Mycobacterium*

CITATION

El Tigani-Asil, E.A., El Derdir, G.A., Terab, A.M.M., Zackaria, H., Khalil, N.A.H., Abdu, E.A.M., Al Marri, Z.J.M., Elmola, A.I.K.F. and Shah, A.M. (2023). Anatomopathological profile, microscopic and molecular diagnosis of paratuberculosis/john's disease in naturally infected dromedary camels (camelus dromedaries). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Assessment of Some Toxic Elements (Co, Cr, Mn, Se, and As) in Muscle, Offals, Hair and Blood of Camels (Camelus Dromedaries) and their Risk Assessment

Ahmed M.A. Meligy^{1,2,*}, Hesham A.A. Ismail^{3,4} and Sherief M. Abdel-Raheem^{3,5}

¹ Department of Clinical Sciences, College of Veterinary Medicine, King Faisal University, KSA, P.O. Box: 400, Al-Ahsa, 31982, Saudi Arabia.

² Department of Physiology, Agriculture Research Center, ARC, Egypt.

³ Department of Public Health, College of Veterinary Medicine, King Faisal University, KSA, P.O. Box: 400, Al-Ahsa, 31982, Saudi Arabia.

⁴ Department of Food Hygiene (Meat Hygiene), Faculty of Veterinary Medicine, Assiut University, Assiut 71526, Egypt.

⁵ Department of Animal Nutrition and Clinical Nutrition, Faculty of Veterinary Medicine, Assiut University, Assiut, Egypt

* amelegi@kfu.edu.sa

AIM:

The goal of this research is to assess the levels of trace elements (selenium, manganese and cobalt) and heavy metals (arsenic and chromium) in the blood, hair, and offal of three different camel breeds (Magaheem, Maghateer, and Wadha) in Al-Ahsa province, Saudi Arabia. Additionally, human dietary intake of these metals and risk assessment associated with the consumption of such camel meat will be.

INTRODUCTION:

Saudi Arabia is the Middle East's largest producer of camel meat, accounting for 62% of total volume with annual per capita consumption of 3.10 Kg (Indexbox, 2022). Camel meat is becoming increasingly popular because of its low fat, low cholesterol and high polyunsaturated fatty acid content (Kadim et al., 2008). Food safety is a major concern for people all over the world. The hazard of heavy metal contamination in meat is of big concern for both food safety and human health.

METHODS:

A total of 225 tissue samples (muscles, liver, and kidney), serum, and hair samples (n = 75) were taken from three local camel breeds at random. Directly after slaughter, samples were obtained from the Al-Omran central slaughterhouse in Saudi Arabia. The elements determination by using Atomic Absorption Spectrometry AAS6800 Shimadzu, Japan.

RESULTS:

Camel breed significantly ($P < 0.05$) influences Co, Cr, Mn and Se accumulation and distribution in organs and muscle, however arsenic accumulation was not significantly affected ($P < 0.05$) by camel breeds. The highest values of Co, Cr, Se and Mn in All examined samples were detected in the liver samples of maghateer and magaheem breeds; however, the highest values for Se were detected in Wadha breed. The Co, Cr, Mn and Se contents in all male camel samples were considerably greater than in female camel and the vice versa for arsenic concentrations. Furthermore, significant strong positive correlation between serum and liver cobalt, chromium, manganese and arsenic.

CONCLUSION:

It can be concluded that heavy metal distributed among camel sample of different breeds and trace elements in meat and offal below the international maximum permissible limit. In addition, no potential health hazards among camel meat consumers in Saudi Arabia especially, adult.

KEYWORDS

Heavy metals, Trace elements, AAS, Camels, Risk assessment, daily intake

CITATION

Meligy, A.M.A., Ismail, H.A.A. and Abdel-Raheem, S.M. (2023). Assessment of some toxic elements (Co, Cr, Mn, Se, and As) in Muscle, Offals, Hair and Blood of Camels (Camelus Dromedaries) and their Risk Assessment. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Shelf Life on the Physicochemical and Biochemical Parameters Camel milk

Aichouni Ahmed

Agronomy and environment laboratory, Tissemsilt university
ahmed_aichouni@yahoo.fr

AIM:

In order to determine the physico-chemical and biochemical composition of camel milk, again this study consisted of monitoring the evolution of a parameter during storage at ambient temperature.

INTRODUCTION:

Animal feed, environmental conditions and the period of lactation are the main factors of the change in the physicochemical composition of camel milk.

METHODS:

We proceeded to the determination of pH, titratable acidity, density, total dry extract contents, ash, fat, protein and vitamin C.

RESULTS:

The results of physicochemical analyzes indicate that this product has a lower pH of 4.47. A titratable acidity equal to 17.5 ° D and a density equal to 1.01. Meanwhile, the analyzes show that camel milk contains an ash rate (7g / l), also contains a fat content (50.08 g / l). The content of camel milk protein (2.65%) is slightly higher. The content of total dry matter of this milk is equal to 129.3 g / l. This milk also including vitamin C content equal to 41.8 mg / l. It seems slightly higher.) Monitoring the change in pH and acidity of camel milk during storage at room temperature (22 ± 6 ° C) showed as lower acidification of camel milk. Furthermore the variation of the other ingredients has a gradual decrease, however the study of variation of the density shows an increase with time.

CONCLUSION:

These results allowed us to confirm that camel milk had a number of particularities of chemical and physical composition, which prolongs its shelf life.

KEYWORDS

Camels, milk, physicochemical parameters, biochemical parameters, conservation

CITATION

Ahmed, A. (2023). Effect of shelf life on the physicochemical and biochemical parameters camel milk. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

The Impact of Climate Change on Bluetongue Disease in Camels (*Camelus dromedarius*) in Kassala State, Sudan

Molhima Mobaruk Emahi Ahamed*

Virology Department, Central Veterinary Research Laboratory, Soba, Sudan

*molhima24@gmail.com

AIM:

The objective of this study was to investigate the seroprevalence of BTV in camels in Kassala State, Eastern Sudan and to identify the potential risk factors associated with the infection.

INTRODUCTION:

Climate factors are known to affect the reproduction, development, behavior, and population dynamics of the arthropod vectors of non-zoonotic viral vector-borne diseases (e.g. Blue tongue - BT) and zoonotic vector-borne viral diseases (e.g. Rift Valley Fever - RVF, West Nile Fever - WNF, and Yellow Fever - YF). Moreover, it has effects on the development of pathogens in vectors and the population dynamics and ranges of the non-human vertebrate reservoirs of many vector-borne diseases. Its effect on the incidence of vector-borne diseases depends on climatic conditions and local non-climatic epidemiologic and ecologic factors.

Bluetongue (BT) is a vector-borne viral disease of ruminant and camelid species which is transmitted by *Culicoides* spp. The causative agent of BT is bluetongue virus (BTV) that belongs to genus *Orbivirus* of the family *Reoviridae*. The clinical disease is seen mainly in sheep but mostly sub-clinical infections of BT are seen in cattle, goats and camelids. The clinical reaction of camels to infection is usually not apparent. The disease is notifiable to the World Organization for Animal Health (OIE), causing great economic losses due to decreased trade and high mortality and morbidity rates associated with bluetongue outbreaks

METHODS:

A cross sectional study using a structured questionnaire survey was conducted during 2015–2016. A total of 210 serum samples were collected randomly from camels from 8 localities of Kassala State. The serum samples were screened for the presence of BTV specific immunoglobulin (IgG) antibodies using a competitive enzyme-linked immunosorbent assay (cELISA).

RESULTS:

Seropositivity to BTV IgG was detected in 165 of 210 camels' sera accounting for a prevalence of 78.6%. Potential risk factors to BTV infection were associated with sex (OR = 0.061, p-value = 0.001) and seasonal river as water source for drinking (OR = 32.257, p-value = 0.0108).

CONCLUSION:

Sex and seasonal river as water source for drinking were considered as potential risk factors for seropositivity to BTV in camels. The high prevalence of BTV in camels in Kassala State, Eastern Sudan, necessitates further epidemiological studies of BTV infection in camels and other ruminant species to better be able to control BT disease in this region.

KEYWORDS

Climate changes, Seroprevalence, Blue tongue virus, Kassala State, Sudan

CITATION

Ahamed, M.M.E. (2023). The impact of climate change on bluetongue disease in camels (*Camelus dromedarius*) in kassala state, Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Parity Effect on Camel Milk Composition Under Traditional Management Systems in Butana Area-Sudan

M.H.M.Elbashir and Sijoud. F. Elhassan

^{1,2} Tumbool Camel Research Center, Animal Resources Research Corporation, Khartoum, Sudan.

• m0122662711@gmail.com

AIM:

to investigate the effect of parity on some chemical components of camels milk from intensive and traditional management systems in Butana area.

METHODS:

A total of 147 camel milk samples from healthy she-camels (*Camelus dromedaries*) in different (parity numbers (one to fifth), different breeds and seasons) were randomly collected.

RESULTS:

Data obtained were analyzed with SPSS version 21 software using analysis of variance and independent-sample- T. Test. Results revealed that parity had significant effect ($P > 0.05$) on camel milk components that were collected from traditional management system. Wherein proteins, lactose, free fatty acid (FFA) and solid not fat (SNF) were markedly affected by parity. Protein content in 2nd parity recorded highly significant differences ($P < 0.01$) when compared to 5th one.

CONCLUSION:

The study concluded that parity had significant effect on some chemical components of camel milk under traditional management system in Butana area of Sudan.

KEYWORDS

Camel, milk analysis, parity, system

CITATION

Elbashir, M.H.M. and Elhassan, S.F. (2023). Parity effect on camel milk composition under traditional management systems in butana area-Sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Curve Estimation Regression Analysis to Identify the Model That Best Fits Camel Biomechanics Applications for Selective Breeding

Carlos Iglesias Pastrana^{1*}, Francisco Javier Navas González¹, Taher Kamal Sayed Osman², Elena Ciani³ and Juan Vicente Delgado Bermejo¹

¹ Department of Genetics, Faculty of Veterinary Sciences, University of Cordoba, Cordoba, Spain

² Salam Veterinary Group, Kingdom of Saudi Arabia

³ Department of Biosciences, Biotechnologies and Environment, University of Bari 'Aldo Moro', Bari, Italy

* ciglesiaspastrana@gmail.com

AIM:

The present research is aimed at the identification of the curve, or mathematical function, that has the best fit to a series of data points obtained from the analysis of different gaits (walk, pace and galloping) in dromedary camels (n=190). Such curve fitting solves the need for stakeholders and breeders of developing a model to describe the dynamics of camel locomotion and further study its potential statistical relationships with animal-dependent factors.

INTRODUCTION:

Although mostly reared for food production, camels are also traditionally selected for body conformation traits and physical performance given their role as packing, racing and/or riding animals. However, currently available literature hardly characterizes camel locomotion, as well as neither evaluates the relationships between animal physical attributes and gait performance in these species. Therefore, selective breeding programs may be failing to reach functional objectives and genetic improvement.

METHODS:

By means of 2D video captures, eleven key kinematic variables (acceleration, horizontal acceleration/position/velocity, total distance, total horizontal/vertical displacement, velocity, and vertical acceleration/position/velocity) were evaluated per gait and animal. The Curve Estimation Test in SPSS software produces curve estimation regression statistics and related plots for 11 different curve estimation regression models (linear, quadratic, compound, growth, logarithmic, cubic, S, exponential, inverse, power, and logistic).

RESULTS:

The mathematical model that best fitted (comparatively superior average values of individual $R^2 > 0.6$) the dynamics of locomotion of study animals was the cubic model. Conclusion The study of the statistical associations between animal-dependent variables and the coefficients of the cubic function for each one of the kinematic parameters evaluated, will make it possible to identify the relative weight that each of the factors would have when selecting animals for a specific locomotor behavior (amplitude, speed, acceleration, etc.) according to the desired functionality (riding, racing, etc.).

KEYWORDS

locomotion, curve fitting, cubic function, functional selection, camel

CITATION

Pastrana, C.I., González, F.J.N., Osman, T.K.S., Ciani, E. and Bermejo, J.V.D. (2023). Curve estimation regression analysis to identify the model that best fits camel biomechanics applications for selective breeding. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Antioxidant and Antibacterial Activity of Yoghurt and Cheese from Camel Milk

Imen Fguiri*, Amel Sboui, Samira Arroum, Mohamed Dbara, Mohamed Hammadi and Touhami Khorchani

Laboratory of livestock and Wild life Institute of Arid lands (IRA Medenine). 4119. Médenine. Tunisia

* imen.fguiri@yahoo.com

AIM:

In this study, we were interested to the manufacture of yoghurt and cheese from camel milk and the study of their physicochemical characteristics and their biological properties.

INTRODUCTION:

The transformation of milk into yoghurt and cheese is a preservation technique widely used to preserve the virtues of camel milk, but the operation is considered delicate due to the difficulties encountered in carrying out coagulation.

METHODS:

The antioxidant activities were evaluated using four antioxidant assays, including 2,2-diphenyl-1-picrylhydrazyl (DPPH), ferric reducing power and H₂O₂ trapping test.

RESULTS:

Interestingly, the antioxidant activities increase with the increase of the concentration of the milk's antioxidants. The highest antioxidant potential was obtained yoghurt and cheese camel milk (61.58% and 14.9% respectively). The antibacterial activity was determined with diffusion test against 7 pathogenic strains. Yoghurt and cheese camel milk showed highest antibacterial activity against all strains.

CONCLUSION:

Yoghurt and camel cheese present a high antibacterial and antioxidant activity.

KEYWORDS

Camel milk, Cheese, yogurt, antioxidant activity, antibacterial activity

CITATION

Fguiri, I., sboui, A., Arroum, S., Dbara, M., Hammadi, M. Khorchani, T. (2023). Antioxidant and Antibacterial activity of yoghurt and cheese from camel milk. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Survivability of the Cooled Camel Spermatozoa Added with Glycine Betaine During Storage at 5 °C

Zeidan A.E.B.¹, A.M. Amer^{*1}, Dalia S.A. Al-Tahan² and Liza A. Abdel-Rafaa¹

¹ Animal Production Research Institute, Agricultural Research Center, Giza, Egypt.

² Animal Health Research Institute, Agricultural Research Center, Mansoura Laboratory, Egypt.

* doctoramer69@gmail.com

AIM:

The present study aimed to define the effect of different concentrations of Glycine betine (GB) addition to Maghrebi camel spermatozoa extended with Lactose-Yolk-Citrate (LYC) extender and stored at 5°C for three days.

METHODS:

Semen was collected from five healthy camels using an artificial vagina and extended with LYC extender free-GB medium (first medium) or addition of GB at concentrations of 100 mM, 200 mM or 300 mM for second, third or fourth media respectively for a final sperm concentration of 100x10⁶ sperm cell/ ml.

RESULTS:

Results showed that the percentage of motile camel spermatozoa extended with LYC extender added with 100 or 200 mM GB were significantly ($P < 0.05$) higher compared with 300 mM GB or free-GB medium. However, the percentage of dead, abnormal, acrosome damage, chromatin damage and activities of aspartate-aminotransferase (AST) and alanine-aminotransferase (ALT) enzymes (U/10⁶ spermatozoa) were significantly ($P < 0.05$) lower with LYC medium added with 100 or 200 mM GB compared with the control medium (free-GB) or 300 mM GB medium during storage at 5°C for three days. The prolongation of storage time was significantly ($P < 0.05$) decrease of the camel semen quality with or without GB medium. Additionally, the conception rates for one day of the dromedary she-camels artificially inseminated were 31.57, 52.63, 47.61 and 26.31 %, respectively with the cooled free-GB medium, cooled semen added with 100, 200, or 300 mM GB in the first, second, third and fourth media, respectively.

CONCLUSION:

In conclusion, enrichment of the camel sperm quality and fertility rates were recorded with GB addition to the cooled camel spermatozoa at 100 or 200 mM, during storage at 5°C.

KEYWORDS

Camel spermatozoa; glycine betaine; sperm quality; fertility

CITATION

Zeidan, A.E.B1., Amer, A.M., Al-Tahan, D.S.A. and Abdel-Rafaa, L.A. (2023). Survivability of the cooled camel spermatozoa added with glycine betaine during storage at 5 °C. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

About the first case of Camelin Prion Disease in Tunisia

Abdelkader Amara¹, Kéfia Elmehetli³, Michele Angelo Di Bari², Laura Pirisinu², Rihab Andolsi¹, Souhigachout³, Boubaker Ben Smida³, Meriem Handous⁴, Heni Haj Ammar⁵, Roukaya Khorchani⁵, Malek Zrelli⁵, Barbara Iulini⁶, Lucia Florio⁶, Maria Caramelli⁶, Cristina Casalone⁶, Laura De Antoniis⁷, Geraldina Riccardi², Elena Esposito², Matteo Giovannelli², Claudia D’agostino², Barbara Chiappini², Romolo Nonno², Umberto Agrimi² and Gabriele Vaccari²

¹ Ecole Nationale de Médecine Vétérinaire de Sidi Thabet, Université Mannouba, Tunis, Tunisia

² Istituto Superiore di Sanità, Department of Food safety, Nutrition and Veterinary public health, Rome Italy

³ Arrondissement de Production Animale de Tataouine, Tunisia

⁴ Institut Pasteur, Tunis, Tunisia

⁵ Direction des Services Vétérinaires de Tunisie, Tunis, Tunisie

⁶ Istituto Zooprofilattico Sperimentale del Piemonte Liguria e Valle d’Aosta, Torino, Italy

⁷ Istituto Zooprofilattico Sperimentale dell’Abruzzo e Molise “G. Caporale”, Teramo, Italy

* abdelamara2@yahoo.fr or abdelkader.amara@gmail.com

AIM:

Following the reported cases of prion in camels in Algeria by Babelhadj and al (2018), The authors presented here the results of thorough investigations carried out on a suspect case of 12-year-old adult female from a runaway Dhahar region farm, slaughtered in Tataouine (Tunisia) during the summer of 2018.

INTRODUCTION:

Transmissible spongiform encephalopathies (TSE) or prion diseases are part of the group of neurodegenerative diseases including Creutzfeldt-Jakob disease in humans, scrapie in small ruminants, and bovine spongiform encephalopathy (BSE). They are characterized by a long incubation period, a degeneration of the central nervous system whose outcome is always fatal.

RESULTS:

Histopathology and immunohistochemistry revealed spongiform change in several brain areas with associated pathological prion protein deposition. Western-blotting confirmed the diagnosis. Sequence analysis of the prion protein gene showed that the animal carried the WT genotype. Extensive testing by inoculation of genetically modified mice is underway.

KEYWORDS

Prion diseases, camel prion disease, *Camelus dromedarius*, dromedary camels, zoonoses, Tunisia

CITATION

Amara, A., Elmehetli, K., Bari, M.A.D., Pirisinu, L., Andolsi, R., Souhigachout, Ben Smida, B., Handous, M., Ammar, H.H., Khorchani, R., Zrelli, M., Iulini, B., Florio, L., Caramelli, M., Casalone, C., Antoniis, L.D., Riccardi, G., Esposito, E., Giovannelli, M., D’agostino, C., Chiappini, B., Nonno, R., Agrimi, U. and Vaccari, G. (2023). About the first case of Camelin Prion Disease in Tunisia. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Indirect and Direct Boiling on the physicochemical Properties of Camel Milk

Sabah Ahmed* and Abdelmaged Mohammed

Tumbool Camel Research Center, Gazira, Sudan.

*sabahabdelmaged89@gmail.com

AIM:

This study was carried out to evaluate the effect of boiling on the physicochemical properties of camel milk (total solids, fat, protein, casein, whey protein, lactose, ash, vitamin C, density and acidity).

METHODS:

Five batches of camel milk samples were collected, each batch were divided into 3 equal portions. The first portion was raw milk (control), the second portion was subjected to indirect boiling and the third portion was subjected to direct boiling.

RESULTS:

The result indicated that the mean values of total solids, fat, total proteins, casein, whey protein, lactose, ash, density, acidity and vitamin C for raw camel milk were $11.63 \pm 0.61\%$, $3.67 \pm 0.36\%$, $3.12 \pm 0.20\%$, $2.04 \pm 0.15\%$, $0.77 \pm 0.04\%$, $4.19 \pm 0.13\%$, $0.63 \pm 0.04\%$, $1.026 \pm 1.04 \text{ gm/cm}^3$, $0.17 \pm 0.01\%$ and $23.70 \pm 0.20 \text{ mg/l}$ respectively. Boiling had no significant ($P > 0.05$) effect on fat, total protein and acidity. However significant ($P < 0.05$) differences were found between the milk samples that were subjected to direct boiling and raw milk in total solids and lactose ($13.44 \pm 0.34\%$ and $4.77 \pm 0.11\%$, respectively). The mean value of camel milk that was subjected to indirect boiling revealed $12.62 \pm 0.51\%$ and $4.52 \pm 0.14\%$ for total solids and lactose, respectively. There were also significant ($P < 0.01$) differences between boiled camel milk and raw camel milk samples in ash, density, casein, whey protein and vitamin C content; the mean values were $0.81 \pm 0.04\%$, $1.032 \pm 0.61 \text{ gm/cm}^3$, $2.98 \pm 0.12\%$, $0.32 \pm 0.03\%$, $9.11 \pm 0.30 \text{ mg/l}$, respectively of camel milk samples treated with direct boiling. However, the mean values for camel milk subjected to indirect boiling were $2.56 \pm 0.14\%$ for casein, $0.48 \pm 0.03\%$ for whey protein and $16.83 \pm 0.59 \text{ mg/l}$ for vitamin C.

CONCLUSION:

Hence the present data indicated that boiling treatment reduce the content of whey proteins and vitamin C of camel milk. However, the indirect boiling could represent good alternative procedure to direct boiling.

KEYWORDS

Camel milk, direct boiling, indirect boiling, physico chemical properties

CITATION

Ahmed, S. and Mohammed, A. (2023). Effect of indirect and direct boiling on the physicochemical properties of camel milk. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Comparison of the Effect of 2 Diet Content of the Concentrate on Ph, VFA Levels and Buffering Capacity in Camels and Sheep

Touhami Khorchani¹, Mabrouk-Mouldi Seddik¹, Mohamed Hammadi¹ and Mongi Sghaeir^{2*}

¹ Laboratoire Elevage et Faune Sauvage, Médenine, Université de Gabès, Tunisie

² Direction de la Valorisation des Résultats des Recherches Institut des Régions Arides, Médenine, Université de Gabès, Tunisie

* khorchani.touhami@ira.rnrt.tn and touha2009@gmail.com

AIM:

This study aims to compare the ruminal environment in response to a diet containing one third or two thirds of concentrate in dromedary and sheep.

INTRODUCTION:

Camels are very suitable for walking distant, often marginal pastures to meet part or all of their nutritional requirements. However, the increase in breeding costs and the succession of drought years have pushed herders to supplementing their herds on rangeland or in stables as an intensive system to produce milk or meat. The responses of animals to diets relatively high in concentrate have been little studied. Thus, the effect of 2 diets containing 2 levels of concentrate on 5 parameters in the 1st rumen's compartment of dromedary compared to the rumen of sheep (pH, AGV, bicarbonates, phosphates, lactic acid and buffering power) was studied.

METHODS:

Two Maghrebi camels (4 years old, 222 kg live weight) and 2 Barbarine sheep (3 years old, 34 kg live weight) were used in this trial. Camels were equipped with a cannula at the level of compartment 1 and sheep at the rumen. Two diets constituted of alfalfa hay and concentrate were distributed to the 2 species. Diet 1 contained a 2:1 hay/concentrate ratio while Diet 2 contained a 1:2 ratio. The two diets were distributed at a rate of 65 g dry matter per kilogram of metabolic weight for the 2 species. The pH and VFA concentration were measured by standard methods. The buffering capacity was measured by the titrimetric method between pH=5 and pH=6 and expressed in meq/ of rumen juice. The bicarbonate, phosphate and lactic acid contents were determined by the appropriate methods.

RESULTS:

Camels in the cases of diet 1 (6.37 against 5.73 and 2 hours after the meal) for diet 2 meal (5.71 versus 5.40), respectively for camels and sheep. However, the average daily pH was not different ($P>0.05$) between the 2 species in the case of the diet rich in concentrate (diet 2). The average levels during the day of VFA were equivalent in the 2 species (111.9 and 116.2 mM/l) in the case of diet 1 but these levels were higher ($P<0.001$) in camels in the case of diet 2 (125.1 versus 103.0, respectively). The bicarbonate contents were similar ($P>0.005$) between the 2 species except 2 h after meal of diet 1. However, the phosphate and lactic acid levels were ($P<0.01$) higher in the rumen of the sheep. Contrary to what is expected, the buffering capacity measured between pH 5 and 6 was lower in camels with the exception of the daily average corresponding to diet 2. The average values reached 37.30 against 57.97 and 46.12 against 40.12 in camels and sheep, respectively.

CONCLUSION:

The general trend of these results show a higher pH in the first compartment of camels compared to sheep in the cases of the 2 diets studied for equivalent or higher VFA contents in the first species. This shows a better ability of camels to buffer the acidity resulting from the digestion of diets rich in concentrate, although the method of measuring the buffering capacity used did not clearly allow this difference. As it is well adapted to poor rangelands, the dromedary also seems well adapted to the ingestion and digestion of diets rich in carbohydrates in the new intensified farming systems.

KEYWORDS

Camel nutrition, sheep, rumen pH and buffering capacity

CITATION

Khorchani, T., Seddik, M.-M., Hammadi, M. and Sghaeir, M. (2023). Comparison of the effect of 2 diet content of the concentrate on pH, VFA levels and buffering capacity in camels and sheep . In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Exogenous Progesterone on Implantation after Embryo Transfer in Dromedary Camel

Ayman A. Swelum*, Hani A Ba-Awadh, Isiaka O. Olarinre and Abdullah N. Alowaimer

Department of Animal Production, College of Food and Agriculture Sciences, King Saud University, P. O. Box 2460, Riyadh 11451, Saudi Arabia

*aswelum@ksu.edu.sa

AIM:

This experiment assessed the roles of exogenous progesterone on successful embryo implantation in Arabian camels.

INTRODUCTION:

Dromedary camel uterine receptivity following embryo transfer is unknown for external progesterone source.

METHODS:

Twenty multiparous dromedary camels were used for this study. The camels were grouped into two of ten camels each. One group received extra progesterone (EP4), and the other group, the control (CP4), did not receive the progesterone. Animals in the two groups were prepared in the same way to receive embryos. Twenty embryos (at the blastocyst stage) were transferred to all the recipients. External progesterone source (CIDR) was inserted into the vaginas of all camels in group EP4. Blood was collected from the jugular veins of recipients from each group immediately after CIDR was inserted. Blood collection from all the camels continued at 48 hours for four weeks. The number of implanted embryos per animal per group was monitored by ultrasound.

RESULTS:

The blood was analyzed by enzyme-linked immunoassay for progesterone levels (P4). The number of successfully implanted embryos in the EP4 group was significantly ($P < 0.05$) higher than in the CP4 group. The level of P4 in the EPA group was significantly ($P < 0.05$) higher than in the CP4 group.

CONCLUSION:

In conclusion, the study indicated that external P4 (CIDR) increased the number of successfully implanted embryos after transfer by increasing the P4 in the circulating blood. Keywords.

KEYWORDS

Progesterone, implantation, embryo transfer, blastocyst, superovulation, CIDR

CITATION

Swelum, A.A, Ba-Awadh, H.A., Olarinre, I.O. and Alowaimer, A.N. (2023). Effect of exogenous progesterone on implantation after embryo transfer in dromedary camel. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Prevalence of the Major Camel Milk Borne Pathogens in Turkey

Abderraouf Boughezala* and Ahmet Güner

Health Sciences Institute, Department Of Food Hygiene And Technology, Selcuk University- Turkeya

* Vet.Raouf86@Gmail.Com

AIM:

In the study, microbiological analyzes were carried out according to ISO reference methods.

INTRODUCTION:

In the world the majority of camel milk is drunk not to heating to take advantage of the effect of bioactive peptides. In the study, it was aimed to investigate the contamination of camel milk with major foodborne pathogens such as Salmonella spp., Escherichia coli and Listeria monocytogenes and coagulase positive Staphylococci. 75 camel milk samples were collected from different camel breeders in Turkey, mainly in Aydın, Denizli and Alanya.

METHODS:

As a result of microbiological analysis of 75 milk samples collected from different regions, Salmonella spp., Escherichia coli O:157 and Listeria monocytogenes were not detected in any of the samples. Coagulase positive Staphylococci was detected in only seven samples.

RESULTS:

The detection of only coagulase positive Staphylococci among the pathogens can be attributed to the fact that breeding of camel is made in the form of a small number in housekeeping in Turkey, rather than pasture form. It is necessary to carry out research in those areas to upgrade hygienic milk production by technology and milking machines. And also, controlling the hygiene of the camel milk during the collection, transportation, processing and storage is essential.

KEYWORDS

Camel Milk; Foodborne Pathogens; Raw Consumption

CITATION

Boughezala, A. and Güner, A. (2023). Prevalence of the major camel milk borne pathogens in turkey. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Breeding of dromedary camel heifers based on ultrasonographic detection of ≥ 9 mm follicle reduces the age of first service

Sumant Vyas^{1*}, Rajesh Kumar Sawal¹, Mohammed Matin Ansari¹, Kashi Nath¹, Subroto Vyas², Govind Narayan Purohit³

1 ICAR- National Research Centre on Camel, P.B. 07, Bikaner-334001 India

2 Department of Geology and Geophysics, Indian Institute of Technology, Kharagpur-721302 India

3 Department of Veterinary Gynaecology and Obstetrics, College of Veterinary and Animal Science, Rajasthan University of Veterinary and Animal Science, Bikaner-334001 India

*Corresponding author: Sumant Vyas, Ph.D., Principal Scientist (Ani. Reproduction), ICAR- National Research Centre on Camel, P.B. 07, Bikaner- 334001 India
sumant.vyas@icar.gov.in

AIM:

In the present study we attempted to breed dromedary camel heifers (n= 68) at a younger age compared to the common practice of breeding camel heifers at 4 years of age.

METHODS:

In the first experiment, heifers (n=15) were maintained on different nutritional groups viz. intensive system with fodder (ISF; n=5), intensive system with extra protein (ISP; n=5) and semi-intensive system with fodder (SIF; n=5) starting from 2.5 years of age. Body weight and body measurements like heart girth, height at withers, body length, tail length and body girth were measured. In experiment II, heifers (n=18) were maintained under SIF (n=12) and ISF (n=6) and in experiment III, heifers (n=35) were maintained under SIF. The heifers in all experiments were evaluated every 10 days during the breeding season by transrectal ultrasonography and those evidencing a follicle (≥ 9 mm diameter) were mated with virile stud camels.

RESULTS:

Ultrasound examination revealed follicular growth (≥ 9 mm diameter) in 14/15 (93.3%), 18/18 (100%) and 31/35 (88.5%) of the camel heifers in Experiments I, II, III respectively, at 3 yr \pm 2 months of age and weighing at least 360 kg; they were successfully mated and 28 out of 68 heifers conceived at approximately 3 yr and delivered calf at around 4 yr age. The age of first service was positively correlated with body weight, heart girth and body girth.

CONCLUSION:

It was concluded that supplementary feeding of camel heifers has positive effects on the body weight and reduces age at first service. Camel heifers attain puberty at of 3 yr of age and >360 kg body weight and can be bred successfully if the follicle is monitored by ultrasonography.

KEYWORDS

heifers, breeding, dromedary camel, follicle

CITATION

Vyas, S., awal, R.K., Ansari, M.M., Nath, K., Vyas, S., and Purohit, G.N. (2023). Breeding of Dromedary camel heifers based on ultrasonographic detection of ≥ 9 mm follicle reduces the age of first service. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Oral Presentation

Sarcoptic mange outbreak in a herd of Bactrian camels (*Camelus bactrianus*) in Sweden

Bornstein S¹, Bergvall K,² Vest G³, Erlingsson B⁴, Karlstam E¹, Seligsson D¹.

The National Veterinary Institute, Uppsala Sweden¹, Veterinary Faculty of the Swedish University of Agriculture, Uppsala, Sweden²

INTRODUCTION:

The burrowing mite *Sarcoptic scabiei* causes sarcoptic mange in animals, and scabies in humans. It is prevalent both among companion animals, livestock and wild animals. The infection may cause significant economic losses due to reduced production and increased mortality. It is a common skin disease of over 100 mammals including camelids worldwide, particularly prevalent in dromedaries and alpaca. It is often ranked second in importance to all the diseases of dromedaries, second only to trypanosomosis. Information of sarcoptic mange in *Camelus bactrianus* is difficult to find in the scientific literature since the early 1980ies. The mite was earlier thought to have many subspecies or variants depending on which host it had been isolated from ie *S scabiei* var *hominis*, *S scabiei* var *canis*, *S scabiei* var *achenium*. The different “variants” are morphologically indistinguishable. Some *S scabiei* variants frequently infest humans, e.g. *S scabiei* var *canis* as also var *cameli*, some times does. This leads to clinical signs of scabies, pseudo-scabies which most often clears up after a few weeks without treatment. Thus *S scabiei* is recognized as a zoonotic parasite. And often is referred to as re-emerging.

Host-specificity is not complete. Transmission (cross infestation) from one host species to another species occurs which is shown by experimental infections. However, during the last decade with advent of polymerase chain reaction (PCR) technology and molecular marker systems it has been possible to distinguish some variants of *S scabiei* from each other.

We report the case of Sarcoptic mange in a herd of Bactrian camels (*C bactrianus*) on the island of Öland close to the mainland of Sweden. In late October last year the owner observed large areas of skin lesions compatible with Sarcoptic mange over large areas of the abdomen and sides of the body in one young adult female, which had been introduced about a year ago from Germany. In addition, thickened hyperkeratotic areas of the skin on the head, nose and lips and an ulcer at the base of the front hump were present. The animal was outdoors (on natural grazing and browsing land) in a herd of 11 other Bactrians separate from a smaller breeding herd. The animals were in fairly good condition, but the mangy camel deteriorated rather fast and within 2 weeks stopped eating and eventually died. A mangy looking red fox was seen about 20 m from the herd around the time of observing the mange. *S scabiei* is endemic among the red fox population on the island. Two weeks before death the diseased camel were given extra feed and put inside an animal-shed. Ivermectin was given subcut. with double cattle dose of 0.4 ml per kg bodyweight, twice 10 days apart..

METHODS:

Samples were taken; blood for serology and skin biopsies for PCR and pathology.

RESULTS:

Results from the PCR were positive for *S scabiei* var *canis* and from the pathology was observed chronic hyperplastic, crusting, perivascular dermatitis with numerous intralesional mites, some indistinguishable from *S scabiei*. The lesions seen are compatible with *S scabiei* infestations/infections. All the other camels were eventually treated with Ivermectin. Four of them showed signs of limited mange on the abdomen.

KEYWORDS

Mange, Camel, outbreaks, parasites, Bactrian

CITATION

Bornstein S., Bergvall K., Vest G., Erlingsson B, Karlstam E., E and Seligsson D. (2023). Oral Presentation Sarcoptic mange outbreak in a herd of Bactrian camels (*Camelus bactrianus*) in Sweden. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Quality and Antimicrobial Activity of Camel Kefir

Arroum S.^{1,2}, Sboui A.¹, Fguiri I.¹, Dbara M.¹, Hammadi M.¹ and Khorchani T.¹

¹ wildlife and livestock laboratory, Arid Land Institute, Médenine, Tunisia/ university of Gabes

² Higher Agronomic Institute Chott Meriem, University of Sousse, Tunisia

* arrousamira2017@gmail.com

AIM:

In this study, the quality of camel kefir was carried out and compared to cow kefir. The composition of grain was also determined.

INTRODUCTION:

Kefir is fermented milk; made by inoculating milk with kefir grain. This study aimed to determine the quality of camel and cow kefir. In addition it conducted to test their antimicrobial activity against some pathogenic strains.

METHODS:

The antibacterial activity of (camel, cow) milk and (camel, cow) kefir were determined was using the agar well method in MH agar against pathogenic strains (E. coli, Streptococcus, Klebsiella Pneumonia, Pseudomonas, Staphylococcus and Micrococcus).

RESULTS:

The results showed that camel milk is richer in fat (38.2 ± 6.16 g/l) and in dry matter (123.8 ± 1.45 g/l) than cow milk (35.8 ± 6.61 g/l, 102.16 ± 0.41 g/l respectively). The Total aerobic flora FAMT in camel milk was lower (4.77×10^3 UFC/ml) than in cow's milk (2.09×10^4 UFC/ml). Kefir grain is characterized by a few fat content (0.02g/l). The camel Kefir contains fat (20.4 ± 6.48 g/l) and dry matter (109.18 ± 6.98). The load of lactic acid bacteria for camel kefir is 40.106 CFU/ml which is the highest compared to cow kefir. The antimicrobial activity of camel Kefir against 6 pathogenic strains showed that camel Kefir has the best antibacterial activity with inhibition zone diameter of 6 mm to cow milk kefir.

CONCLUSION:

A good microbiological quality and antimicrobial activity for camel kefir was shown in this study and further research were recommended to test other biological activities.

KEYWORDS

Camel Milk, quality, pathogenic strains

CITATION

Arroum, S., Sboui A., Fguiri, I., Dbara, M., Hammadi, M. and Khorchani, T. (2023). Quality and antimicrobial activity of camel kefir. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Effect of Production System on Macro Element contents in Camel Blood, Milk, and Meat in Sudan

El-rasheed M.Y.¹ and Adam, Y.S.I.^{2*}

¹ Department of Animal production, Faculty of Agriculture Technology and Fish science University of Al-Neelain.

² Department of Food Technology, Faculty of Agriculture Technology and Fish science University of Al-Neelain.

* yasirsalah1977@gmail.com

AIM:

This study was conducted to determine the production system effect on camel blood, milk, and meat contents of macro-elements in Sudan.

INTRODUCTION:

Camel products from meat and milk defined as a good source of nutrients for the peoples living especially in the arid and urban areas, it was unique from other ruminant's milk and meat in terms of composition as well as claimed health effects.

METHODS:

Blood serums were randomly collected from 27 camels in the different areas. Samples purchased from camel milk and meat production markets (Albutana- Tumboul, Kordfan-Ellobied, and Khartoum-Alsalam market) in 6 replicate. A total number of 6 soil samples within each growth from the study area were taken and stored in plastic bags.

RESULTS:

The Content of macro-elements (K, P, Ca, Mg, and Na) in camel blood from different location (Butana, Khartoum and Kordfan) were significantly different. Macro-elements of the camel meat samples showed significant difference especially Ca, and Na, which were higher in Albutana camel meat samples. On the other hand Ca, Na, K, Mg, and P higher in Khartoum camel milk and lowest content in Kordofan camel milk. The study were extend to determined soil macro-elements contents in Albutana and Kordofan which feed by grazing system, and ignored soil in Khartoum whereas camels lives in a farm.

CONCLUSION:

The results in this study had significantly different in potassium content in Butana soil higher than Kordofan soil.

KEYWORDS

Camel, blood, milk, meat, soil macro-elements

CITATION

El-rasheed, M.Y. and Adam, Y.S.I. (2023). Effect of production system on macro element contents in camel blood, milk, and meat in sudan. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Effect of Controlled Intravaginal Drug Release and Ovsynch Protocol on Reproduction of Dromedary Camels

Metwally K.K.^{1*}, Hussein F.M.^{*1}, Hussein, Noha¹ and Hasan R.H.²

¹ Department of Theriogenology, Faculty of Veterinary Medicine, Alexandria University, Egypt

² Department of Theriogenology, Faculty of Veterinary Medicine, Aswan University, Egypt

* Kamal.ghatas@alexu.edu.eg

AIM:

This study aimed to investigate the effect of controlled intravaginal drug release (CIDR) and Ovsynch protocols for the synchronization of follicular waves on ovarian hormones, oxidative stress, and antioxidant biomarkers during the breeding season.

METHODS:

Dromedary she camels (N = 12) were divided into three equal groups. The first group received saline as control. The second group received CIDR. The third group was subjected to GPG protocol. All animals were examined ultrasonography every day and blood samples were collected. Progesterone (P4), estradiol (E2), nitric oxide (NO), and glutathione reduced (GSH) were measured.

RESULTS:

The results indicated that, the second group showed better follicular growth followed by the third group while the first group was the lower. Significantly higher ($P \leq 0.01$) (P4, E2 and NO) and significantly lower ($P \leq 0.01$) GSH were recorded in second group compared to third and first groups.

CONCLUSION:

CIDR improved ovarian hormones and the antioxidant capacity and minimized the oxidative stress than the GPG treatment and is recommended for future reproductive management of she camels.

KEYWORDS

Camel, CIDR, GPG, Antioxidants biomarkers, Ovarian hormones, Special Session

CITATION

Metwally, K.K., Hussein, F.M., Hussein, Noha and Hasan, R.H. (2023). Effect of controlled intravaginal drug release and Ovsynch protocol on reproduction of Dromedary camels. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Follicular Wave Synchronization Prior to Superovulation in Dromedary Camel (*Camelus Dromedarius*)

Hussein F.M.^{1*}, Metwally K.K.¹ and Hasan R.H.²

¹Department of Theriogenology, Faculty of Veterinary Medicine, Alexandria University, Egypt

²Department of Theriogenology, Faculty of Veterinary Medicine, Aswan University, Egypt

* Fekryhussein2@hotmail.com

AIM:

This study aimed to synchronize follicle wave emergence prior to superovulation using either GnRH or progestogen treatments in dromedary camels.

METHODS:

Dromedary she camels (N = 8) were divided into two equal groups. The first group; GnRH group (n=4) received 20 µg of the GnRH analogue Buserelin on Days -18 and -4 of the experiment (initiation of superovulation=Day 0). The second group; progestogen group (n=4) received two consecutive treatments of progestogens, 7 days apart, on Days -14 and -8 of the experiment. On each occasion, each female received three norgestomet implants and 200mg progesterone (i.m.) and all implants were removed 14 days after the first progestogen treatment coinciding with Day -1 of superovulation. Induction of superovulation was done using a combination of eCG and FSH. The growth of all subsequent follicles and CLs were monitored daily by ultrasonography.

RESULTS:

The results indicated that; the first group showed better follicular growth compared to the second group. At the initiation of superovulation, the diameters of the largest follicle in GnRH group was significantly lower than the progestogen groups but after superovulation and mating there was no significant differences in the number of unovulated follicles or CLs between groups.

CONCLUSION:

In conclusion, two GnRH injections, 14 days apart, may be used to synchronize follicle wave emergence in dromedary camel.

KEYWORDS

Camel, GnRH, progestogen, follicular synchronization, superovulation

CITATION

Hussein F.M., Metwally K.K. and Hasan R.H. (2023). Follicular wave Synchronization prior to superovulation in dromedary camel (*Camelus dromedarius*). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Contribution of the Computer Image Analysis Assistance on Linear Body Measurements of the Dromedary Camel

Djalel Eddine Gherissi¹ and Semir Bechir Suheil Gaouar²

¹Laboratory of Animal Productions, Biotechnologies and Health, Institute of Agronomic and Veterinary Sciences, University of Souk-Ahras, BP 41000, Algeria.

²Applied genetic in agriculture, ecology and public health (GenApAgE), Faculty SNV/STU, University of Tlemcen, Algeria.

* biotech.zootech@gmail.com

AIM:

The aim of the present study was to compare the image analysis approach to manual measurements as a reference method for body measurements of dromedary camels.

METHODS:

Twenty one linear body measurements were performed using a measuring stick or vernier caliper 22 males and 37 females matures and healthy Sahraoui dromedary camels. For each animal, front, back, or side images were taken for image analysis method assisted by computer measurement software (Axiovision Software) calibrated according to specific settings, camel's position, camera's distance Anatomical and camel body reference points.

RESULTS:

The image analysis approach was accurate compared to manual measurement, as shown by the overall mean comparison, relative error, variance, Pearson's correlation coefficient, and coefficient of variation. Additionally, the findings of the image analysis revealed pertinent precision (Pearson 1) and accuracy (bias correction factor, Cb 1), both of which were strongly correlated with those of the reference technique (Lin's concordance correlation coefficients, rccc 1). The concordance was assessed to be between 93.22 and 98.3% based on Blant Altman's top and lower ranges of agreement. Passing-Bablok regression demonstrated a strong correlation between the outcomes of the two approaches with no discernible systematic or proportionate bias. The results of the dromedary camel's linear body measures using image analysis matched those of the standard manual technique.

CONCLUSION:

As a result, image analysis could be considered as a useful tool for research on camel conformation features.

KEYWORDS

Dromedary camel, image analysis, body measurements, distance-based measurements

CITATION

Gherissi, D.E. and Gaouar, S.B.S. (2023). Contribution of the computer image analysis assistance on linear body measurements of the dromedary camel. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Availability of CMT Test and Variability of Milk Somatic Cell Count in Quarter Composite Milk Form Female Dromedary Camel (*Camelus Dromedarius*)

Djalel Eddine Gherissi

Laboratory of Animal Productions, Biotechnologies and Health, Institute of Agronomic and Veterinary Sciences, University of Souk-Ahras, BP 41000, Algeria
biotech.zootech@gmail.com

AIM:

The present study aims to monitor the Quarter-Composite Milk Somatic Cell Count (QCM SCC) as a milk quality indicator of female camels belonging to pastoral and sedentary herds at the southeastern Algeria.

METHODS:

Direct Microscopic Somatic Cell Count (DMSCC) and Californian Mastitis Test (CMT) methods were used for this purpose. Milk samples from 32 female camels were monitored monthly during six months, giving a total of 192 samples.

RESULTS:

The results were used to compare effectiveness of the DMSCC and CMT in camel spaces, then, the effect of the specific factors (age, parity, stage of lactation season, livestock system, region and BCS) on SCC was determined. The mean DMSCC was 452718 ± 130000 cells/ml. CMT results confirm this issue where rates of trace positive and weak positive female camels were 25 and 46.9%, respectively. The deference on the prevalence of positive DMSCC (cut-off level of $\geq 2.5 \cdot 10^5$ cells/ml) and CMT were statistically non significant ($X^2 = 2.68$, P-value = 0.267).

CONCLUSION:

The multiple regression analysis showed significant effects of the season and lactation stage on female camel's DMSCC. However, Khi2 test recorded significant effect of season, livestock system and BCS on CMT.

KEYWORDS

Camelus dromedaries, Californian Mastitis Test, Individual factors, Milk quality, Somatic cell count

CITATION

Gherissi, D.E. (2023). Availability of CMT test and variability of Milk Somatic Cell Count in quarter composite milk form female dromedary camel (*Camelus dromedarius*). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.



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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Arabian Camel (*Camelus dromedarius*) Genome

Aisha Saud Al-Shammari

Department of Biology, College of Science, Imam Abdulrahman Bin Faisal University, P.O. Box 1982, Dammam 31441, Saudi Arabia

*osalshammry@iau.edu.sa

ABSTRACT:

Camels play an important role in people's lives, especially in arid regions, due to their versatile role and unique ability to adapt to harsh conditions. Despite its enormous economic, cultural and biological importance, the camel genome has not been extensively studied. The size of the camel genome is approximately 2.38 GB and contains over 20,000 genes. The camel's unusual genetic makeup is the main reason for its ability to survive in extreme environmental conditions. The use of molecular genetic techniques in conjunction with conventional animal breeding tools is important to balance the selection process and thus optimize the animal breeding program. In this review, we will summarize the report on camel genome SNPs and their relationship to various traits. The dromedary has also benefited from the development of molecular genetics to increase knowledge of various aspects of camel genetics (genetic variation, molecular markers, lineage control, gene of interest, whole genome, dating, etc.). The identification of key genes involved in adaptation to the desert environment may have application in breeding programs and provide perspective for research into disease resistance in different animal species. In future work, it may be useful to study particular aspects of studies on camel genomes and transcriptomes may contribute to a detailed understanding of these important physiological mechanisms relevant to human diseases.

KEYWORDS

Arabian camel, Genome, molecular marking, *Camelus dromedarius*

CITATION

Al-Shammari, A.S. (2023). Arabian camel (*Camelus dromedarius*) genome. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

They Called Them All Afghans-Documentary film with Marie Bejah Williams, Escendant of "Afghan" Cameleer Bejah Dervish, Discussing the History of Camels in Australia

Douglas Baum

independent researcher/documentarian
texascamelcorps@gmail.com

ABSTRACT:

The goal of this film is to highlight the role foreign cameleers played in the growth and development of 19th century Australia. Through interviews with cameleer descendant Marie Bejah Williams we learn the blanket term “Afghan” was used for multiple ethnicities who came from what are now parts of Iran, Afghanistan, Pakistan, and India. And in the form of the world’s only feral camel population we glimpse Australia’s continued fraught relationship with this troubling past.

KEYWORDS

Camels, Australia, Afghan cameleers, feral camels

CITATION

Baum, D. (2023). They called them all afghans-documentary film with marie bejah williams, descendant of "afghan" cameleer bejah dervish, discussing the history of camels in australia. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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“The Role of Camel in Food Security and Economic Development”

Camel Middle East Network (CAMENET): A Genuine Step Towards Maximizing Camels' Impacts and Roles in The Region

Mohamed Ali AlHosa

m.alhosani@woah.org

ABSTRACT:

World camels (OWC) population, inhabits most of the Middle East and Arab Gulf cooperation council countries and is one of the most important camel niches and the cradle of domestication. Camels due to the endowed unique adaptation to the harsh environmental conditions that prevail in the region, acquire an enormous impact on people's lives and inherited domestic cultural values, in addition to their multifunctional important roles as a source of food, traditional sports, and entertainment. This reality has made it essential for the World Organization for Animal Health -WOAH and Food and Agriculture Organization – FAO to envisage more workable innovative developmental frameworks to enhance the role of this species. Accordingly, the establishment of Camel Middle East Network (CAMENET) as a development initiative represents a giant leap forward to create the necessary enabling environment to foster sustainable changes to camel sector modernization.

Since its initiation, the CAMENET is in line with its declared objectives, has recorded witnessed contribution and active involvement in camel health and production aspects, which encouraged broadening its scope and objectives to include scaling up public health security such as curbing AMR, controlling food safety threats & MERS-CoV pandemic threats, and other risk factors at the animal-human-environment interface under the banner of OH which enables CAMENET a pronounced and visible contribution to the realization of the UN- SDGs2030.

The 2023 upcoming work- plan will focus on advancing critical health issues such capacity building interventions guidance, enhance communication for activating and fostering of (public-private partnership) initiatives. Moreover, the plan will devote considerable efforts to the promotion of specific studies on camel husbandry and breeding practices including welfare-specific needs. Also, assistance for Member Countries in adopting modern camel production & reproduction best practices to increase camel population as an additional source of food (milk and meat, skin) to effectively respond to food security needs.

KEYWORDS

Camel, Middle East, CAMNET

CITATION

AlHosa, M.A. (2023). Camel middle East Network (camenet): A genuine step towards maximizing camels' impacts and roles in the region. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Camels on the Walls of Arabian Peninsula

Ashraf Sobhy Mohamad Saber

Emeritus prof. of Anatomy and Embryology, Faculty of Veterinary Medicine, University of Sadat City, EGYPT

ABSTRACT:

The Arabian Peninsula's constituent countries are: Kuwait, Bahrain, Qatar, the United Arab Emirates (UAE), Oman, Yemen, and Saudi Arabia at the center. South Iraq and Jordan sometimes added to the Arabia.

The Arabia was the passage of camels through its journey from Asia to Africa. Many authors postulated different views about the time when domesticated camels first appeared on the scene. In the opinion of Bulliet (1978) the taming of camels was practiced even before 2500 B.C. According to Zeuner (1963) it started somewhere between 2900 and 1900 B.C. Youssef (2008) believed that the camel was first domesticated during the Bronze Age, around 4000 years ago, because the abundance of camel bones found at sites as Umm Al Nar (Abu-Dahbi desert).

Camels petroglyphs and engravings were recently discovered in UAE (Hatta and Wadi Daftah), Oman (Wadi Al Ayn, Hajar Mountains, Wadi Darbat, Musundam), Yemen (Wadi Raghwan, Ma^{ri}rib) and Saudi Arabia (Najran, Jabal Misma, Tayma, Jabal Yatib, Jabal Ghawata, Hail, Darb Bakr, Abar Himma, Jabal Al-Manjor, Al Jouf).

The anthropomorph to the camel do symbolize the importance of camels in the lifestyle of the figures rendered, but not the lifestyle itself (Eisenberg-Degen and Rosen 2013: 240, 242-243). The examples of the camel given here do not show the every-day use of the camels. However, do proof the crossing of the dromedary to Africa either by the south route through Yemen to Somalia or Ethiopia or through the North rout through Sini (Saber, 2013).

KEYWORDS

Camel, Walls, Arabian Peninsula, anthropomorph, domesticated camels

CITATION

Saber, A.S.M. (2023). Camels on the walls of Arabian peninsula. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Camel's milk Products and Food Security

Najeeb Al-zoreky* and Faisal S. Al-Mathen

Camel Research Center, King Faisal University, Eastern Region, Al-Ahsa, Saudi Arabia

* nalzoraky@kfu.edu.sa

ABSTRACT:

According to the World Food Summit (FAO of the UN) held in November 1996, food security is defined when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. In each country, food security depends on many factors, such as climate conditions and self-sufficiency in major food types (meat and milk). Camel's milk and its derivatives are good sources of essential nutrients (proteins, minerals, etc.) and energy for people. Camel's milk (one-hump, *Camelus dromedarius*) is a better alternative for cow's ones. For example, lack of β -Lactoglobulins (whey protein) in camel's milk (CAM) would make it a safer alternative for those suffering from allergic reactions from cow's milk. In addition to its known health benefits, it has recently been reported that CAM (compared to cow's milk) could improve the health of children with autism. While raw CAM (fresh) has been mainly consumed by pastoralists and camel's calves, the remaining milk production could be spoiled and wasted under the harsh conditions of the desert. Therefore, CAM derivatives would contribute to food security and better incomes for camel farmers. In this regard, added-value products from raw CAM were made in our laboratory, especially yogurt (typical texture to that of cow's milk) and soft cheese. Such commercial productions of those two items would contribute to both food security and economic developments.

KEYWORDS

Camel, milk, food security, whey protein, lactoglobulins

CITATION

Al-zoreky, N. and Al-Mathen, F.S. (2023). Camel's milk products and food security. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

The Camel - a Core of Food Security

Asim Faraz

Department of Livestock and Poultry Production, Bahauddin Zakariya University Multan, Pakistan

drasimfaraz@bzu.edu.pk

ABSTRACT:

In this shattering world, Food Security has become significant warning, so to scout new age of resources is the present need of moment. The camel is the leading accession to the food cycle; it supplies food products such as milk, meat and other by-products of principal economic significance. Camel plays remarkable part in the economy of quiet environmental area that extends from India and Gobi desert in central Asia to Ethiopia and Somalia in the horn of Africa.

Camel has captivated humanity, due to its looks and capability to remain alive in scorching, extreme and dry territory and to cope much pressure, e.g. heat, lack of water or water with high salt concentration and insufficiency of feed. It can assimilate dry matter as well as all the other supplements, specifically crude fiber better than other ruminants. The Arabian camel is the chief animal among the household animals in hot and dry regions as it has ability to produce standard foods like meat, milk and milk under extremely grating condition at reduced prices. It has patience to elevated temperatures, solar radiations and water shortage. It can bloom on barren wilderness with scarce vegetation and mainly feed on those materials that are not utilized by another animal.

Pakistan is the 5th largest inhabited country, where farm animals provide nourishment and subsistence to more than 35 million people. It nurtures 8 million rural families. Pakistan categorize 8th in the world having 1.1 million camels as camel is a salient segment of livestock. Camel is practiced as husbandry system in sandy environment. Due to the industrialization, this tillage system is changed and the camel wranglers are moving towards urban and peri-urban regions of parched and droughty environment. Principal use of camel is milk production and its milk is now used as a food product which is not used in the past. Previously people have restrictions about camel milk usage. Now they get responsive about anomaly especially due to its restorative value. Camel milk grant up to 30% in the yearly caloric diet of pastoral community. Food security is ensured by daily milk yield about 5-12 kg with a longer nursing period of 12-18 months. Camel's milk is used for treating ailments like diabetes, tuberculosis, liver disorders, asthma, piles, spleen ailments, food allergies and arthritis. It is considered as erogenous. Camel milk is worthier than other animals as it has higher vitamin C and Phosphorus contents. Camel meat desire is enhancing day by day due to health associations as it produces cadaver with little fats and cholesterol but high polyunsaturated fatty acids. The water contents are also 5-8% appreciable than other meat. It is also used as healing agent in curing blood pressure, hyperacidity, pneumonia and pulmonary disorders. In Pakistan, daily gain is 1 kg in camel calves bring up on feedlot. Different research studies enlightening its milk and meat production potential has been conducted in different.

management systems, which ensures the major role of camel in food security chain. It is concluded that the camel is a food animal now and have important function in food security which has changed the formulation „ship of the desert” to a “core of food security”

KEYWORDS

Camel, Food Security, Production, Desert

CITATION

Faraz, A. (2023). The camel - a core of food security. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Raising Camels in North America: The Struggles, the Needs and the Plan for the Future Valeri Crenshaw, MS MA

Valeri Crenshaw

North American Camel Ranch Owners Association

crenshawvaleri@hotmail.com

ABSTRACT:

As the camel industry in North America moves forward, industry personnel are facing difficulties related to raising camels in a non-traditional camel country and environment. Camel owners from across the continent have come together to address the obstacles that keep the industry from flourishing by forming the North American Camel Ranch Owners Association (NACROA). Under the mentorship of the Saudi Arabia International Camel Organization (ICO), the owners are working to promote culture, improve health care, highlights animal welfare and lobby for legal support of the industry. The association is working closely with members who use their camels in unique environmental sustainability roles and do research that addresses the unique presenting problems. In this endeavor, the vital research projects include addressing premature death caused by parasites; the significant number of cases of camels in America with fibrous osteodystrophy and the lack of camel specific mineral supplement options. The goal for our research is to end the premature death of camels due to internal parasites, osteodystrophy and lack of informed health care in North America. Our focus is to understand how parasites affect camels, recognize harmful parasites, and establish treatment protocols. After performing thousands of fecal tests on hundreds of camels, our data is improving the way owners care for their camels, helping them live a longer lives. Our aim for the camel mineral research is to establish the normal quantitative values of each mineral a camel should be at. This will be accomplished by taking blood and/or liver samples from healthy camels. We then hope to be able to create a mineral product that is specifically formulated for camels in North America. In conclusion, we are a young association supporting a young industry, but with further research and continued promotion of the sustainability of camels as the animal of the future, we believe the camel industry in North America can be elevated past simply exotic pets.

KEYWORDS

parasite prevention, fibrous osteodystrophy, camel, North America

CITATION

Crenshaw, V. (2023). Raising camels in North America: The struggles, the needs and the plan for the future valeri crenshaw, MS MA. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

To Cull or Cultivate: A Case Study of Australian Feral Camels (*Camelus dromedarius*)

Zia Ur Rehman^{1*}, Tanveer Hussain², Zonah Ali³, Khawar Ali Shahzad³, Saira Mehmood³ and Anum Yaseen³

¹ Department of Physiology, The Islamia University of Bahawalpur, 63100, Pakistan.

² Department of Molecular Biology, Virtual University of Pakistan.

³ Department of Zoology, The Islamia University of Bahawalpur, 63100, Pakistan.

* zia.urrehman@iub.edu.pk and drasimfaraz@bzu.edu.pk

ABSTRACT:

Australian feral camel refers to ~01 million wild dromedary (*Camelus dromedarius*) population mainly inhabited in Central and Western Australia. During the colonization of Australia, domestic dromedaries were imported from Afghanistan and British India during the 19th century for transport and construction. When motorized transport replaced these beast of burdens in the early 20th century, most of these were released in the wild. Due to their inimitable physiological and anatomical features, they survived in the hostile Australian rangelands and resulted in a fast-growing and one of the most robust feral population in the world. This new camel breed was somehow left unattended or rather forsaken and interestingly resulted in a massive feral population. However, with the depleting water and food sources, this growing population turned to neighboring cities and towns which resulted in severe damages to the infrastructure (fences, water pipes and air conditioners), endangered residents and travelers, and polluted food/water supplies. Australian government was highly criticized globally when they decided to kill thousands of these animals to put a leash on the wild increase of population, while there were more humane ways of controlling the population and even benefitting from their biological adaptations i.e., tolerance to dehydration, heat stress, feed scarcity and ability to convert scanty vegetation into food products of high nutritional and nutraceutical value. However, in its National Feral Camel Action Plan (NFCAP), Australian government acknowledged this issue and decided to set following goals: support the humane management; mitigation of negative impacts; adoption of a platform for on-going humane management and developing partnerships and social capacity for humane feral camel management. We believe that this feral population is a biological resource of prime importance and by achieving NFCAP goals, welfare of this beautiful beast will be possible and export of its high value food products and live animals (for breeding and sports) will have a huge contribution towards Australian livestock industry and economy.

KEYWORDS

Feral, Welfare, Biological Potential, Nutraceutical, NFCAP

CITATION

Rehman, Z.U., Hussain, T., Ali, Z., Shahzad, K.A., Mehmood, S. and Yaseen, A. (2023). To cull or cultivate: A case study of Australian feral camels (*Camelus dromedarius*). In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

The Importance of Camels and the Legal and Therapeutic Philosophy of Camel Milk and Urine

Manahil Eltigani

College of Science and Technology of Animal Production, Sudan University of Science and Technology, Sudan.
ManahilEltigani@hotmail.com

ABSTRACT:

The study was conducted to find out the importance of camels as well as the legal and therapeutic aspects of camel milk and their urine. Information was collected from books, references and the Internet. The results of the study showed that the Sharia gave clear attention to the importance of camels. This came in the Qur'an, the Sunnah of the Prophet and the jurisprudence of the jurists. From the therapeutic point of view, the study showed that camel milk was used in the treatment of many diseases.

Camel milk is a main food for Bedouins living in desert areas, where no other animal can produce the same under harsh environmental conditions. The average length of the milk season is about 12 months, and it may extend to 18 months in the event that pregnancy does not occur. Milk is not stored in the udder except in small quantities. The udder of the camel consists of four quarters, each with a separate teat. The behavior of camels does not produce milk except in the presence of the infant only who performs the process of embalming, and this confirms that camels are not like other animals that can produce milk even in the absence of their offspring, and this is attributed to the following reasons:

1. The animals do not get used to milking in the absence of the newborn.
2. The camel is a very sensitive and emotional animal, as the mother does not forget her newborn quickly, but rather continues to check its tracks for a long time, and this contributes to the lack of milk secretion in the absence of the newborn.
3. An animal may need a longer period than other animals to tame it on milk. Suckling by a newborn increases milk production.

Because of this importance, it is not surprising that camel milk has a prominent effect in treating some diseases and reducing their seriousness and complications due to its unique characteristics and many nutrients. Islamic law has paid attention to camels, their milk and urine. The research aims to:

1. Recognizing the legal aspects and the use of camel milk and urine.
2. Encouragement to increase the production and consumption of camel milk.
3. Identifying the therapeutic properties and health benefits of camel milk and urine.

KEYWORDS

Medication, camels, Islamic jurisprudence

CITATION

Eltigani, M. (2023). Manahil eltigani the importance of camels and the legal and therapeutic philosophy of camel milk and urine. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 "The Role of Camel in Food Security and Economic Development"*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Camel Ownership as a Passage to Adulthood in Omani Bedouin Culture

Ibtisam ALwahaibi¹, Victoria Daulitova¹ and Harry Wels³

¹ Sultan Qaboos University

³ Leiden University

ABSTRACT:

Development and maturity of adolescent humans attained through child-pet interaction and attachment is the focus of the current study. The context is the Omani Bedouin culture that is inseparably linked to camel culture that is highly conducive to valuing and nurturing relationships between the camels and the cameleers. We suggest that close proximity and contact with the camels from the early age helps Bedouin children who own camels to more smoothly navigate their journey from childhood to adulthood. Based on narratives collected in the process of one-year long informal conversations with 10 Bedouin children between 10 to 18 years of age, who grew up with camels in Al Wahiba, a Bedouin tribe of the Sharqiyah, Oman, and their parents, we are striving to demonstrate the depth of the impact that the contact with the camels produces on cognitive, emotional, and social development of a Bedouin child. . The empirical data suggest that the child cameleers experienced emotional, social, and cognitive benefits attained from the contact with and attachment to camels. The findings from the parents of these adolescents also suggest that those children who own camels seem to demonstrate higher levels of cognitive and emotional maturity and seem to be more smoothly socialized and integrated in the community compared to their siblings without camel ownership. The novelty of the current study is in insights shedding light on how socio-cultural context embedded in the Bedouin culture affects the degree and the nature of a child's attachment to a pet and how that affects developments in adolescence, taking an inclusive approach to a cultural analysis by including both human and non-human agents, i.e. camels, in the analysis, and discuss the findings in the discussion section in a post-colonial context.

KEYWORDS

Omani Bedouin culture, camel ownership, child-pet attachment, child development

CITATION

ALwahaibi, I., Daulitova, V. and Wels, H. (2023). Camel ownership as a passage to adulthood in omani bedouin culture. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Developing the Knowledge Between the Field/Specialist and the Future Veterinarian/ Medical Students

Noura Abdelmajeed Alzarooni Abudhabi

Agricultural and Food Safety Authority, United Arab Emirates, Abudhabi, UAE.

Noura.alzarooni@adafsa.gov.ae

AIM:

In an effort to create technically competent future veterinarians and medical students in the field of diagnosis of animal diseases as well as zoonotic, the collaborating centre of camel disease at ADAFSA recognized the importance of the bridging the knowledge and cooperation gap between the future generations of veterinary students and researchers. Therefore, the collaborating centre through it is expertise prepared a modern Histopathology Slide kit for various animal diseases obtained from field cases. The kit was offered as free of charge to the colleges engaged in veterinary studies, and in turns improved the diagnostic skills among students and researchers in the veterinary field. Moreover, the Biobanking system as a first Bio Bank on it is kind focusing on Camel filed, also represent a source of isolates and materials for future research and qualification of the veterinary students and researchers in the region and worldwide. It also provides a source of training and creation of new competent generations of biobankers in the camel diseases as well as other livestock. More than 24 research articles in the past three years and books in the field of veterinary with emphasize in camel and one health fields have been published by the WOAHA collaborating center, which enhanced the scientific community and made the information available to the new veterinary generations. The experts in the WOAHA collaborating center besides their research competency, they also had University teaching experience which contributed effectively in the development of veterinary curriculums in the region. In conclusion, the advanced laboratories and competent staff available at WOAHA collaborating center provided a template for creation of future veterinarians and helped advance the research in the regions.

KEYWORDS

Knowledge, veterinary education, field, specialist, veterinarians

CITATION

Abudhabi, N.A.A. (2023). Developing the knowledge between the field/specialist and the future veterinarian/ medical students. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Towards A Genomic Future for Camels in Pakistan; Enhancing Camel Potentials Using New Approaches

Masroor Ellahi Babar^{1*}, Tanveer Hussain² and Qurat ul Ain Ali Hira²

¹ The University of Agriculture, Dera Ismail Khan, Pakistan, Khyber Pakhtunkhwa, Pakistan

² Department of Molecular Biology, Virtual University of Pakistan, Rawalpindi, 46300

*vc@uad.edu.pk

ABSTRACT:

Camels (*Camelus dromedaries*) have evolved special qualities and abilities to survive in harsh environments in different parts of Pakistan. Numerous diseases may be less prone to camels because their immune system detects and responds appropriately to a wide variety of pathogens. There are approximately twenty different breeds of camels in Pakistan found in Punjab, Sindh and Baluchistan. The future of camel genomics in Pakistan holds great potential for the country's economy and agricultural industry. With an increasing demand for camel milk, meat, and skin, along with the potential for camels to be used in medical research and biotechnology, the study of camel genomics could lead to improved breeding and disease resistance. Dromedary camels have also benefited from the development of molecular genetics to increase the understanding of genetic variation, through whole genomic sequencing (WGS), single nucleotide polymorphism (SNPs), Molecular markers analysis (MMs), Quantitative Trait Locus mapping (QTL), Next Generation Sequencing (NGS). However, the field faces challenges in Pakistan such as limited funding, equipment, and infrastructure, as well as a lack of trained professionals. To capitalize on the opportunities presented by camel genomics, Pakistan will need to invest in research and development, as well as education and training programs. Additionally, collaboration with international partners and organizations will be crucial in advancing the field and addressing the challenges it faces.

KEYWORDS

Camels, genomic, WGS, SNPs, QTL mapping, NGS, economic importance

CITATION

Babar, M.E., Hussain, T. and Hira, Q.A.A. (2023). Towards a genomic future for camels in Pakistan; Enhancing camel potentials using new approaches. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Reproduction Practices of Camel Wrestling Culture in Turkey

Devrim Ertürk*¹ And Süleyman Şanlı²

¹Assoc.Prof., Dokuz Eylül University, Efes Vocational School

²Mardin Artuklu University, Department of Anthropology

* devrimpasa@hotmail.com

ABSTRACT:

Turkey is a transit country due to its geographical location. Migration from Central Asia, the homeland of Turks, to Anatolia brought nomadic life to Anatolia. Traditional animal husbandry, which is the main economic activity of the nomadic life, also necessitates the nomadic life. Camels have undertaken essential functions as a pack and riding animals in this migration process. Due to the need for camels decreasing over time, the camel stock in Anatolia declined to extremely low numbers. After 1980, with the increase in commercial transportation and the spread of modern roads, the nomadic lifestyle began to decline. Today, camel wrestling continues to exist as a part of Turkish entertainment culture and is becoming more popular day by day. In this study, it will be discussed how camel breeding continued its existence through camel wrestling in Anatolia, Turkey. In addition to that, camel wrestling, which has an important place among the practices that maintain the existence of camels in Anatolia, finds its presence on the western coast of Anatolia due to the social dimensions it contains. This paper is based on an anthropological fieldwork conducted in places where camel wrestling is common in the West Anatolia Region that the nomadic culture is rich. The data of this study are based on the fieldwork carried out in different times. The fieldwork encompasses the nomad tribes living around Mersin, Konya and Karaman and people dealing with camel wrestling and camel breeding in the cities such as Antalya, Muğla, Denizli, Manisa, Aydın, İzmir, Balıkesir and Çanakkale. Within this framework, a number of rituals related to culture of camel wrestling and camel breeding were also observed.

KEYWORDS

Camel wrestling, Camel dealing, Culture, Identity

CITATION

Ertürk, D. and Şanlı, S. (2023). Reproduction practices of camel wrestling culture in turkey. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Measurements Evaluated by Camel in Kazakh Society

Nurseitova M.¹, Massanov Ye.²

¹«Antigen» Co LTD, Kazakhstan, Almaty region, Abay village, Azerbayev street,4, 040905

² Suleyman Demirel University (SDU) Almaty, Karasay region 040900, Kaskelen city, Abylai khan street

ABSTRACT:

Camels played a main role in the lifestyles of the Kazakh people. Kazakhs, who have been a nomadic people since ancient times, used camel's milk and shubat (sour milk) for food, their strength for transport and plowing the land during migration, for extracting water from the well, and for transporting goods. At the same time, the Great Silk Road, which passed through the Kazakh steppe, also developed trade with the help of camel caravans. The Kazakh people used the camel as an economic indicator as an exchange value. For example, generally, the value of one camel was equal to two horses or twenty sheep. The main kalyn mal (dowry animals) was given a camel for a bride. It could consist several parts, general-part consisted of 9 camels, 8 mares with colts (16 heads), 3-year mares (8 heads), 2-year horses (7 heads), 7 yearlings, a farrow pastured mare, plus a good horse or camel, and one furrow pastured mare. The final part, was made of 1 camel, 1 horse, 1 cow and a gun (Kustanayev, 1894:24). Besides, the groom would give the bride's mother a present consisting of a camel and one carpet (Grodekov,1889: 78-79). Human murder was also penalized with kun. The killing of a man had to be paid with 1000 sheep, or 100 horses, or 50 camels, the killing of a woman was half-cheaper. A broken arm had to be compensated with 250 sheep or 25 horses or 12-13 camels (Sala et al, 2018). The camel played a crucial role in the life of the Central Asia nomads. More in general, a sort of camel cult was widely spread among the peoples of the East, connected to ancient pre-Islamic beliefs and to the worships of various powers and natural phenomena.

KEYWORDS

Camel, Kazakh society, measurements , silk road

CITATION

Nurseitova M. and Ye., M. (2023). Measurements evaluated by camel in Kazakh society. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

King Faisal University

The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023

“The Role of Camel in Food Security and Economic Development”

Therapeutic Properties of Camel Colostrum

Taherah Mohammadabadi

Professor, Faculty of Animal Science and Food Technology, Agricultural Sciences and Natural Resources University, Iran
t.mohammadabadi.t@gmail.com

AIM:

Colostrum is an essential source of nutrients for the newborn. The major proteins in camel colostrum are immunoglobulins, camel serum albumin, lactoferrin, and α -Lactalbumin. Camel colostrum contains the high content of the three main subgroups of IgG. The mean lactoferrin in camel colostrum was more than three times that of mature milk. The highest insulin concentration was after calving. Camel colostrum contains high content of polyunsaturated fatty acids, but the content of saturated fatty acids is lower than mature milk. The camel colostrum is used as an antiscorbutic agent for the elderly. Camel colostrum has antimicrobial, antihypertensive, and antioxidant activity. As a fantastic superfood, Camel colostrum may be adequate as a unique miracle in many health issues of humans.

KEYWORDS

Camel colostrum, superfood, health

CITATION

Mohammadabadi, T. (2023). Therapeutic properties of camel colostrum. In: *The 6th Conference of the International Society of Camelid Research and Development (ISOCARD)-2023 “The Role of Camel in Food Security and Economic Development”*, King Faisal University, Al Ahsa, Saudi Arabia, 12-16/03/2023.

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