CAMELIDS: Parallel Social Enterprise for the Vulnerables

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For more information visit website: https://dairysciencepark.org/dsp2023/

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Message of the Vice Chancellor IUB

It gives me an immense pleasure to extend my heartiest congratulations to the Faculty of Veterinary & Animal Sciences, The Islamia University of Bahawalpur and Dairy Science Park to conduct the DSP-VI 2023 Bahawalpur. Livestock has been an integral part of the economy of our region for the last many centuries by producing milk, meat, draught power and hides. Food shortage has become a worldwide problem now-a-days especially in Asian and African countries. The progressing human population day by day is further reducing the availability of animal proteins.

Keeping in view the great importance of dairy milk & meat and the limited knowledge of production constraints, more emphasis should be given to research to enhance the production of livestock. However, the current situation of research in Pakistan needs dedicated sincere efforts and resources to make it an applied industry oriented for better economic gains using recent advances in dairy science.

With this perspective, it is a great pleasure to welcome the distinguished delegates and participants for DSP-VI in Bahawalpur and hope that this event will serve as a catalyst to develop new ideas to initiate research and development in the livestock industry.

Engr. Prof. Dr. Ather Mehboob
Vice Chancellor
The Islamia University Bahawalpur

Message of CEO SEcure All Pakistan

Parallel Social Enterprise has come up as an idea of SECure All Pakistan with the goal to empower the Common People of the World. I have been impressed by a Hadith quoting a Sahabi whole archard attracted clouds and rains while the surrounding areas could not. He was asked about the secret of this blessing. The Sahabi replied that whenever he earned profit out of his business, he used to divide it into three portions: i) a 33% portion was allocated for his family expenses; ii) 33% retained for development of his business; and 34% for the most vulnerable population of the Society.

This principle may be declared as Parallel Social Enterprise with the intent to apply it to all businesses in the country which may bring prosperity in the Region and alleviate poverty. During discussion with Prof M Subhan Qureshi and Prof Illahi Bakhsh Marghazani, it was agreed that a conference may be held to support the people of Southern Punjab and utilize the camel population for welfare of the people under the same principle of Parallel Social Enterprise.

A WhatsApp Group was established and leading persons were added from academia, industry and the Society to the Group. Prof Athar Mahboob, Vice Chancellor, Islamia University Bahawalpur agreed to host the DSP VI - 2023 at the Islamia University Bahawalpur.

I hope we will be successful in attracting the relevant stakeholders at the Conference to serve the local population, especially the camel farmers in establishing an entrepreneurship network as a Parallel Social Enterprise.

Muhammad Anwar Saleem Hashmi
CEO SECure All Pakistan
Karachi

Message of Vice President CAP

Camels are unique animals and are bestowed with many potentials by nature. Camels are climate smart animals and can be better utilized to address the issue of food security. In Pakistan, the camel population is estimated as 1.1 million standing at 8th position at global level. Balochistan is considered as "Hub of camelids in Pakistan" with 41.5% camel population followed by Sind (30%), Punjab (22%) and Khyber Pakhtoonkhaw (7%). There are twenty-one documented camel breeds in Pakistan. Most camel breeds are found in Balochistan (08) followed by Punjab (05), Sindh (04) and Khyber Pakhtoonkhaw (04). It is unfortunate that despite healthy total strength and breeds, camels are a neglected animal species and are being scaled less. The major bottlenecks in conserving and developing camels and camel farming community are; lack of awareness/ education in camel farmers, optimum utilization of camels for milk and meat production and value added products development, lack of translational research by the academia and Livestock department, negligence by the policy makers at provincial and national levels, and lack of interest by the non-government welfare, financing, and community development organizations. Furthermore, due to mechanization and social change, this animal has lost its conventional use and prestige resulting in a downward sustenance trend in camel pastoral camel farming. Majority of camel farmers are involved in camel husbandry practices just because of traditional living and somehow living support through the sale of live camels in local meat markets or export of live animals. Our camel farmers, livestock entrepreneurs, market players and policy makers have not yet focused on camels as promising dairy animals. On the other hand, it is alarming that high yielding milch breeds form Punjab, Sind and Balochistan have continued to move to the Middle Eastern countries particularly UAE, resulting in dearth of good milking animals in the country. Although, at present we are not utilizing our rich milking camels for milk marketing or initiation of commercial camel dairying in Pakistan however, this loss of good genetics/source will be nothing less than regret for us as a nation in near future. Hence, it is prime time to develop camel policy at national and provincial levels so that camels can be conserved and their optimum utilization can be ensured to face challenges of food security and climate change. Hope this conference will sensitize all stack-holders to work jointly for the conservation, development and optimum utilization of this neglected animal for the ultra-low level poverty alleviation of pastoral camel farmers and health benefits of the general public.

Prof. Dr. Illahi Bakhsh Marghazani
Vice President, Camel Association of Pakistan
Founder, QASWA Foundation Pakistan
LUAWMS, Balochistan

Message of President Dairy Science Park

I welcome the speakers, industry partners and delegates of the Sixth International Conference and Industrial Exhibition on Dairy Science Park - Parallel Social Enterprise for the Vulnerables at the Islamia University, Bahawalpur, with the theme, "Exploring the camel population for entrepreneurship development for the stakeholders and generating surplus income for the vulnerable populations. ".

The biennial conference series commenced with the DSP 2011", held at at the Agricultural University Peshawar, with the theme, "Developing a hub of dairy enterprises in the flood affected regions of Khyber Pakhtunkhwa (KP) through partnership of academia, government, entrepreneurs & civil society".

DSP II – 2013 Peshawar focused on developing the enterprising capacity of livestock and poultry farmers of Pak-Afghan Region for meat production. DSP III – 2015 Peshawar was held with the theme "support to the war-hit economy of KP through self-employment and hygienic food production for local consumers and international Halal Meat Market. DSP IV – 2017 was held at Selcuk University- Konya, Turkey with the Theme, "Achieving Food Security through Entrepreneurship Development and Biorisk Management (BRM)". DSP V – 2019 Quetta was held at the University of Balochistan with the theme, "Emerging Trends and Opportunities in the Livestock Sector of Balochistan."

Through an extensive consultation under the biennial conference series and policy interaction with the stakeholders, we have developed a Triple Helix Good Governance Model of Academia-Industries-Government Nexus through establishment of livestock techno-parks, autonomous bodies represented by all the public and private sector stakeholders; supported by an Endowment Fund and targeted at generation of decent employment and exportable Halal foods for local consumption and export. We hope to attract investors for establishing a techno-park to be hosted by The Islamia University of Bahawalpur.

Prof Dr Muhamad Subhan Qureshi
President Dairy Science Park
Peshawar

KEYNOTE PAPERS

KNP-1. Establishing meat companies for increasing the production of quality meat

Baz Muhammad Junejo

Ex-Secretary Livestock and Fisheries, Government of Sindh, Bungalow B-25, GMB Colony, Qasimabad, Hyderabad.

Preamble

There is an acute shortage of meat in the country. Hardly 50% of the requirement is available, and that too, is not of the desired quality. It is a well-known fact that meat is the main source for the supply of protein being used to build and repair tissues, bones, cartilage, skin and carry out other metabolic functions in the human body. Protein from animal sources contains all the essential amino acids, thus, is regarded better than that from the vegetable sources.

Up till now no efforts have been taken on scientific lines for production of quality meat. The culled farm animals, weaker, older animals and newly born calves are being slaughtered for meat purposes. Their meat is unhealthy, neither nutritious nor having the required characteristics of meat, being injurious to public health. The only solution to provide quality meat to the consumers is to establish meat companies in arid as well as semi-arid areas of the country.

Such companies should be registered under Companies Act or Cooperative Societies Act, be formed by a group of farmers as basic members, and it should own cattle, goat and sheep in satisfactory strength for the production of hygienic meat (beef and mutton). It should process the meat into by-products such as sausage, etc., half of which should be exported, with the other half being used domestically. Along with the production and processing of meat, this company may also process skin hides, bones, blood and intestine for sale in the markets.

As per the scientific definition, meat is the flesh harvested from a mature healthy animal or bird after proper slaughtering and having characteristics such as proper color, taste, flavor, nutrition and digestibility. In goat, mutton, protein and iron are high in quantity. Meat of male animals is more palatable, nutritious and digestible.

Slaughtering age of animals

To achieve the desired characteristics of meat, it is essential to slaughter the animals when they attain adulthood that is when the two permanent central incisors erupt. Suitable age for slaughtering of some animal species is given below:

- Bovine: 20-22 months
- Caprine: 8-10 months
- Ovine: 8 months
- Camel: 4 years
- Ostrich 12-14 months (live weight more than 100 kg)

Age of maturity can be reduced by providing required weaning period, proper feeding management and disease control to calves' kids, lambs and other young animals from the day of birth, to produce hygienic

meat. Meat age is equally important. The pH value of human body and animal body is almost the same i.e. 7.4. The normal pH is 7.0 but that of the human digestive tract is between 4.5 and 5.0 (acidic) due to release of acids required for digestion.
It is essential that after slaughtering the animal, meat is kept at four degree Celsius for 23-24 hours so that its pH is decreased by 2.0, making it acidic and compatible with that of the digestive tract. Thus it is only after 24 hours that the meat is fit for cooking and processing and is treated as a hygienic meat.

Specialized livestock breeds

In our country, livestock breeds are not designated separately for the production of meat and milk. In developed countries, livestock breeds have been developed specifically for milk and meat production. Their cattle mature at an early age of 12-14 months and the body weight of meat animals ranges from 1000 kg to 1300 kg. The characteristics of meat animals include early maturity, fast growth rate, heavy body weight, tick resistance, disease resistance and climate adaptation. These parameters are for all the species such as bovine, caprine, ovine, etc.
In our country, the breeds of livestock with these characteristics are suitable for meat purposes and can be developed further through selective breeding and cross breeding with exotic beef breeds and are mainly located in arid and semi-arid regions of the country.

In our country, there are few cattle breeds, whose growth rate is comparatively fast, suitable for meat production. They are present in Tharparkar and Kankrej Cattle in Sindh, Bhagnari Cattle in Balochistan, Dajal Cattle and Cholistani Cattle in Punjab, and Dhani and Lohani Cattle in KPK.

Fattening regimes

To increase the weight of stock, calves may be reared properly after weaning i.e. 6-8 months on proper nutrition, management and disease control, then fattened to achieve maturity at an early age i.e. 22-25 months and increase maximum weight for the production of quality meat.

The other way of increasing meat production is by crossing large sized local cows with exotic beef bulls to fetch the progeny with early maturity and increased weight. In 2003-04, research trials in Sindh were carried out by crossing with exotic beef cattle, Chorolais with Tharparkar cows of desert area Sindh and Cholistani cow of Cholistan area Punjab at few farms gave good results as in F-1 progeny age of maturity reduced by about eight months and body weight increased by about 150-250 kg. They were adaptable to climate and resistant to diseases. Comparatively, the results of Tharparkar cross were more encouraging.

The Meat Company

The following are the basic components of a meat company:
A. Breeding Farms

- Tharparkar and Kankrej Cattle in Sindh
- Cholistani and Dajal Cattle in Punjab
- Bhagnari Cattle in Balochistan

- Dhani and Lohani Cattle in KPK
- Pateri, Bari, Teddy and Khurasani Goat Breed in Sindh and Balochistan
- Beetal, Nachi, Teddy, Bar Bari, Damani goat breed in Punjab and KPK
- Kooka, Kachhi, Balochi goat breed in Sindh and Balochistan
- Lohi, Thali, Kaghani, Bulkhi sheep breed in Punjab and KPK
- Ostrich farms

Ostrich Produces red meat with high nutrition and less cholesterol. Ostrich farming is well developed on commercial lines only in Punjab. Being profitable, other provinces are required to start this farming.

B. Rearing of male calves:

After weaning and rearing of Thari and Khankrej male calves, male kids' lambs and male buffalo calves above 3-5 months of age can be purchased from commercial dairy colonies as only in Karachi, Hyderabad more than one to two lac male buffalo calves, and about two lac male Tharparkar and Kankrej Cattle, are easily available every month, will be reared, managed and fed properly to achieve fast growth.

C. Fattening of male young stock:

Tharparkar and Kankrej Cattle young male, buffalo young male, goat male, sheep male will be kept on fattening ration up to age of maturity and slaughtering.

D. Additional Components:

- Mini feed mill for production of fattening ration
- Mechanical slaughtering house separate for small and large animals
- Chinese style processing unit for beef, mutton, chicken meat, hide, blood, bones and intestine processing.
- Weighing balance
- Veterinary services and fodder unit
- Transport/Marketing

E. Requirements for Fattening on a Daily Basis:

- Quality water 10% of body water
- Maize silage or fodder
- Wheat bhoosa
- Crushed barley, maize, wheat brawn, rice brawn
- Cotton seed cake and meal

F. Finishing:

Finishing of animals for a few days with high protein concentrate at slaughter houses may be ensured before slaughtering.

Company membership:

Basic members of the company (10-20 farmers) possessing more than 30 breeding cows, 100 goats, 100 sheeps at the farm will establish the company. Small interested farmers in the radius of 10-15 km of each breeding farm will be treated as coordinated farmers of the company.

Services:

The company will provide all the facilities to basic farmers and coordinated farmers like supply of silage, feed, seed of multi-cutting fodder, saline and drought resistant fodder and veterinary services on no profit basis and their young male stock i.e. cattle 10 to 14 months of age, goat and sheep 2-4 months of age, be procured by the meat company on weight basis and pay cost after deducting services and feed charges. In this way middle man will be eliminated and farmers can earn more profit.

Animals supply:

The basic breeding farms of the company will serve as mother farms as in case if any smaller coordinated farmer is requiring bull, heifer, goat or sheep, may be supplied on reasonable cost and the amount be recovered from the sale of young male of his farm. If this trend of sale of male animals on weighing basis is popular in meat area, every a farmer, after proper fattening, will sell his male to fetch a good price. This is the best way to increase the production of hygienic meat in the country.

The home tract of almost all beef breeds is arid or semi-arid areas of the country like Tharparkar and Kankrej cattle Mithi, Badin, Umerkot, Mirpurkhas and Sanghar. In this area, about 4.5 million breeding cows are available, owned by small or large farmers, producing more than 3.5 million calves every year. Alone in Sindh, more than 20 lac male calves are easily available for meat companies.

In this area, male kids of Pateri and Bari goats, male lambs of Kooka and Kachhi sheep are available in larger numbers. Every year more than 3 million can be procured easily for rearing and fattening. In all other provinces, the number of young male animals are almost the same for fattening purpose and meat production. Teddy goats are very profitable animals, mature at an early age and show multi-kidding. More farms of 100 goats each will be established in the meat area.

Ostrich farming is profitable farming. Breeding farms of 200 birds each may be established in the meat area. A male ostrich can achieve body weight above 100 kg in 13-14 months with 58% meat which is rich in iron, protein and tasty with low calories and low cholesterol.

Slaughter House

Meat companies have to establish a small or medium-sized slaughter house near Hyderabad or Karachi along with a Chinese style meat processing unit, which is best suited and economical technology for the country. To run the farm profitably, meat companies are supposed to work on the modern aspects of breeding, management, feeding and disease control and marketing. At least five meat companies shall be established in every province in the first phase to carry out the following businesses:

- Sale of raw and processed meat
- Export of processed meat
- Sale of animals during Eid-ul-Adha
- Sale of quality bulls to the farmers
- Sale of bullocks
- Sale of heifers and other young animals to farmers
- Sale of ostrich chicks, feather eggs and other parts
- Sale of raw and processed skin and hides

To receive maximum dividends from meat companies, it is essential to implement regulations as:

- Strict ban on slaughtering of calves both sex
- Ban on slaughtering of female animal of any age
- Sale of male animals on weight basis in meat zone

KNP-2. A global perspective on pastoralists' value to biodiversity and human health

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Abstract

While many endangered species survive mainly in zoos and botanical gardens, preserving ecosystems only through protective measures is not sustainable. Species and ecosystems need freedom to evolve in their natural conditions, and may otherwise lose their special attributes via inbreeding and other impacts.

Economic policies should create financial resources for those who would otherwise damage these nearby natural resources, per the UN Strategy. Traditions developed by pastoral and nature-based cultures can help sustain biodiversity and lead to greater health for humans and animals. Economic improvements can result from practical applications of such ancestral knowledge. One demonstration of this animal-human linkage is the use of camel milk and products for health conditions and as a sustainable traditional food in drylands and rangelands.

Camel milk, fat, meat, urine and organs have been used for centuries in Arabian, African, and Asian cultures as natural healing tools. The recent movement behind the rising worldwide use of camel milk for autism was driven mainly by the author's experience, as noted in her 2013 publication "Autism Spectrum Disorder Treated with Camel Milk" (GAHM Journal) and other publications, most recently the nonfiction book "Camel Crazy: A Quest for Miracles in the

Mysterious world of Camels" (New World Library 2019). Her initial use, research and subsequent contribution to global camel milk adoption shows how 'hidden' pastoral knowledge can contribute to economic growth and human health.

While the growth in camel milk is noted in many traditional camel-raising countries, India is an exception, with the camel population falling precipitously due to restrictions and changing uses. However, the use of camel milk to ameliorate autism symptoms is the reason for 80% of the sales of one Rajasthani camel dairy, with TB becoming a secondary market during the COVID-19 pandemic.

Research-based evidence states that camel milk is rich in enzymes, antibodies, and vitamins that benefit autistic children. Parents who have fed their autistic children camel milk have reported benefits including better sleep, increased motor planning abilities, improved spatial awareness, more eye contact, better expressive language abilities, resolution of skin disorders and fewer gastrointestinal problems. Another Indian company has served over 3 lakh (300K) customers, with autism and height growth driving sales.

The camel milk market also serves some diabetic, health concern and beauty users. The upward trend of camel and other pastoralist livestock products (like goat and donkey milk) demonstrates the need for

biodiversity maintenance; one example is the recent use of registered dryland and rangeland databases (in Mongolia, etc).

Pastoralists, often keepers of genetic legacies due to their knowledge of and care for livestock and plants, can benefit from greater communal coordination, such as UN declarations and activities, which will hopefully lead to their greater recognition and protection. These genetic legacies are finally being seen as irreplaceable and economically valuable, despite hard challenges including development, climate change and more. Pastoral tourism, sports, and cultural practices also hold promise for economic growth.

Keywords: Biodiversity, Pastoralist, Camel Milk, Camel Meat, Camel Products, Drylands, Autism, Climate, Constituents, Health, Case Study

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KNP-3. Introducing Academia-Industry-Government-Nexus- Establishing Livestock Entrepreneurship Development Centre Bahawalpur as a Triple Helix Good Governance Model

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Preamble

It was a great experience to work with SECure All Pakistan (SAP), Camel Association of Pakistan (CAP) and Islamic University of Bahawalpur (IUB) on behalf of Dairy Science Park (DSP), with special focus on evaluating camel value chain for entrepreneurship development leading to Parallel Social Enterprise for the Most Vulnerables, as an outcome of the Sixth International Conference and Industrial Exhibition on Dairy Science Park during February 1 to 3, 2023 at IUB Bahawalpur.

The Cholistan desert is part of the ancient Hakra River civilization, one of the oldest of the Aryan settlers in the Indian subcontinent (Raziq et al, 2011). It is one of the largest deserts in Pakistan, inhabited by around 1.2 million Rohi pastoral people practising mobile livestock husbandry. This production system is extremely important for food security and conservation of livestock and landscape. Camels, donkeys and horses for moving. Camels are preferred as they not only provide draft power for transporting goods but also provide food in the form of milk when other livestock species cease milk production in the dry and harsh seasons.

The livestock resource base

Livestock sector contributes 11% to the GDP in Pakistan however, like rest of the country, the development approach in the Cholistan Region has been Laissez-faire type, an economic system in which transactions between private groups of people are free from any form of economic interventionism deriving from special interest groups (Farooq et al, 2007). A notable portion of the livestock population of Pakistan has been present in the desert regions where herders have got no alternate source of livelihood. Cholistan Desert located in the southern Punjab spread over 26,100 sq km. The farming system has been practiced under pastoral and agro-pastoral systems (Iqbal et al 2000).

The average distance of livestock farmers from milk collection centers in the regions is 19.44, veterinary dispensaries 36.07, veterinary medical store 40.07 and livestock market 46.25 km (Farooq et al, 2007). Cattle is the most important animal of Cholistan and on an average each herder owns 51 heads of cattle. Camel is the second most important animal with 4-5 heads, sheep 61, and goats 19. Livestock provide livelihood support to the local community through sale of adult males of small ruminants and young large ruminants and dairy products. However, low human capital, little infrastructural facilities and livestock production in isolation from various amenities necessary for life and business, impedes the entrepreneurship potential of livestock value chain.

The development approach

Cholistan Development Authority has been established under CDA Act 1976, available at https://pnd.punjab.gov.pk/node/2179, however, the relevant page is missing. The Punjab government has decided to give the government land in Cholistan to 20,000 local farmers for temporary cultivation for a period of five years in a transparent manner (Dawn 2022), which was decided in a meeting chaired by Chief Minister Parvez Elahi. The draw for the land allotment's first phase would be conducted by the Punjab Information Technology Board (PITB), while another 5,000 farmers would be allotted land in the second phase. The government would resolve Cholistani farmers' problems on a priority basis and hoped this initiative would boost the agricultural economy in the area.

Livestock and Dairy Development Punjab has been serving the farmers through a network of veterinary hospitals, artificial insemination and livestock farms. Cattle Market Management Company (CMMC) was established in June, 2014, under section 42 of the Companies Ordinance 1984. CMMC holds twelve cattle markets in the Bahawalpur Division, whereas the identified five potential cattle markets in the division will be upgraded in Phase-1 and working on field staff and outsourcing system is under discussion. Meanwhile the following facilities are being provided in all cattle markets: tents, drinking water for humans and animals, loading/unloading ramps and cleanliness. Establishment. of University of Veterinary and Animal Sciences, Bahawalpur was another milestone in the development history of Bahawalpur.

Threats to pastoralism in Cholistan

A new move in the region to bring more land under cultivation for cotton production is apparently very eye-catching, but there are many side effects of this practice. Land grabbing is one of the important issues, as the grazing lands are decreasing with the intensity of grabbing. The two deserts (Thal and Cholistan) are the homelands of very rich cultures, wide biodiversity of flora and fauna and beautiful landscapes. As FAO (1992) stresses, the in situ conservation of flora and fauna genetic resources is an essential tool for food security in the near future. The flora genetic resources can also be used for human and animal health care in the future. The cultivation of land for cotton is a threat to those valuable genetic resources.

Part of the Thal desert has already been brought under cultivation by canal irrigation from the river Indus and the land was allotted in majority of cases to the influential people in the country. The Brela camel herders and other livestock keepers of Thal have been excluded and never compensated for their losses. The small ruminant and cattle breeders have already left the occupation of livestock husbandry but like in other parts of the world, the camel herders adapted a new way by moving long routes with their camels and traveling up to the desert of Cholistan. The land grabbing pushes the livestock deep into the desert; the situation puts more pressure on the desert rangelands of the region.

Increasing the designated area for cereal production and decreasing the area for livestock production is not wise. Cereals need high inputs and irrigation and are therefore unsustainable under desert conditions Cereal production favours the pockets of rich people but does not enhance food security.

Along with the squeezing of grazing lands, together with commercial pressure, water scarcity is a tremendous problem for the pastoral people. During drought periods, the tobas dry up and no water is available. This provokes the Marrecha pastoralists to migrate to irrigated areas, resulting in cultural chaos and conflicts with agricultural

The Dairy Science Park Approach

Dairy Science Park (DSP) Dairy Science Park (DSP) was established for generating decent employment and exportable surpluses across the Food Value Chain. DSP was registered as a Society with the Government of Khyber Pakhtunkhwa and accepted by the United Nations as SDGAction9671 and by FAO-UN as a FAO Best Practices Model.

DSP has been collaborating with various stakeholders related to Livestock-Value- Chain (LVC) comprising government departments, universities, SMEDA and Chambers of Commerce and Industries for utilisation of the indigenous resources through academia- industries- government nexus. Industrial issues were analysed through postgraduate research and quality control certification was introduced for development of entrepreneurship models.

Livestock Technoparks (LTs) were proposed at Peshawar and Quetta under FAO/ITC-UN National Consultancies as apex-level autonomous bodies with full legislative, financial powers, focused on establishment of entrepreneurship models across the livestock-based value chain, in continuation to the MoU siged with Konya Teknokent during DSP 2017. Food and Agricultural Organization of the United Nations at Islamabad, Pakistan was assisted in developing the KP Livestock Action Plan 2019 for the war-hit region of Khyber Pakhtunkhwa. It was an interaction with various stakeholders integrating the private sector with the policy makers and international players.

LEDC Bahawalpur

Livestock Entrepreneurship Development Centre (LEDC) would be established in Bahawalpur as a joint venture of the Islamia University of Bahawalpur, Dairy Science Park, SECure All Pakistan, Camel Association of Pakistan and a private partner. LEDC would be run through a local committee under an Endowment Fund (EF) to provide farmers an access to business incubation, development of entrepreneurship models, training, farm inputs, product sale, products processing and regulatory support. The LEDC would be providing facilities of establishing model farming, milk/meat shops, products processing factories, diagnostic labs, marketing and allied facilities.

Endowment Fund

An EF would be established through provincial/federal/donors grants for developing entrepreneurship models under the LEDC. The private sector would offer their land, animals, building and other assets for a period of at least 5 years with investment by LECD and operational arrangements by pvt partner.

The fund would be used for entrepreneurship development, for facilities required for establishing common facilities/processing units at various locations.

Net profit for each project will be shared on periodical basis as:

- 34% would be reserved for the Gift Fund for payment to the extremely vulnerable populations.
- 28% for the private partner providing land, animals, clinic, factory, meat/milk shop and operational arrangements.
- 28% will be paid to the relevant faculty members, staff and students involved in HHP.
- 2.5% each will be paid to DSP, CAP, SAP and IUB.

Functions of LEDC

- The farmers would be provided an appropriate access to the farm inputs at accessible points and products sold through LEDCs; the Centres would be providing facilities of training, disease diagnosis, model farming and products processing, labelling and marketing facilities.
- Outgoing graduates at the universities would be provided facilities for internship and enthusiastic faculty members would be facilitated in demonstrating feasible entrepreneurship models.
- Hatchery services would be provided to the farmers for breeding of layers, quails, fancy and rare birds; quality of underground water would be checked for drinking of livestock to prevent emergence of different diseases.
- Facilities for cold chain and value addition of livestock products would be provided support to the farmers for enhanced profitability
- Successful models would be selected as Startups and university graduates would be sponsored to establish private companies for generating decent employment.

Herd Health Program

Herd Health Program (HHP) teams would be constituted to engage the postgraduate students and faculty members of IUB to improve product quality and; to reduce the per unit productivity cost through improved practices. Entrepreneurship models would be developed engaging the postgraduate students at the proposed LEDCs jointly by the farmers, processors, universities and government officials through business incubation.

Facilities would be provided for laboratory diagnosis of various livestock and poultry diseases and applied research will be conducted for postgraduate thesis on animal health and productivity issues through collaboration with sister organisations and Herd Health Program teams.

Animal Health and Production

Faculty of Animal and Veterinary Sciences IUB will help in improving health and productivity of livestock animals targeted at improved productivity, reduced cost per unit productivity. Laboratory facilities will be provided for disease diagnosis, treatment of diseases, research on emerging diseases, feed analysis and toxicology, genetic improvement and fertility management, artificial insemination and molecular techniques in animal health and productivity.

Meat and Dairy Technology

Cholistan district is rich in livestock resources however, resource management is poor resulting in prevalence of poverty in the region. Processing of meat and milk is at negligible level preventing preservation of the high value foods and reduced income levels of farmers. Establishment of such factories would boost up development and replication of interlinked entrepreneurship models in livestock, poultry and fish production, marketing, quality control, diagnostics, veterinary clinical services, biotech products, marketing and legislative services. Engagement of university graduates would be used as a source of generation of decent employment and exportable surpluses.

Halal and Hygienic standards

The Departments of Shariah and Law would help in defining the Halal standards Relevant Departments would be involved in developing business modules for entrepreneurship models working across the Livestock/Camel Value Chain. The Departments of Biochemistry, Biotechnology, Bioinformatics, Botany and Zoology will place their students at LEDC for pursuing relevant research and providing solutions to the emerging issues. The Cholistan Institute of Desert Studies will work on the genetics of medicinal plants and identification of candidate plants for drug development.

Halal Meat Factory

Hygienic and Halal quality and traceability standards would be integrated into LBVC. A mini slaughterhouse and meat factory would be established for processing meat of the farmers registered with HHP. Quality control standards would be developed for farming and meat processing practices regarding aflatoxins and other harmful substances in the feeds and processed products.

Entrepreneurship Development

Entrepreneurship models would be developed like livestock farms, dairy/meat factories, marketing outlets, diagnostic labs, training/consultancy centres, etc, through academia-industry interaction and propagated by LEDC. Halal foods and biotech products would be produced for local consumption and export associated with employment generation.

The Department of Entrepreneurship and Business Innovation is a newly established department in the Institute of Business Management and Administrative Sciences, The Islamia University of Bahawalpur to offer such programs that prepares its students for a wide range of careers in business including business development and establishing a startup.

The Department of Entrepreneurship and Innovation will engage their students at LEDC with the opportunity to develop skills that can be applied to a variety of organizations to new and existing ventures and to a wide range of sectors. They would be able to manage innovations within existing organizations, develop policies and business development roles, establish joint ventures and take on more serious roles within a family-run business.

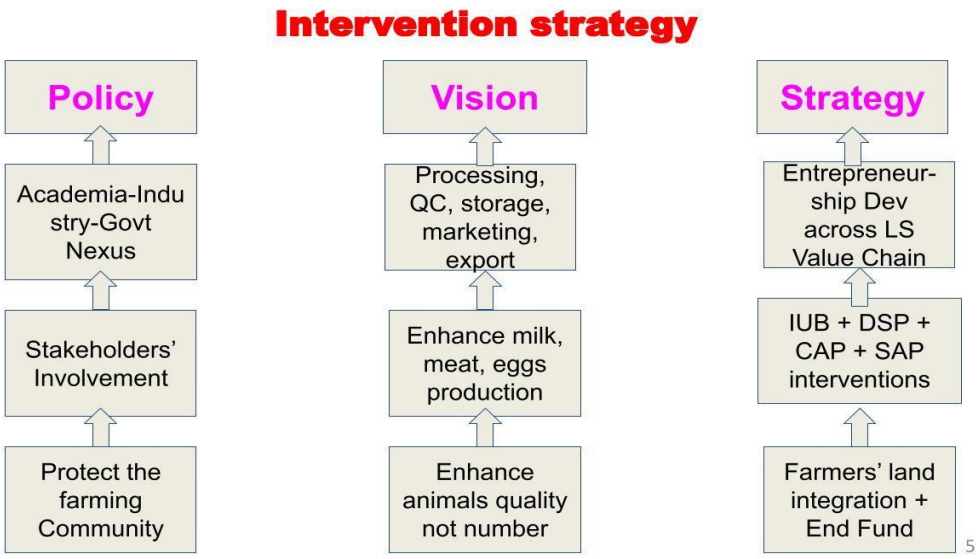
Zoology may contribute in animal breeding and production; Department of Botany in fodder production; Department of Microbiology in meat quality analysis; Department of Environmental sciences in waste management, solar energy and biogas production. The Biotechnology Department may work on genetics, vaccinology; Pharmacy Department on medical plants investigations; and Department of Social sciences will work on farmers' issues.

Outcomes

- Training of undergraduates through sponsored internship and graduate students through thesis research in livestock's health and production, to motivate them for entrepreneurship models, hence increasing employment opportunities for the youth.
- To support applied research in livestock and poultry science to be published in high ranking impact factor journals, providing social and economic benefits.
- To produce well-educated, trained and skilled men and women graduates belonging to different parts of the country who may lead the industry through establishment of an entrepreneurial network of model farms, milk/meat shops, products processing factories, diagnostic labs, training and marketing centres and allied facilities.having visible impact on the national economy.
- To ensure availability of quality certified and traceable meat, milk, eggs and other animal products in the market at local, provincial and national level and export export market, especially the Middle East in coordination with BCCI.
- To support the vulnerable family system in the region through the Gift Fund, empowering women and men through enhanced income, improved education for kids, good quality diets and a better living standard for everyone in the family. Such families would be facilitated to establish their own business.
- Outgoing graduates at the universities would be provided facilities for internship and enthusiastic faculty members would be facilitated in demonstrating feasible entrepreneurship models across LBVC.
- Specialized facilities would be provided like mini feed mills, mini slaughterhouses, mini dairy factories, hatchery services to the farmers for breeding of layers, quails, fancy and rare birds.

Cost Estimate (Rs. million)

S No	Component	End Fund	Non-laps Dev Grant	Total
1	HH Program	10	0	10
2	Animal H&P	10	0	10
3	Meat & Dairy Tech	10	10	20
4	HH Standards	5	0	5
5	Halal Meat Factory	15	10	25
6	Mini Feed Mill	10	10	20
7	Entrepreneurship Dev	10	0	10
	Total	70	30	100



Good Governance Model
Academia-Industries-Government Nexus

- Developing SOPs
- Entrepreneurship models

- Exploring sponsorship/land/ market
- Identifying vulnerables

- Developing farming systems
- Collaborating camel dev orgs

- Hosting LEDC
- Outreach services
- Establishing model entrepresizes

DAIRY SCIENCE PARK

SECure All Pakistan Societal Resilience

`(*Picture Courtesy: APP 2021*)

6

Good Governance Model
Academia-Industry- Government Nexus
Rs.100 Million

After 3 years
Project Inputs-Output FlowChart Of Livestock Entrepreneurship Development Center Bahawalpur

End Fund/HH Program/ Animal H&P/Meat & Dairy Tech/HH Standards/Halal Meat Factory/Mini Feed Mill Entrepreneurship Dev

→ 50 Farmers engaged

→ 5 Meat factories established

→ Meat produced 0.1 m kg/an

→ **Rs.70 million/annum**
(Value US$ 0.32 m, (Project cost of Rs.100 million or US$ 0.45 m)

Expected export (10%) US$ 0.045 m/annum
Annual entrepreneurship models generated 550, each one providing 10 decent employments

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KNP-4. Nutritional quality assessment of camel milk and its anti-diabetic effect

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Abstract

Camel milk is a valuable source of nutrition having a wide range of therapeutic effects. Due to its unique composition, it helps in regulating the blood glucose level. Camel milk is a supreme source of nutrients. Diabetes is a severe health problem with increasing prevalence in the world. This study aims to evaluate the nutrient contents in camel milk as well as antidiabetic activities of camel milk in diabetic mouse models. The results showed that Protein concentration was between 2.7- 4.2%, Fats 2.1- 4.7% and lactose 3.0 – 4.10%. More concentration of vitamin C was found in all regions among other vitamins (A, B and E) ranging from 0.50-0.70%. Among minerals (Ca, Na and Mg), more Ca was found in all regions ranging from 101 mg/100g-107 mg/100g. Camel milk significantly reduced blood glucose, HbA1c ($P<0.001$), aspartate transaminase (AST), alanine transaminase (ALT) ($p<0.01$), compared to the diabetic control group. Moreover, the therapeutic effects of camel milk were completely comparable with the antidiabetic drug glibenclamide. Due to the presence of insulin like proteins, bioactive peptides and poly-unsaturated fatty acids, the camel milk might be a good source for the treatment of diabetes.

Keywords: Antidiabetic activity, hepatoprotective effect, triglyceride, glibenclamide

KNP-5. Poverty alleviation of pastoral camel farming community in Pakistan: strengths, bottlenecks and strategies

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Abstract

Camels are unique animals and are bestowed with many apparent and unearthed potentials by nature. In Pakistan, the camel population is estimated as 1.1 million and stands at 8th major camel populated country of the world. Balochistan stands as hub of camelids with 41.5% camel population followed by Sind (30%), Punjab (22%) and Khyber Pakhtunkhwa (7%). The major bottlenecks in conserving and developing camels and camel farming community are; i) lack of awareness/ education in camel farmers about potential utilization of camels ii) lack of translational research by the academia and research wings of Livestock department iii) negligence by the policy makers at provincial and national levels iv) least interest by the non-government welfare, financing, and community development organizations. There are 23 major regions in Pakistan where more than ten thousand (>10000) camels can be found. Of it, Balochistan, Sindh, Punjab and Khyber Pakhtoonkhaw provinces have ten, fi, six and two regions, respectively. While analyzing camel milk yield potential (6-8 months) in top 23 major regions of Pakistan on few standard assumptions, it is estimated that in Balochistan, Kharan has milk yield potential of 38000 L/d followed by Kohlu (29000 L/d), Dera Bugti (17500 L/d), Bolan (17000 L/d), Lasbela (16000 L/d), Khuzdar (15000 L/d), Killa Saifullah (10000 L/d), Musa Khail (9000 L/d), Chaghi (9000 L/d) and Kalat (5000 L/d). In Sind, Tharparker region has the highest milk yield potential (68000 L/d) followed by Dadu (20000 L/d), Khairpur (9000 L/d), Thatta (2800 L/d) and Ghotki (2800 L/d). In Punjab, the milk yield potential is in Bakkar (9500 L/d) followed by Rajanpur (9000 L/d), Layya (8000 L/d), D.G.Khan (6000 L/d), Cholistan (5500 L/d) and Ex-D.G. Khan (5500 L/d) regions. In Khyber PakhtoonKhaw, the maximum milk yield potential is in D.I. Khan (6500 L/d) followed by South Waziristan Agency (5500 L/d). It is unfortunate that not a single penny from this God gifted asset is earned by the pastoral camel farmers. The collaborative efforts at all levels may lead to developing the camel dairy sector which consequently alleviate poverty of camel farming community in addition to conservation of camels, direct and indirect jobs creation, and availability of super medico-nutrients camel milk and value added products to the general public.

Keywords: Pastoral, poverty, camel, milk, Pakistan

Preamble

Camels are unique animals and are bestowed with many potentials by nature. Zoologically, camels fall in kingdom Animalia, phylum Chordata, class Mammalia, order Artiodactyla, suborder Tylopoda, Family Camelidae and genus Camelus. It is estimated that there are 35 million heads of camels in the world.

Globally, there are two major types of camels. One humped camel (*Camelus dromedarius*; Dromedary camels are 94% of world camel population and mostly found in continents of Africa and Asia) and two humped camels (*Camelus bactrianus*; Bactrian camels are 5.5% of world camel population mostly found in Mongolia/China). Approximately 0.5% of the world camel population consists of small stature new world camels (Llama, Alpaca, Guanaco and Vicuna) that are found in the continent of South America.

In Pakistan, the camel population is estimated as 1.1 million (PES, 2021-22) and stands at 8th major camel populated country of the world. Balochistan stands as hub of camelids with 41.5% camel population followed by Sind (30%), Punjab (22%) and Khyber Pakhtoonkhaw (7%). There are twenty-one documented camel breeds in Pakistan. Most camel breeds are found in Balochistan (08; Kharani, Kachhi, Brahvi, Lassi, Makrani, Pishin, Rodbari, Kohi) followed by Punjab (05; Marecha/Mahra, Barilla/Thalochi, Bagri/Booja, Cambelpuri, Kalachitta), Sindh (04; Sakrai, Saindhi/Larri, Dhatti, Kharai) and Khyber Pakhtoon Khaw (04; Gaddi, Ghulamani, Khader, Maya). Among all these breeds, Marecha, Brela, Sindhi and Kharani camel breeds are considered as the best camel dairy breeds of Pakistan.

It is unfortunate that despite healthy total strength and breeds, camels are neglected animal species and are being scaled less. The major bottlenecks in conserving and developing camels and camel farming community are lack of awareness/ education in camel farmers about reproductive management, health management and potential marketing of camels and camel products, lack of translational research by the academia and Livestock department, negligence by the policy makers at provincial and national levels, and lack of interest by the non-government welfare, financing, and community development organizations.

Further, due to mechanization and social change, this animal has lost its conventional use and prestige resulting in downward sustenance trend in pastoral camel farming. Majority of camel farmers are involved in camel husbandry practices just because of traditional living chic and living support through the sale of live camels for local meat market or export. Our camel farmers, livestock entrepreneurs, market players and policy makers have not yet focused camels as promising dairy animal. On the other hand, it is alarming that high yielding milch breeds form Punjab, Sind and Balochistan have continued flow to middle east

countries particularly United Arab Emirates resulting in dearth of good milking animals. Although, at present we are not utilizing our rich milking camels for milk marketing or initiation of commercial camel dairying in Pakistan however, this loss of good genetics/source will be nothing less than regret for us as a nation in near future.

In literature, it is found that Pakistan is bestowed with camel breeds that have good potential to be used for milk, meat, sports and tourism. There are 23 major regions in Pakistan where more than ten thousand (>10000) camels can be found. Of it, Balochistan, Sindh, Punjab and Khyber Pakhtoonkhaw provinces have ten (Fig.-1), five (Fig.-2), six (Fig.-3) and two (Fig.-4) regions, respectively. In Balochistan, Kharan has most population of camels (75000) followed by Kohlu (58000), Dera Bugti (34000), Bolan (33000), Lasbela (32000), Khuzdar (23000), Killa Saifullah (22000), Musa Khail (18500), Chaghi (18000) and Kalat (10000).

In Sind, Tharparker region is the most camel populated zone (140000) followed by Dadu (42000), Khairpur (20000), Thatta (11000) and Ghotki (10000). In Punjab, the most camel populated zone is Bakkar (19000) followed by Rajanpur (18000), Layya (17000), D.G.Khan (12000), Cholistan (11500) and Ex-D.G. Khan (11000). In Khyber PakhtoonKhaw, the most camel populated zone is D.I. Khan (13000) followed by South Waziristan Agency (10000).

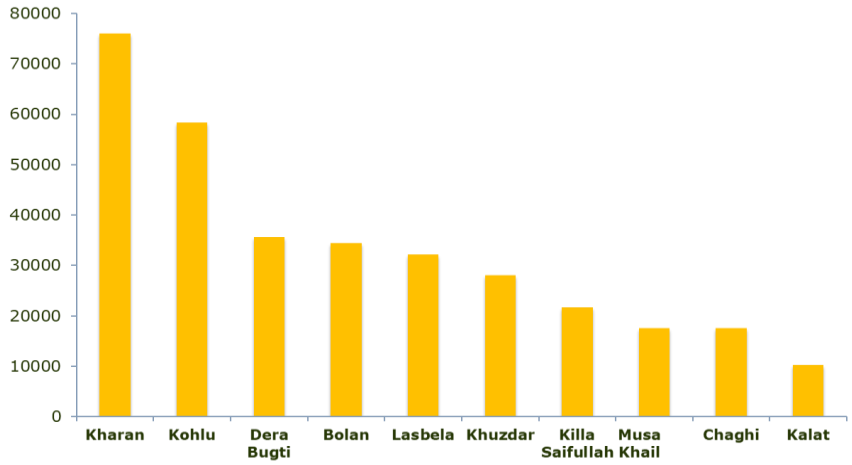

Figure 1: Camel population in top zones (>10000) of Balochistan

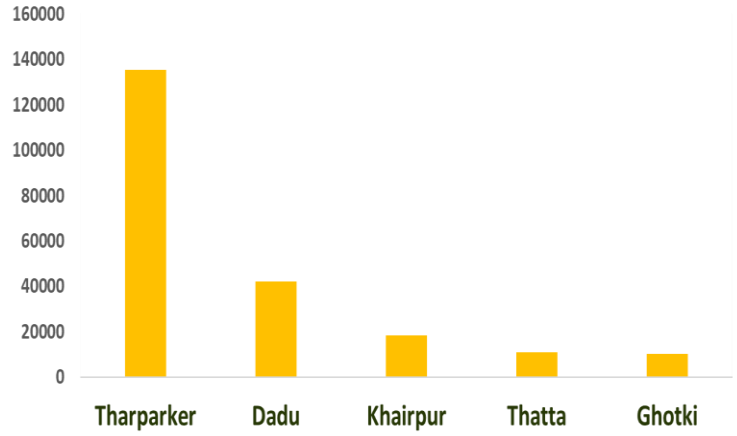

Figure 2: Camel population in top zones (>10000) of Sind

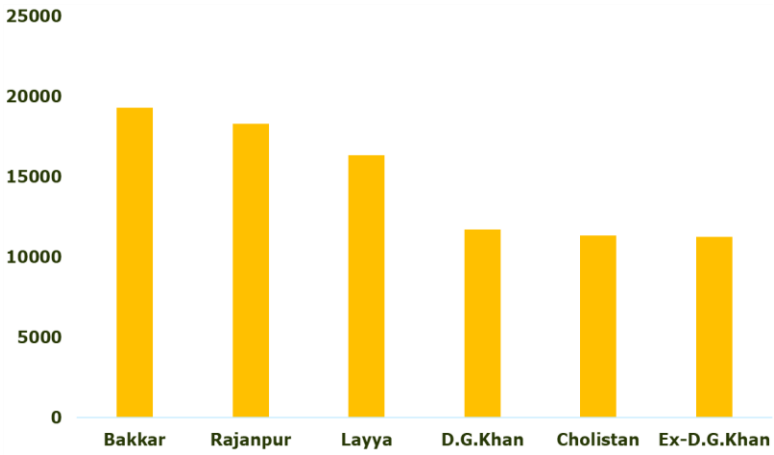

Figure 3: Camel population in top zones (>10000) of Punjab

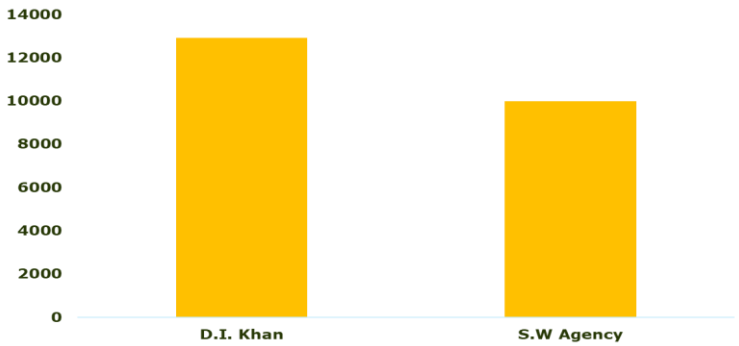

Figure 4: Camel population in top zones (>10000) of Khyber Pakhtunkhwa

While analyzing camel milk yield potential (6-8 months) in top 23 major regions of Pakistan on few standard assumptions, it is estimated that in Balochistan, Kharan has milk yield potential of 38000 L/d followed by Kohlu (29000 L/d), Dera Bugti (17500 L/d), Bolan (17000 L/d), Lasbela (16000 L/d), Khuzdar (15000 L/d), Killa Saifullah (10000 L/d), Musa Khail (9000 L/d), Chaghi (9000 L/d) and Kalat (5000 L/d). In Sind, Tharparker region has the highest milk yield potential (68000 L/d) followed by Dadu (20000 L/d), Khairpur (9000 L/d), Thatta (2800 L/d) and Ghotki (2800 L/d). In Punjab, the milk yield potential is in Bakkar (9500 L/d) followed by Rajanpur (9000 L/d), Layya (8000 L/d), D.G.Khan (6000 L/d), Cholistan (5500 L/d) and Ex-D.G. Khan (5500 L/d). In Khyber PakhtoonKhaw, the maximum milk yield potential is in D.I. Khan (6500 L/d) followed by South Waziristan Agency (5500 L/d).

The province wise milk yield potential in major zones (>10000) shows that Balochistan has milk potential of 166 ton/d having a worth of 16 m/d. The major zones of Sindh province have milk yield potential of 102.5 ton/d having a value of 10.3 m/d. The major zones of Punjab province have a potential of 43.5 ton/d having a worth of 4.3 m/d. Likewise, Khyber Pakhtoonkhaw 11.0 ton/d having a worth of 1.1 m/d.

Figure 5: Milk yield potential in top zones (>10000) of Balochistan

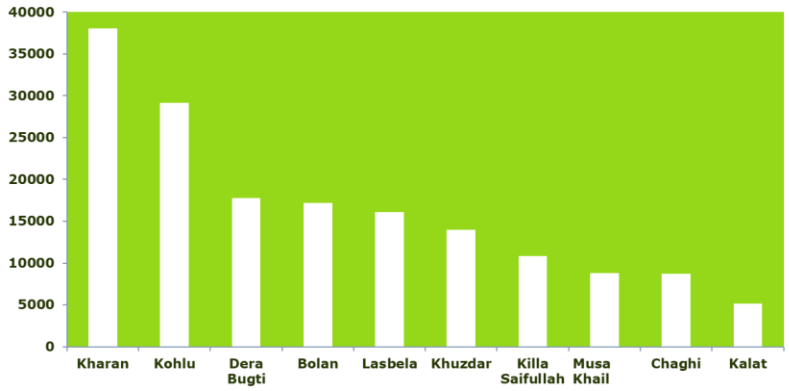

Figure 6: Milk yield potential in top zones (>10000) of Sind

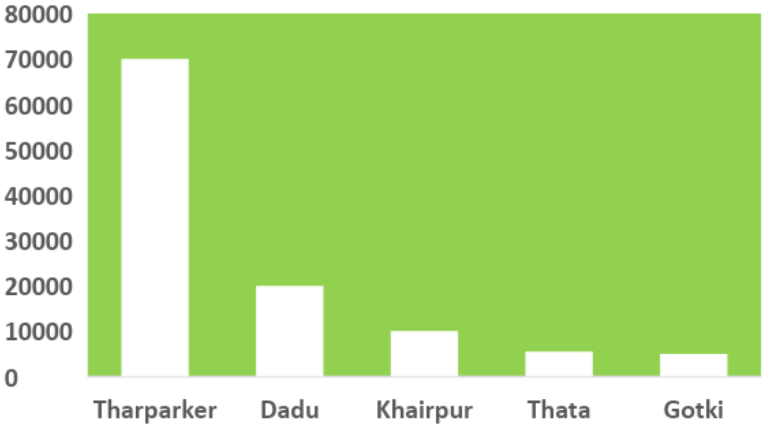

Figure 7: Milk yield potential in top zones (>10000) of Punjab

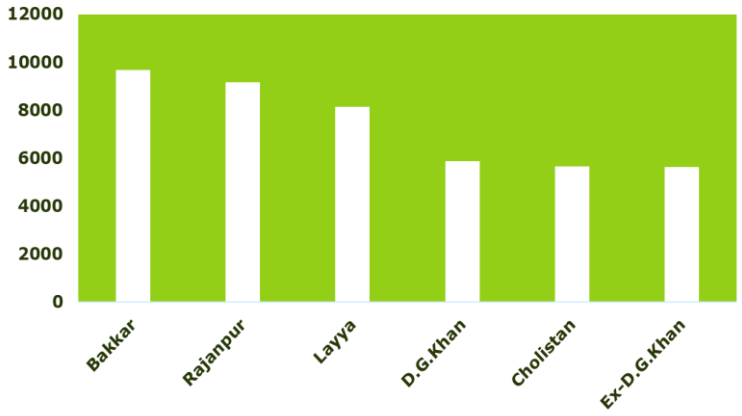

Figure 8: Milk yield potential in top zones (>10000) of Khyber Pakhtoonkhaw

At national level, the top ten potential regions of Pakistan having more than 10000 heads are given in table-1. As per Livestock census record, Tharparker is the most camel populated region of Pakistan with 137000 heads with milk yield potential of 68000 L/d. Tharparker is followed by Kharan region of Balochistan with 75000 heads and 38000 L/d milk yield potential. The other regions in descending order are Kohlu, Dadu, Dera Bugti, Bolan, Lasbela, Khuzdar, Killa Saifullah and Bakkar. The total milk yield potential is 323 ton/d with worth of 31.7 m/d (@ 100/L PKR) in these top ten regions of Pakistan.

Table-1: Top ten camel populated and cam milk (CAM) potential regions in Pakistan

Sr. #	Region	Heads	CAM Potential (Total/Net L/d)	Worth (Net M.PKR/d)
1	Tharparker	137000	68000/34250	3.4
2	Kharan	75000	38000/19000	1.9
3	Kohlu	58000	28000/14000	1.4
4	Dadu	42000	20000/10000	1.0
5	Dera Bugti	34000	17500/8750	0.875
6	Bolan	33000	17000/8500	0.85
7	Lasbela	32000	16000/8000	1.6
8	Khuzdar	23000	15000/7500	0.75
9	Killa Saifullah	22000	10000/5000	0.5
10	Bakkar	19000	9000/4500	0.45

The way forward /strategy is required from prevailing ignored attitude of all stack-holders to camels and camel farming community. Any intervention may definitely lead to potential utilization of camels and consequent poverty alleviation of the camel farmers, job creation and multi-dimensional entrepreneurship opportunites. Moreover, it will also result in paradigm shift from conventional concept of camels as" ship of desert" to potential "source of food security under climate change".

Strategic recommendations

The following suggestions/ strategies are highly desired.

1. Inclusion of camels in provincial and national livestock policies.
2. Initiation of field awareness of camel milk marketing among pastoral camel farming communities.
3. Initiation of milk collection models in top ten regions of Pakistan.
4. Installation of dry milk processing plants in top ten regions of Pakistan.
5. Modeling and distribution of small capacity dry milk processing units to pastoral camel farming communities.
6. Value addition of camel milk in preparing organic i.e., camel ice cream, camel yogurt, camel cheese and camel coffee for regional, national and international marketing.
7. Standardization of dry milk powder and other value added products as per food safety and international marketing laws.
8. Establishment of at least one commercial camel dairy farm as Model farm in each province.
9. Establishment of well-equipped Camel Research and Entrepreneurship Centres (CRECs) in each province.
10. Development of linkages with China and other foreign countries.

11. Utilization of Halal camel meat marketing opportunities in the Muslim World.
12. Value addition of camel meat.
13. Camel welfare and development organizations are required at community and regional levels for proper care and health management of camels.

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KNP-6. The Current and future of the economics of the Animal Production sector in light of some challenges

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Abstract

While the contribution of the animal production sector to agricultural output increased from about 30.9% in general to about 35.1% during 2000-2020, however, the value of animal forage as one of the most important requirements for animal production increased from about 12.53 billion pounds to about 149.60 billion pounds during the same period, However, the number of cows and buffaloes decreased from about 3.53, 3.38 million heads each in 2000 to about 2.75, 1.35 million heads in 2020. The decrease in the total animal units is due to the sharp decrease in the number of buffalo units, as it decreased from about 4.224 million animal units in 2000 to about 1.685 million animal units in 2020, which represents about 60%. The increased in the total forage production is due to the sharp increased the concentrated forage from about 41% to about 48%, as well as increased the dry forage from about 16% to about 17%, as a result of decreasing areas of green fodder, as well as manufactured fodder. There is a statistically significant effect of the high costs of fodder feeding, as the equation constant (the cut-off part of the y-axis) moved from about 11673 to about 13842, and it is also clear from the estimated equation that by increasing the costs of fodder feeding by one unit, it will lead to a decrease in the number of animal units by about 0.042. Self-sufficiency from red meat has decreased from about 84.14% to about 65.44% during the study period, with an average of about 68.29%, and it is expected to decrease to about 44.96% in 2027. While for milk it has increased from about 93.80% to about 98.17% during the study period, with an average of about 90.29%, and it is expected to be at the same to about 98.07% in 2027.

Keywords: Agricultural investment, forage, budget, Box-Jenkins prediction models

Introduction

The agricultural sector is one of the main pillars on which the national economy relies, and it is also a major source of food supplies. The agricultural sector suffers from many problems that limit the efficiency of investment in the agricultural sector, given that dairy products are among the cheapest sources of food, especially animal ones, in addition to being a semi-complete food because it contains about 85 nutrients necessary for the growth of the human body; however, the contribution of the animal production sector to the national product decreased from about 7.0% in 2000 to about 3.8% in 2020, while the contribution of the animal production sector to agricultural output increased from about 30.9% in general to about 35.1% during that period, however, the value of animal forage as one of the most important requirements for animal production increased from about 12.53 billion pounds to about 149.60 billion pounds during the same period. and the contribution of dairy production to agricultural output increased from about 3.6% to about 8.2% during the same period, but the number of cows and buffaloes decreased from about 3.53, 3.38

million heads each in 2000 to about 2.75, 1.35 million heads in 2020, which has become a threat to the future of the animal production industry in Egypt, and the consequent decrease in the quantities supplied and a change in the level of demand and then a change in the level of balance as a result of a shortage of supply and high price levels.

The general level of prices increased by about 5.60 times during that period. The average per capita share of dairy decreased from about 61 kg/person in 2000 to about 53 kg/person in 2020, and the average per capita share of red meat decreased from about 17 kg/person to about 13 kg/person during that period. Production for red meat consumption from 271 days/year to about 169 days/year during that period.

Research objective

The research aimed to identify the efficiency of the performance of the animal production sector as a major source of animal protein, by studying the following sub-objectives:

- Identify the relative importance of the animal production sector's contribution to the national income.
- Evolution of investment efficiency in the animal production sector.
- Identifying the evolution of the numbers of animal units and their fodder needs.
- Identify the relative importance of the components of the forage balance.
- The standard estimate of the impact of the development of animal forage and production requirements on the number of animal units.
- The current and future status of self-sufficiency indicators and the period of production meeting the consumption of red meat and dairy.

Data and Research Method

The research relied on the use of descriptive and quantitative analysis methods, where simple and multiple regression equations were compared, and the best one was chosen according to statistical and economic logic, in addition to using t-tests in groups, F-chaw, Forecasting Model using Box Jenkins methodology: (ARMA), (ARIMA), and the comparison between models is done through the criteria of judging the quality of the model using: Mean Absolute Error(MAE) and Mean Square Error (MSE).

The study relied on secondary data published by the Central Agency for Public Mobilization and Statistics, Economic Affairs Sector - Central Administration of Agricultural Economy, in addition to research related to the subject.

Results and Discussion

By studying the relative importance of the animal production sector's contribution to the national income during the period (2000-2020).

National production: The average national product increased from about 604.46 billion pounds during the period 2000-2010 to about 2774.30 billion pounds during the period 2011-2020, with a total average of about 1625.00 billion pounds during the period 2000-2020.

Agricultural Production: The average agricultural production increased from about 131.27 billion pounds, representing about 21.72% of the national product during the period 2000-2010 to about 365.00 billion pounds, representing about 13.16% of the national product during the period 2011-2020, with a total average of about 245.00 billion pounds, representing about 15.08% of the national product during the period 2000-2020.

Animal Production: The average animal production increased from about 46.64 billion pounds, representing about 7.72%, 35.53% of the national and agricultural product respectively during the period 2000-2010, to about 131.44 billion pounds, representing about 4.74%. 36.01% of the national and agricultural product respectively during the period 2011-2020, with a total average of about 85.27 billion pounds, representing about 5.27%, 34.98% of the national and agricultural product respectively during the period 2000-2020.

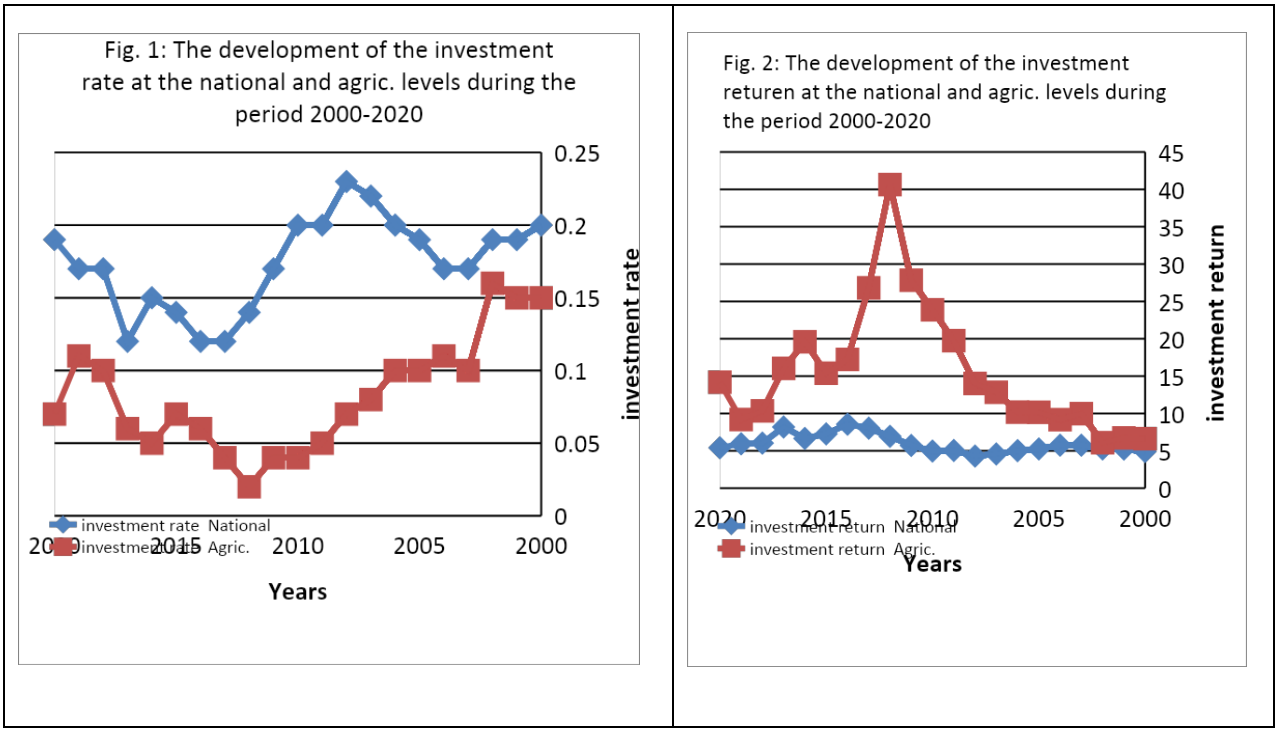
Evolution of investment efficiency:

Development of the investment rate at the national and agricultural levels: By studying The development of the investment rate at the national and agricultural levels during the period 2000-2020, from Fig, 1, its turns out that the investment rate efficiency in the agricultural sector has increased compared to the national level during all years of the study. It decreased in the agricultural sector from about 0.15 in the year 2000 to about 0.07 in 2020, compared to the national average from about 0.20 to about 0.19 during the same period.

Table 1: The evolution of the relative importance of the bottom of animal production during the two study periods, (2000-2010), (2011-2020)

Variable		**First period (2000-2010)**	**Second period (2011-2020)**	**Total period (2000-2020)**
National production	Average (billion pounds)	604.46	2774.30	1625.00
Agric. production	Average (billion pounds)	131.27	365.00	245.00
	National product %	21.72	13.16	15.08
Animal production	Average (billion pounds)	46.64	131.44	85.70
	National product %	7.72	4.74	5.27
	Agric. Product %	35.53	36.01	34.98

Source: Central Agency for Public Mobilization and Statistics: Annual Bulletin of Livestock Statistics, 2000-2020; Ministry of Agriculture and Land Reclamation: Economic Affairs Sector, Agricultural Statistics Bulletin 2000-2020.

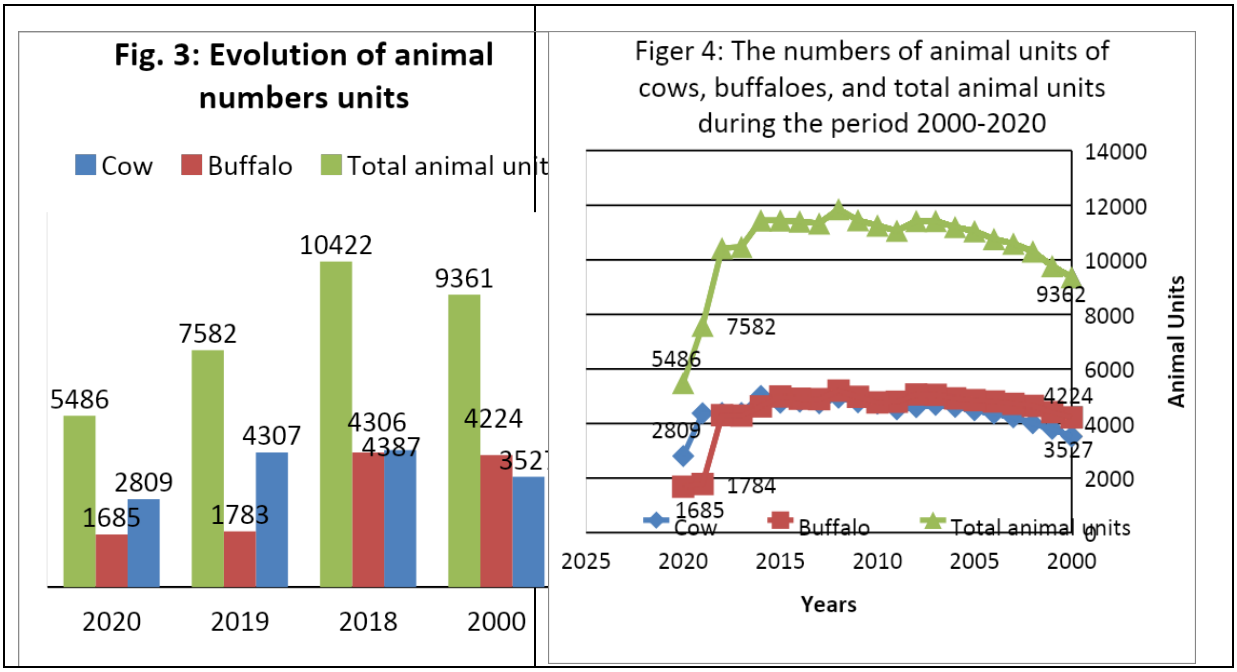


Development of the Return on investment the national and agricultural levels: By studying the development of the Return on investment at the national and agricultural levels during the period 2000-2020, from Fig, 2, its turns out that the investment rate efficiency in the agricultural sector has increased compared to the national level during all years of the study. It increased in the agricultural sector from about 6.62 in the year 2000 to about 14.18 in the year 2020, compared to the national increase from about 4.90 to about 5.40 during the same period.

The evolution of the numbers of animal units:

By studying the evolution of the numbers of animal units, Fig. 3 and 4, show that: Increasing the number of animal units from about 9,362 million animal units in 2000 to about 10,422 million animal units in 2018, Then the numbers of animal units declined to about 7.582 million animal units in 2019, then the regression increased to reach about 5.486 million animal units in 2020.

Fig. 3 show that: the distribution of the relative importance of the numbers of animal units in Egypt during the period 2000-2020, the numbers of buffaloes and cows represent about 84%, at a rate of 42% each of the number of animal units, followed by sheep, goats, camels, and others, at a rate of about 5%, .3%, 1%, 7% respectively.



By studying the effect of structural change on the development of the numbers of animal units, the following is a review of the development of the numbers of animal units during the two study periods, shown from the data of Table No 2. To find out the extent of significant differences between the numbers of animal units between the two study periods using t-test in groups, it was found that there were no significant differences between the numbers of animal units for each of the cows, buffaloes, sheep, goats, camels, and pack animals, where the calculated value of (t) was less than its tabular counterpart at any of the levels of significance. The significant effect did not appear between the two periods as a result of the decrease in the number of animal units decreased in the last two years only, as shown in Fig. No 3.

Table 2: The structural change of the composition of animal units and the extent of data homogeneity and the presence of significant differences during the two study periods

Types of animals	First period (2000-2010)				Second period (2011-2020).				t. in group	F. Chaw
	Average	%	Coeff. of variance	Index number	Average	%	Coefficient of variance	Index number		
Cow	4438.55	40.55	6.67	125.85	4023.47	40.64	36.44	114.73	0.46	0.50
Buffalo	4821.56	44.11	3.73	114.14	3670.00	35.25	47.03	87.24	1.74	13.54*
Sheep	521.53	4.77	4.83	116.7	418.39	4.25	46.28	93.99	1.14	12.86*
Goat	274.8	2.51	6.21	114.63	237.45	2.61	42.99	99.41	0.40	3.43
Camel	103.76	0.95	10.28	98.3	88.10	1.79	36.68	83.52	1.00	3.15
Other animal	776.38	7.11	4.01	94.84	710.45	7.9	34.53	87.14	0.37	13.96*
Total animal units	10936.58	100	4.65	116.82	9144.75	100	39.51	98.14	0.97	7.03**

Source: Ministry of Agriculture and Land Reclamation: Economic Affairs Sector, Livestock statistics 2000-2020

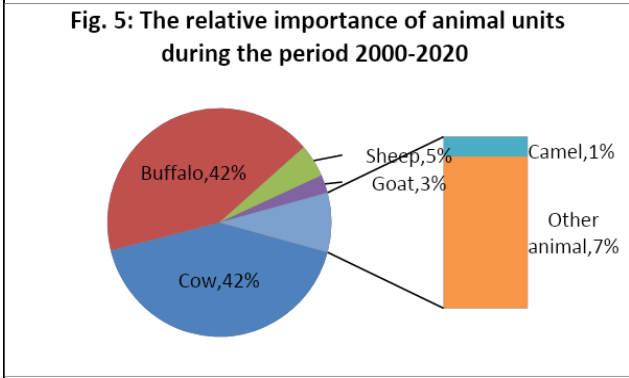


Fig. 5: The relative importance of animal units during the period 2000-2020

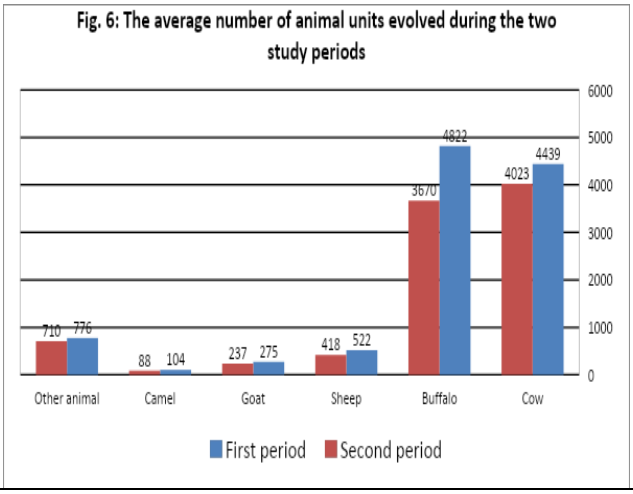


Fig. 6: The average number of animal units evolved during the two study periods

In order to show the extent of data homogeneity during the two study periods, F-Chaw test was used, where it was found that the total animal units were heterogeneous during the two study periods, where the value of F-Chaw was about 7.03, which is greater than its tabular counterpart at the same level of significance, as well as, for buffalo and sheep units, where the value of F-Chaw reached about 13.54, 12.86 respectively which is greater than its tabular counterpart at the same level of significance. While the homogeneity of the animal units for each of the cows, goats and camels was evident, as the value of F-Chaw reached about 0.50, 3.43, 3.15 respectively which is less than its tabular equivalent at the same level of significance.

Accordingly, the study period was divided into two periods First period (2000-2010), Second period (2011-2020).

Total animal units: The average number of animal units has decreased from about 10.937 million animal units, at an index average of about 116.82% during the first period, to about 9.145 million animal units, at an index average rate of about 98.14%, during the second period.

Cow animal units: The average number of cow animal units has decreased from about 4.439 million animal units, at an index average of about 125.85% during the first period, to about 4.024 million animal units, at an index average rate of about 114.73%, during the second period.

Buffalo animal units: The average number of Buffalo animal units has decreased from about 4.822 million animal units, at an index average of about 114.14% during the first period, to about 3.670 million animal units, at an index average rate of about 87.24%, during the second period.

Sheep animal units: The average number of Sheep animal units has decreased from about 0.522 million animal units, at an index average of about 116.70% during the first period, to about 0.418 million animal units, at an index average rate of about 93.99%, during the second period

And from the foregoing: The decrease in the total animal units is due to the sharp decrease in the number of buffalo units, as it decreased from about 4.224 million animal units in 2000 to about 1.685 million animal units in 2020, which represents about 60%.

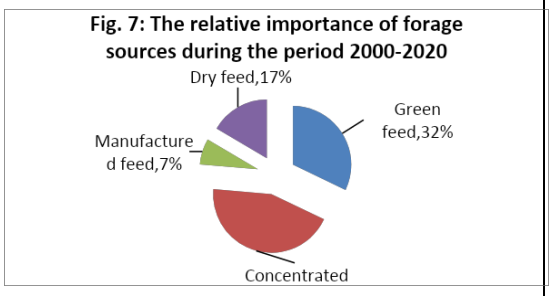
The available food compounds and digestible protein, (TDN), (TDP):

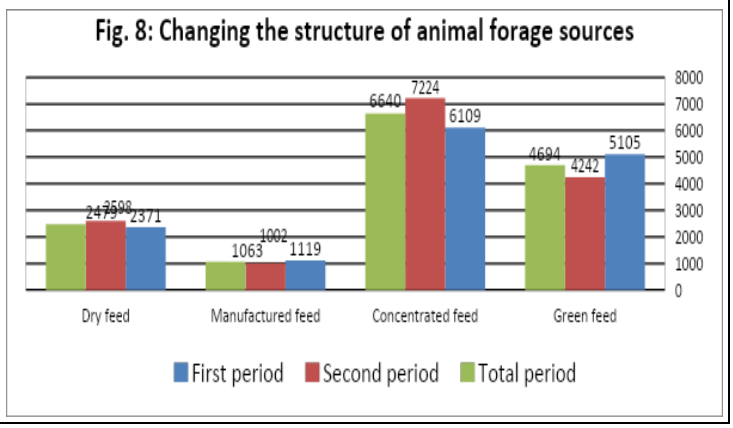
By studying the available food compounds and digestible protein, Total Digestible Nutrients (TDN), Total Digestible Protein (TDP), From Table 3 and fig. 7, 8, show that:

Table 3: The structural change of the composition of types forages (TDN), (TDP) and the extent of data homogeneity and the presence of significant differences during the two study periods

Feed type	First period			Second period			t. in group	F. Chaw test
	Average (thousand tons)	%	Coefficient of variance	Average (thousand tons)	%	Coefficient of variance		
	Total Digestible Nutrients (TDN)							
Green forage	5105.15	34.68	8.02	4242.17	27.96	27.54	2.18**	2.04
Concentrated forage	6109.30	41.21	14.23	7224.48	47.97	9.14	3.73*	2.13
Manufactured forage	1119.40	7.61	6.71	1001.66	6.68	9.04	3.87*	0.53
Dry forage	2370.81	16.10	8.19	2598.28	17.39	18.03	1.52	1.39
Total forages	14704.66	100.00	6.46	15066.59	100.00	5.04	1.23	1.04
	Total Digestible Protein (TDP)							
Green forage	1374.95	65.13	8.02	1142.53	56.14	28.22	2.18**	2.04
Concentrated forage	534.56	25.14	14.23	632.14	33.25	9.14	3.73*	2.13
Manufactured forage	97.95	4.64	6.71	87.65	4.63	9.04	3.87*	0.53
Dry forage	100.30	4.75	8.19	109.93	5.98	18.03	1.52	1.39
Total forages	2107.77	100.00	5.66	1972.24	100.00	14.46	1.23	1.04

Source: Ministry of Agriculture and Land Reclamation: Economic Affairs Sector, Livestock statistics- 2000-2020





The relative importance of forage sources, to distribution of the relative importance of the forage sources in Egypt during the period 2000-2020, the concentrated forage represent about 44%, followed by green forage, dry forage and manufactured forage at a rate of about 32%, .17%, 7% respectively.To find out the extent of differences between the forage sources (TDN), (TDP) between the two study periods using t-test in groups, and it was found that there were significant differences between the forage sources for green forage, concentrated forage and manufactured forage, where the calculated value of (t) was bigger than its tabular counterpart for the same levels of significance. In order to show the extent of data homogeneity during the two study periods, F-Chaw test was used, where it was found that the all forage sources were heterogeneous during the two study periods, where the value of F-Chaw was less than its tabular counterpart at any level of significance. Accordingly, the study period was divided into two periods: First period (2000-2010), Second period (2011-2020).

Total forages: The average of total forages for (TDN) has increased from about 14704 thousand tons, during the first period, to about 15067 thousand tons, during the second period. While the average of total forages for (TDP) has decreased from about 2108 thousand tons, to about 1972 thousand tons, during the same period.

Concentrated forages: The average of Concentrated forages for (TDN) has increased from about 6109 thousand tons, during the first period, to about 7224 thousand tons, during the second period. At the same for (TDP) from about 535 thousand tons, to about 632 thousand tons, during the same period.

Green forages: The average of green forages for (TDN) has decreased from about 5105 thousand tons, during the first period, to about 4242 thousand tons, during the second period. And at the same for (TDP) from about 1375 thousand tons, to about 1143 thousand tons, during the same period.

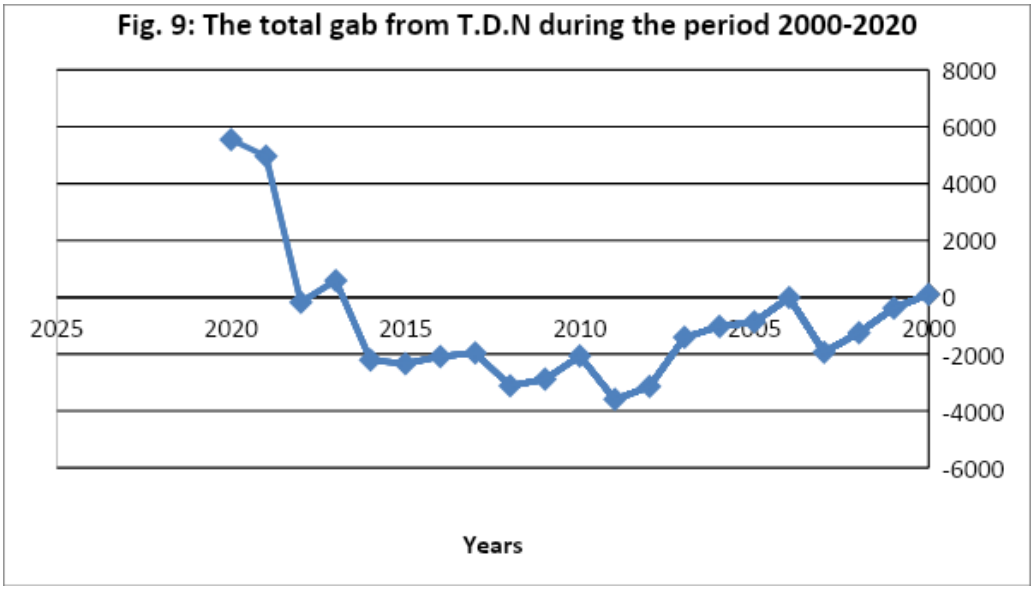
Manufactured forages: The average of manufactured forages for (TDN) has decreased from about 1119 thousand tons, during the first period, to about 1002 thousand tons, during the second period. And at the same for (TDP) from about 98 thousand tons, to about 88 thousand tons, during the same period.

Dry forages: The average of dry forages for (TDN) has increased from about 2371 thousand tons, during the first period, to about 2598 thousand tons, during the second period. At the same for (TDP) from about 100 thousand tons, to about 110 thousand tons, during the same period. The increased in the total forage is due to the sharp increase in the concentrated forage from about 41% to about 48%, as well as increasein the dry forage from about 16% to about 17%, As a result of decreasing areas of green fodder, as well as manufactured fodder.

Forage budget:

By estimating the availability of feed in the form of digested food compounds and digested crude protein on the one hand, and estimating the feed needs of the total animal units during the study period 2000-2020, it is clear from Figure No. 9 that the period from 2007 to 2016 showed a nutritional gap in animal feeding that reached its maximum during the period 2008-2010 and as a result of the decrease in the number of

animal units, as previously mentioned, it led to an increase in fodders availability due to a decrease in fodder needs.



Note: Please read the gab as a gap.

Measuring the impact of structural change in the cost of animal feed on the number of animal units:

To measure the impact of the structural change in animal forage costs on the number of animal units, a regression equation has been developed using dummy variables. It is clear from the estimated regression equation that the statistical significance of the model has been proven at the usual level of significance, as the calculated (F) value was about 13.28, which is greater than its tabular counterpart at the same level of significance. From the derived equations, it is clear that there is a statistically significant effect of the high costs of fodder feeding, as the equation constant (the cut-off part of the y-axis) moved from about 11673 to about 13842. It is also clear from the estimated equation that by increasing the costs of fodder feeding by one unit, it will lead to a decrease in the number of animal units by about 0.042.

Current and future situation to evolution of food security indicators for red meat in Egypt:

Current and future situation evolution of food security indicators for red meat in Egypt during the period 2010-2020, from data tables No. 4 and 5 show that Red meat production has decreased from about 992 thousand tons to about 589 thousand tons during the study period, with an average of about 857 thousand tons, and it is expected to increase to about 680 thousand tons in 2027.

Consumption of red meat: Red meat Consumption has decreased from about 1179 thousand tons to about 900 thousand tons during the study period, with an average of about 1276 thousand tons, and it is expected to increase to about 1517 thousand tons in 2027.

Average annual per capita consumption:

Consumption has decreased from about 14.98 Kg/capita to about 8.82 Kg/capita during the study period, with an average of about 14.32 Kg/capita, and it is expected to increase to about 13.25 Kg/capita in 2027. Production has decreased from about 12.60 Kg/capita to about 5.77 Kg/capita during the study period, with an average of about 9.74 Kg/capita, and it is expected to increase to about 6.95 Kg/capita in 2027. The self-sufficiency has decreased from about 84.14% to about 65.44% during the study period, with an average of about 68.29%, and it is expected to decrease to about 44.96% in 2027. The production coverage period for consumption has decreased from about 307 day/year to about 239 day/year during the study period, with an average of about 249 day/year, and it is expected to decrease to about 164 day/year in 2027.

Current and future situation of evolution of food security indicators for milk in Egypt:

Current and future situation evolution of food security indicators for milk in Egypt during the period 2010-2020, from data tables No. 6 and 7 show that Milk production has decreased from about 6172 thousand tons to about 5890 thousand tons during the study period, with an average of about 5055 thousand tons, and at the same it is expected to decrease to about 5727 thousand tons in 2027. Red meat Consumption has decreased from about 6580 thousand tons to about 6000 thousand tons during the study period, with an average of about 6164 thousand tons, and at the same it is expected to decrease to about 5840 thousand tons in 2027.

Table 4: Evolution of food security indicators for red meat in Egypt during the period 2010-2020

Years	Total production of red meat (1000 tons(	Consumption of red meat (1000 tons(	Average annual per capita (kg)		Self-sufficiency %	Production coverage period for consumption (day/year)
			Consumption	production		
2010	992	1179	14.98	12.60	84.14	307
2011	989	1200	14.92	12.30	82.42	301
2012	990	1109	13.43	11.99	89.27	326
2013	965	1278	15.10	11.40	75.51	276
2014	941	1304	15.02	10.84	72.16	263
2015	975	1691	19.01	10.96	57.66	210
2016	788	1218	13.38	8.66	64.70	236
2017	792	1417	14.88	8.32	55.89	204
2018	858	1755	18.06	8.83	48.89	178
2019	544	988	9.95	5.48	55.06	201
2020	589	900	8.82	5.77	65.44	239
Average	857	1276	12	9.74	68.29	249

Source: Central Agency for Public Mobilization and Statistics: Annual Bulletin of Livestock Statistics, 2000-2020; Ministry of Agriculture and Land Reclamation: Economic Affairs Sector, Agricultural Statistics Bulletin - 2000-2020.

Table 5: Future situation to evolution of food security indicators for red meat in Egypt 2023- 2027

Years	Total production of red meat (1000 tons(	Consumption of red meat (1000 tons(	Average annual per capita (kg)		Self-sufficiency%	Production coverage period for consumption (day/year)
			Consumption	production		
2023	640.61	1428.02	13.29	5.96	44.86	164
2024	682.04	1450.26	13.26	6.24	47.03	172
2025	665.69	1472.50	13.25	6.45	45.21	165
2026	729.48	1494.74	13.23	6.94	48.80	178
2027	681.98	1516.98	13.21	6.95	44.96	164
Average	679.96	1472.50	13.25	6.12	46.17	169
Model	ARIMA(1,1,0)	ARIMA(1,1,1)	---	---	---	---

Source: Collected and calculated from the results of the statistical analysis using Minitab program

Average annual per capita consumption:

Consumption has decreased from about 83.58 Kg/capita to about 58.82 Kg/capita during the study period, with an average of about 69.40 Kg/capita, and at the same it is expected to increase to about 50.86 Kg/capita in 2027.

Table 6: Evolution of food security indicators for milk in Egypt during the period 2010-2020

Years	Total production of milk (1000 tons(	Consumption of milk (1000 tons(	Average annual per capita (kg)		Self-sufficiency%	Production coverage period for consumption (day/year)
			Consumption	production		
2010	6172	6580	83.58	78.39	93.80	342
2011	5803	6337	78.81	72.17	91.57	334
2012	5849	6248	75.69	70.85	93.61	342
2013	5554	6117	72.28	65.63	90.80	331
2014	5601	6323	72.84	64.52	88.58	323
2015	5245	6401	71.95	58.96	81.94	299
2016	5089	6618	72.71	55.91	76.90	281
2017	5505	5676	59.62	57.83	96.99	354
2018	5173	5744	59.13	53.25	90.06	329
2019	5227	5756	57.97	52.64	90.81	331
2020	5890	6000	58.82	57.75	98.17	358
Average	5055	6164	69.40	62.54	90.29	330

Source: Central Agency for Public Mobilization and Statistics: Annual Bulletin of Livestock Statistics, 2000-2020; Ministry of Agriculture and Land Reclamation: Economic Affairs Sector, Agricultural Statistics Bulletin -2000-2020.

Table 7: Future situation to evolution of food security indicators for milk in Egypt during the period 2023-2027

Years	Total production of milk (1000 tons(	Consumption of milk (1000 tons)	Average annual per capita (kg)		Self-sufficiency%	Production coverage period for consumption (day/year)
			Consumption	production		
2023	5434.38	5923.37	55.11	50.56	91.74	335
2024	5507.58	5965.21	54.55	50.36	92.33	337
2025	5580.78	6007.05	54.04	50.21	92.90	339
2026	5653.97	6048.90	53.52	50.03	93.47	341
2027	5727.17	5839.68	50.86	49.88	98.07	358
Average	5580.78	5956.84	53.62	50.21	93.70	342
Model	ARIMA(1,1,0)	ARIMA(1,0,0)	---	---	---	---

Source: Collected and calculated from the results of the statistical analysis using Minitab program

Production has decreased from about 78.39 Kg/capita to about 57.75 Kg/capita during the study period, with an average of about 62.54 Kg/capita, and at the same it is expected to increase to about 49.88 Kg/capita in 2027.

Self-sufficiency: it has increased from about 93.80% to about 98.17% during the study period, with an average of about 90.29%, and it is expected to be up to about 98.07% in 2027.

Production coverage period for consumption: it has increased from about 342 days/year to about 358 day/year during the study period, with an average of about 330 days/year, and it is expected to decrease to about 358 day/year in 2027.

For policy makers the study recommended:

1. We need to stop the slaughter of female cows and buffaloes less than 500 kg, and to pay attention to breeding good, high-production breeds.
2. The importance of moving towards non-traditional feeds to reduce production costs and encourage small breeders to enter the production process.
3. Encourage investors to invest in the agricultural sector due to the efficient performance of agricultural investment compared to the national level

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KNP-7. Power of genomics for camel improvement

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Abstract

Camels are the most advantageous animals used for agricultural work, transport, production and leisure. Incredible adaption to extreme heat and drought makes it as the most suitable choice in rapidly changing climate. Camel milk is used for therapeutic purpose in treating diabetes, cancer, ulcers, autism, allergies and infections. However, milk yield is not sufficient to meet the demand. Current and future technologies could contribute to cope with challenges of increasing demand. Gene editing and breeding technology is expected to be the key to solving the camel production demand and challenges. Gene editing relying on CRISPR/Cas9 is a promising technology of this century and has revolutionized the genetic engineering field. It has gained attention in biotechnological products manufacturing research and development industries. Milk production associated DGAT1, Prolactin and Casein genes could be modified. The CRISPR/Cas9 efficiency of base-editing, knock-in and knock-out could be increased with siRNAs. Selectable marker free animals could be produced using Cre-Recombinase system along with the genome editing technology. This would be helpful in uplifting the socio-economic condition of the families associated with camel farming.

Keywords: Camels, Gene editing, genome editing technology, milk, CRISPR/Cas9

KNP-8. Evaluation of the Dairy Industry in Türkiye

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Abstract

Milk and its products are an important sector with high added value in Turkey as well as in the world. While the production stage of milk only concerns the farmers, when the processing and market supply dimensions are evaluated together, it is understood that it concerns the entire population in the country. In this respect, policies and practices related to milk are carefully followed by the society. In this study, the processing stage after milk production in Turkey will be evaluated. Although the data on the usage areas of raw milk produced in Turkey vary in different sources, in general, approximately 20% of the total milk is used for self-consumption and animal feeding on the farm, 20% is sold as fresh milk, and 33% is processed in simple enterprises and 27% are processed in modern industries. Therefore, many different dairy products are available and consumed.

Keywords: Dairy Industry, Turkey, value addition, milk marketing, policies and practices

KNP-9. Crimean-Congo Haemorrhagic Fever Virus in Humans and Livestock in Pakistan

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Abstract

Laboratory diagnosis of suspected CCHF is performed in specially-equipped, high biosafety level laboratories. PCR is used as diagnostic: a) within the first 1-4 days of illness. b) patients with fatal disease who do not usually develop a measurable IgM antibody response, c) PCR remains positive up till week 3. We have collected a total of 1,872 human serum samples during 2017–2018 from all four provinces. For animal sampling, we have selected 14 districts from Punjab, 3 from Khyber Pakhtunkhwa, 7 from Balochistan, and 5 from Sindh. We chose sampling sites on the basis of animal populations, ease of sampling, and the presence of veterinary clinics. We sampled a total of 311 buffaloes, 480 camels, 183 cattle, 440 goats, and 424 sheep; from each animal, we drew 4 mL blood aseptically directly into the gel-clot activator containing vacutainer (Improvacuter). We have also collected a total of 509 Hyalomma spp., 134 Rhipicephalus spp., 77 Haemaphysalis spp., and 54 Rhipicephalus spp. ticks from livestock from Punjab and Balochistan provinces of Pakistan. We stored ticks at 4°C in the field and sent them to the University of Agriculture Faisalabad, Pakistan, where they were stored at -40°C. For human serum samples, we used a 2-step approach for serological sampling. In the first step, we screened all human serum samples using a commercial ELISA (Vector-Best, https://vector-best.ru) according to the manufacturer's instructions. In the second step, all ELISA-positive serum samples were confirmed by indirect immunofluorescence assay. For animal serum samples, we conducted screening of anti-CCHFV IgGs by ELISA (ID Vet, https://www.id-vet.com). This double antigen multi-species ELISA can detect IgG antibodies against NP protein of CCHFV in caprine, ovine, bovine, and other susceptible species' serum samples. We used animal plasma samples and ticks to screen CCHFV antigen by VectoCrimea-CHF-antigen (Vector-Best, https://vector-best.ru) ELISA kit according to the manufacturer's instructions. Reverse Transcription PCR (RT-PCR): We extracted total RNA from CCHFV antigen–positive samples using TRIzol reagent (Invitrogen, https://www.thermofisher.com) and performed RT-PCR. Whole-Genome Sequencing and Analysis: We prepared libraries for next-generation sequencing using Truseq mRNA kit (TruSeq Stranded mRNA Library Prep Kit, Cat # RS-122–2101; Illumina) following the manufacturer's instructions. We conducted statistical analysis using R version 3.5.1 (https://www.r-project.org). Caution & Care: Extreme care is required for sample collection, storage and transportation, which can seriously affect the quality of laboratory assays/ results and have huge potential for infecting other persons.

Keywords: CCHF, congo virus, ticks, prevalence, control, human, animal, Pakistan

ABSTRACTS

1. CAMEL SCIENCE (CS)

CS-1. Camel milk: A nutrient-rich therapeutic diet

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Abstract

In third-world countries, the camel, an animal of desert land, plays a pivotal role in poverty alleviation, fulfilling nutritional requirements, and enhancing health. Camels are widely distributed throughout the desert regions of Eastern Asia and Northern Africa, with an estimated 30 million animals in total. The dromedary camel is one of the well-adapted animas that can be utilized in difficult climatic circumstances. It is a well established truth that its continual propagation has revealed a global climate change in desertification, survival in extreme temperatures and as well as water scarcity. Indeed, several recent reports have shown that the dromedary camel is the main animal that survives as the best species of livestock for future agriculture and to improve or enhance the animal production sector primarily by playing a significant role in achieving the Sustainable Development Goals (SDG). Numerous studies have shown that camel milk is closer to human milk in a variety of all kinds of milk. With low sugar, low cholesterol, high mineral contents (potassium, sodium, copper, iron, magnesium, and zinc), and elevated vitamin C. Compared with other ruminants, camel milk differs in composition and reported many health benefits. Camel milk has medicinal applications due to its anti-hypertensive, anti-diabetic and anti-carcinogenic properties. A high-level of anti-fungal, anti-bacterial, anti-parasitic and antiviral substances give it remarkable medicinal capabilities that aid in the treatment of major illnesses like Hepatitis, Rotavirus diarrhea, Tuberculosis and worms infestation. Camel milk exhibits immunomodulatory effects by triggering the immunoglobulins level against parasitic infections, e.g., *Schistosoma mansoni*, *Blastocystis* sp, *Heligmosomoides Polygyrus*, *Leishmania donovani, Plasmodium spp. Entameba histolytica*, and *Haemonchus contortus*. Camel milk has been used to treat Autism, Crohn's disease, Diabetes, Colitis and Cancer. It contains disease-fighting immunoglobulins that are tiny in size, letting antigens penetrate and boosting the immune system's efficiency collectively. Taking in view the therapeutic benefits of camel milk make it more suitable in producing value-added goods and will be a key product in future for developing entrepreneurship models.

Keywords: Camel milk, nutrient profile, therapeutic measures, value-added goods

CS-2. SAREBANYAR App: a camel Phenotyping Assistance System

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Abstract

One of the central challenges in camel husbandry is the lack of recording and characterization of economically and health-relevant phenotypes. Because of their distribution and the nature of camel grass breeding, particularly the phenotyping of camels, there are many underlying issues. The involvement of people in the design and implementation of livestock and agricultural development programs is a simple matter and an inescapable necessity, and they should be involved in all cases and aspects of the programs. This research aims to design and establish a system to establish communication and networking between herds, phenotyping and tracking of camels. Camel phenotyping assistance system features include: herd trait registration, camel tracker, body weight estimation and training developed in a mobile phone platform. This system, called SAREBANYAR, will improve data collection and can undoubtedly pave the way for the development of applied research to improve characteristics of camel production. One of the most important features of this system is access to the information of the camels of the herds covered by the plan and by introducing this system it would be possible to record them remotely on the mobile platform. The PNLSVM model was proposed to estimate body weight from body metrics in this system. Ability to view each camel's location on the map and view the routes traveled by each camel on the map, report location and time information in a convenient format for research purposes, manage SMS panel settings and view authorized and unauthorized areas, defined by camel owners are features of the Trackers section in the admin panel. Besides developing and facilitating communication between camel herders, using this application will be very effective in camel identification, registration and recording. It will also pave the way for improved camel farming management by offering skills training on the mobile platform. Online camel monitoring should be effective as one of the solutions for road and rail accident notification and prevention. The knowledge of the camel keepers in the mobile phone platform will also increase and the herds can be tracked online.

Keywords: Camel husbandry, system, cell phone, networking, characterization

CS-3. Hydatidosis in Camel

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Abstract

Camels *(Camelus dromedarius)* are unique in nature and known as the ship of the desert; its salient features make them survive under severe conditions. This animal can be kept as a pet, livestock and used for transportation. The Middle East is a big market for camels, where different fancy shows of camels are conducted. Hydatidosis is a disease that is caused by larval stages of *E. granulosis* and *E. multilocularis*, which has zoonotic significance globally and are emerging very rapidly in the third world countries. Hydatidosis in camels varies according to the camel population, invasion of organs, sex, and seasonal variations. Cystic echinococcosis is significantly transmitted through camels to the Middle East and North Africa (MENA). *E. granulosis* has been identified in camels, with hydatidosis, the genotypes such as G1, G2, G3, G1-G3, G5, G6, G7, G6-G7 and G6-G10, and G6 is a commonly prevalent type. This investigation is based on a collection of fluid from the cysts mainly located in the lungs and liver. Fluid is examined under the microscope for the presence of protocolex and scanning electron microscopy or histopathological examinations are carried out. Then the antigen is coated on glass beads and a latex agglutination test is carried out, by the reaction with immunoglobulins. Western blotting is carried out after the collection of protein through the lorry method. The estimated size of Camel protein was 18kDa to 99 kDa, and this was used, as antigen to detect antibodies in the samples through sandwich ELISA. Results were statistically analyzed using ANOVA, which showed the Prevalence of Echinococcus, which was found about 18% (72/384*100) in different districts of Punjab which were further divided according to risk factors. This helps to create the relation between the prevalence of Echinococcus and associated risk factors in the area, which consequently help the policy makers to design appropriate mitigation strategies to combat the impact of this deadly disease on the livestock and human health. Screening and surveillance programs should be initiated at the juvenile stage, to identify the Echinococcus in susceptible hosts and this also should be implemented as a national control program in Pakistan.

Keywords: Camel, hydatidosis, cystic echinococcosis

CS-4. Nutritional values and health benefits of camel meat

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Abstract

Camel meat is as nutritious as other conventional red meat and it has more health benefits than beef and mutton. The Middle East and North-East Africa are two arid regions where camel meat is a common ethnic dish, and Sudan is the only established camel meat market. The current population of camels in Pakistan is more than one million and is increasing at the rate of 1.62% per year, which is about 5.1% of the world's camel population. Camel lean meat is a nutritious human diet because it is primarily composed of water (78%), with a small amount of intramuscular fat (3%) and protein (19%). Camel meat is said to taste like beef, and scientists reported that camel meat has higher iron (45.5 mg/100 g) content as compared to beef (1.8 mg/100 g), mutton (4.05 mg/100 g), and poultry (0.4 mg/100 g) meat. Camel meat contains omega-3 polyunsaturated fatty acids such as α-linolenic acid, which are known to help prevent cardiovascular diseases, children's brain development, and other metabolic disorders. Camel meat has low cholesterol levels and good nutritional value. Because of their impact on plasma cholesterol levels, low levels of saturated fat in the diet are crucial for preventing atherosclerosis. Consumers' acceptance of camel meat and its shelf life can be increased through active packaging like modified atmosphere packaging. Camel meat can become an economical source of meat in the current scenario in replacement of other sources that have a worldwide shortage and are expensive. Awareness about camel meat is lacking in the community. Today, the need is to do research and should do strong campaigns on the benefits of camel meat in the community, social media platforms, and print media.

Keywords: Camel, meat, nutrition, human health

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CS-5. Camel Parasitic Diseases

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Abstract

Pakistan is home to approximately 171,500 one-humped camels (*Camelus dromedarius*) and 100-300 two-humped camels (*Camelus bactrianus*) having 21 breeds of which the highest population are present in Balochistan (41%) including both riverine and mountainous, providing meat, wool, and 10-15L milk per head per day. Parasitic diseases are a major economic and public health concern in Pakistan causing decreased milk, and meat production, decreased calving rate, performance, and even death. Trypanosoma, Dipetalonema, Babesia, and Anaplasma are commonly found in Pakistan. Some camel parasites are also dangerous to human health due to their zoonotic nature such as *Echinococcus granulosus*, *Toxoplasma gondii*, *Cryptosporidium spp.*, *Fasciola spp.*, *Trichinella spp.* and *Linguatula serratarata*. Worm species are observed in the gastrointestinal tract, including flukes *Fasciola spp*., *Dicrocoelium dendriticum*, and *Schistosoma spp*, segmented worms, and some species of roundworms, as well as helminths from other organs. So far, camels have been infected with Dictyocaulus filaria, Thelazia leesei, and Dipetalonema evansi. Camels have also been infected with hard ticks (*Rhipicephalus*, *Hyalomma*, *Dermacentor*, *Ixodes*, *Amblyomma*, *Argas*, *Otobius*, and *Ornithodoros*) and TBDs (Crimean-Congo hemorrhagic fever virus, *Coxiella burnetii*, *Anaplasma spp.*, *Rickettsia spp.*, *Bartonella spp.* and *Yersinia pestis*), mange mites, myiasis flies, *Wohlfahrtia magnifica*, and immature stages of the *Pentastomida Linguatula serrata*. Control of these parasitic diseases is essential to prevent huge economic losses and it will benefit farmers, the community, and the camel industry by taking proper control measures, and standard procedures for diagnosis and identification of parasites along with hygienic measures. Deworming and tick control may lead to the use of this novel animal as a natural resource to meet the ever-increasing food demand of the world's population. Camel ranching schemes and a collaborative research approach are required.

Keywords: Camelus dromedarius, camelus bactrianus, zoonotic, parasite, worms, diagnosis

CS-6. Control of Surra in Camels of Balochistan

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Abstract

The socioeconomic system of Asia and Africa is unique due to the presence of camels as pets, a source of livelihood, and fauna. Pakistan ranked 3rd among the nations that raise dromedary camels with over 1.2 million head of these animals. Out of this, 41% of the total population of camels are seen in Balochistan. Trypanosomiasis is commonly known as Surra. which is an eminent problem for camels as well as for keepers. Bats are the main reservoir host and serve as vectors for surra. The incidence of *T. evansi* is more in the population of camels in Balochistan. *Tabanus, stomoxys, hyperoxia, and hematobia* are responsible for the spread of Trypanosoma to animals. The disease in camels is under-reported and misdiagnosed. It causes 8 million USD in economic losses throughout the world. Serology is carried out to detect the surra in camel. Then it will proceed to DNA isolation and identification through PCR. The disease can be eradicated through proper diagnosis and treatment strategies. Diminazeneaceturate, melarsomine, and Quinapyramine are the drug of choice for the treatment of surra. Different strains of *T. evansi* have been identified from many areas of Balochistan which have zoonotic potential. Attention should be paid to enhancing the host resistance against the parasite, vector control, and controlling the movement of the affected animals. The need of the hour is that epidemiological and biochemical research should be carried out to develop and implement effective therapeutic strategies.

Keywords: Surra, camels, Balochistan, control, molecular techniques

CS-7. Phenotypic characterization of camel breeds of Balochistan

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Abstract

The current study was conducted to phenotypically characterize the 240 native camels comprising eight breeds of Balochistan, Pakistan. Kachhi breed is a riverine while others are mountainous camels. The phenotypic characteristics parameters included biometry, somatometric measurements, growth traits, productive and reproductive traits, draught traits of eight camel breeds (Brahvi, Kachhi, Kohi, Makrani, Lassi, Pishin, Rodbari and Kharani). Roadbari breed showed highest birth weight (48.58kg) while the weaning weight (118.83kg) was higher in Kharani breed and mature weight (712kg) in Pishin breed and age of ridding (1467 ± 3 days) in Brahvi breed. Morphologically the face length and width are long in Kachhi camels (55.15 ± 0.69cm) and (61.92 ± 1.16cm) respectively. The head length is long in Brahvi breed (39.31 ± 2.98cm) and head width in Kohi breed (30.46 ± 0.74cm). Kohi breed also had longer and wider ears (12.23 ± 0.1cm) and (8.92 ± 0.24cm) respectively. The Kacchi breed possesses long foreleg and hind legs (169.46 ± 1.46 and 179 ± 1.38cm). The milk yield per lactation (2049 liter) was higher in Kachhi breed and lactation length (579.18 days) is high in Brahvi breed. Age at puberty in female camels was (1282.6 days) and age at first breeding (1575.7 days) was longer in Brahvi breed. Makrani breed has the highest gestation period (405.53) and dry period (369.12 days) was longer in Brahvi breed. Calving interval (787.65 days) was longer in the Roadbari breed. Age at puberty for male camels in Pishin breed and peak rutting vigor (128.54 days) in Kohi breed. Duration of copulation (25.38 minutes) wais higher in Brahvi breed. The dressing percentage was higher in Kharani (57.1538 %) male camels. Rodbari breed had a higher quantity of (2.7 kg) of hair production. Under Hierarchical cluster analysis, the similarity level of Bravhi and Kachhi camel breeds was the highest with 85.3569 (%). At the second step, Makrani joined a new cluster of Brahvi and Kachhi camels found at the first step, and the similarity level of the new cluster comprising Bravhi, Kachi and Makrani breeds was found as 84.5562 (%). MW was significantly correlated with BW (0.677, $P<0.01$), WW (0.536, $P<0.01$), HL (0.524), HuW (0.529), and ARD (0.375) at $P<0.01$ and there was the highest correlation of 0.994 between HHL and FLL ($P<0.01$). As a result, it could be suggested that results of MARS modeling may help camel breeders to reproduce the elite camel populations and to describe characteristics associated positively with MW within the scope of indirect selection criteria.

Keywords: Phenotypic, characterization, camel breeds, Balochistan

CS-8. Mitochondrial Phylogeny and Population Structure of Pakistani Dromedary Camel *(Camelus dromedarius)*

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Abstract

Dromedary camels (Camelus dromedarius) are one of the most important livestock species mainly used for milk and meat production in semi-arid and hot-desert expanses of the Arabian-Peninsula, Africa, and Southwest Asia. This study investigated the genetic diversity and population structure within and between eight dromedary camel breeds (n = 210) inhabiting Balochistan province, Pakistan, by mitochondrial cytochrome b (Cyt b). Sequences (1140 bp) analysis showed a total of 18 variable sites resulting in 16 haplotypes. The average haplotype and nucleotide diversities were Hd = 0.484 ± 0.051 and π = 0.00272, respectively. Phylogenetic analysis showed different clusters for camelids. The neutrality tests did not support the population demographic expansion for these camel breeds. We suggest based on these results, an imperative genetic management and breeding strategy for the effective conservation of this species.

Keywords: Mitochondrial phylogeny, population structure, Pakistan, dromedary camel

CS-9. The role of camel milk and milk products in the food security and camel milk value chain

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Abstract

The world's increasing human population has emerged as a matter of food security. Livestock supplies food and livelihood support to its keeping communities. In the last decade, the socio-economic status of camel herders has improved a lot mainly due to the knowledge about the camel and their products. Now people are getting aware of consuming camel milk and products as in earlier times there was a taboo to use camel products and people did not get their taste developed. Now the camel has diverted its place from "ship of the desert" and "beast of the burden" to a "food security animal" with great potential to produce valuable products. Camel milk can also be used for making milk products. Significantly, 80 percent of consumption of milk is handled by informal traders in developing countries; 98 percent share in the Pakistani milk supply chain is contributed by this community. Rural herds of the camel under traditional conditions provide a field for scientific studies and contribute its share to food security as well as sovereignty. The Barela is a very important dairy breed of Punjab having prominent milk veins with good dairy potential. A long term monitoring, notably throughout the lactation, could be a good opportunity to assess the potential of this breed at the national level. Keeping in view the poor status of camel products markets, the development of a proper marketing system and structure for camel products by involving camel farmers and other local stakeholders is recommended to benefit the local communities by ameliorating the supply of camel products in local markets. Supply chain disruption has become a critical issue that is based on informal channel bargaining power and information barriers. Nowadays, China and Pakistan have been standing on the list of four top worldwide milk suppliers. Camel farming will be profitable for farmers when proper marketing infrastructure is designated. Standards can be utilized for this novel animal as a natural resource to cope with the food demands of an ever-increasing population and Entrepreneurship development across the Camel Milk Value Chain empowering farmers and supporting the vulnerable of the net profit.

Keywords: Barela, Camel milk, camel milk, food security, ship of the desert, value chain

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CS-10. Camel milk: A rich source of protein

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Abstract

The camel is a member of the Camelidae family and is distinguished from the others by its capacity for producing milk. A camel's lactation phase lasts between six and eighteen months. Although camel milk production is currently a prevalent practice in pastoral migratory systems, intensive and semi-intensive camel dairy farming is expanding globally. On the basis of milk production, dairy camels are divided into three categories, low, medium, and high. Many factors play a role in deter progress of milk production like hand milking, socioeconomic constraints and longer inter-calving intervals than cattle. Nowadays intensive systems are the most profitable ones for camel milk production and have shown promising results. Although camel lactation peak tends to decrease more abruptly in comparison to dairy cows, camels are still considerably superior sources of high-quality protein than cows, sheep, and goats, for arid and semi-arid regions of the human population. Although the camel milk's overall composition is similar to that of cow and goat milk, there are variances in the vitamins, proteins and fatty acids. Due to low beta-carotene, the majority of camel milk is opaque white in color. Camel milk tastes crisp and sweet, although it can also occasionally be salty and extra milk can be used to make cheese or powder. The health advantages of this milk are significant drivers for the growth of the camel milk industry globally. Therefore, it is strongly recommended that research on camel milk and its constitutions should be focused to get as much benefits from camel milk and to enhance the camel milk production throughout the world.

Keywords: Camel milk, protein, human health

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CS-11. Determining the grazing capacity of camel pastures in the central desert of Iran

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Abstract

There are many desert areas in Iran that can be used for camel breeding. But attention should be paid to its various aspects, including the protection of plant resources and the estimation of the amount of fodder that can be harvested, the capacity of water resources, and the balance of livestock and pasture. Camel breeding in Iran is the most extensive system and depends on the pasture, and based on the experiences and local knowledge of camel owners, camels need more physical activity and distance travel, and grazing for their health. Due to the decline of the camel population in recent years, there is empty capacity in the natural pastures that can be used for camels in the central desert of Iran, and on the other hand, setting up model sites in the form of artificial pastures can be effective in increasing grazing capacity. In this technical instruction, the information of 4621 camels located in 15 usable camel pastures with a total area of 750 thousand hectares in Yazd province was used in the form of 51 herds. Yazd province has 4.4 million hectares of a desert area with average and poor pasture conditions. The forage that can be harvested from the mentioned pastures is estimated at 80 thousand tons per year, and currently, 23 thousand tons of fodder are harvested and 57 thousand tons is surplus. According to existing estimates, camels need 5 tons of fodder annually, which is considered to be one camel per 100 hectares in order to maintain pastures in poor and medium areas. Considering the sum of the above calculations, it is estimated that the usable camel pastures Yazd province has an empty capacity of 11327 camels. Also, by creating artificial pastures, fodder production per hectare can be increased to 800 to 2000 kg, respectively. In this way, one camel will be bred per 2.5 to 8 hectares, and as a result, the density of grazing will increase.

Keywords: Grazing capacity, camel, pastures, central desert, Iran

CS-12. Effect of camel milk addition on shelf life of the dairy cow's milk in tropical conditions

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Abstract

Milk is a perishable product that easily gets spoiled in a couple of hours and gets wasted. Similarly milk after collection is transported through unrefrigerated vehicles which results into spoilage of milk before processing. Shelf life of cattle milk in summers is around 4.0 hours and in winters it is 8.0 hours. For the purpose of preservation, farmers use chemical preservatives such as formalin, hydrogen peroxide, sodium benzoate and urea which are very harmful for human health and pose serious complications in human health.

A study was conducted to use an organic way to preserve the milk so it can reach the consumers or processors without getting spoiled. For this purpose camel milk was used as it has high concentration of natural enzymes such as lysozyme, lactoperoxidase, and immunoglobulin. A total of 5 treatment groups were made and labeled as group A (control), group B, C, D, and group E. Group A is kept constant with 0.0% addition of camel milk in the cattle milk. Group B has 5.0 % addition of camel milk followed by 10%, 15%, and 20% in group C, D and E respectively in cow's milk . All groups were evaluated for changes in absorbance of lactoperoxidase, composition, sensory properties, methylene blue reduction test and shelf life. Absorption of lactoperoxidase was measured from 1 minute to 5 minutes and the results showed highest absorption in treatment group E at 5 th minute (1.80) and least was recorded in samples from treatment group A (0.31). Changes in composition after addition of camel milk include decrease in fat (3.37 to 2.55). Similarly decrease in lactose is recorded with increase in camel milk (4.28 to 3.67) while no significant change is recorded in protein, fat and solid not fat. For bacterial count methylene blue test was done which shows change in color in sample A after 2 hours which reflects poor quality of milk whereas no change in color is recorded in sample C, D and E which reflects excellent quality milk. Results indicate change in taste as camel milk is slightly salty while no change is recorded in aroma, color and consistency. For overall acceptability samples from treatment group D (7.93) were found most appropriate which is closest to treatment group A (7.90). Shelf life was recorded at 6.0hrs, 12.0 hrs, And 24.00 hrs with the increase in the time samples from group A got spoiled completely while less spoilage was recorded in samples enriched with camel milk. Present research study concludes that the shelf life of the cattle milk may be enhanced up to 24 hours through addition at the rate of 5% cattle milk, keeping the bacterial counts lower and lactoperoxidase levels higher.

Keywords: Camel milk addition, cow milk, shelf life, bacterial counts, lactoperoxidase

CS-13. Comparative genomics analysis reveals desert adaptations, including fat and Water metabolism, stress responses to heat in camel

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Abstract

Camels are well-known for their ability to thrive in harsh desert environments, and recent studies of their genomes have shed light on some of the adaptations that have allowed them to survive in these challenging conditions. Comparative genomics analysis of the camel genome has revealed numerous adaptations that have allowed these animals to thrive in harsh desert environments. Camels have evolved specialized metabolic pathways that allow them to store large amounts of fat and water, which can sustain them during long periods without food or water. Comparative genomics analyses have revealed that camels have unique genes involved in lipid metabolism and fat deposition that are absent in other mammals, as well as adaptations in their kidneys that allow them to produce very concentrated urine and conserve water. There are unique genes involved in thermoregulation and stress responses in camels, including those related to heat shock proteins and the renin-angiotensin system, which helps regulate blood pressure and body temperature. Camels have a unique immune system that is highly adapted to their harsh desert environment. Genomic analysis has revealed that camels produce a special type of antibody called a heavy-chain antibody, which is more stable and effective in extreme conditions than the antibodies produced by other mammals. They also have a unique set of genes involved in immunity to viral and bacterial pathogens, likely due to the high environmental exposure to these pathogens in desert conditions. This unique antibody is the result of a genetic mutation that occurred in the camel lineage, and it has likely played a crucial role in the evolution of the domestic camel. Overall, comparative genomics analyses have provided insights into the genetic pathways that underlie some of the adaptations that allow camels to survive in harsh desert environments. These findings could have important applications for the development of new therapies for human diseases, as well as for the conservation of endangered camel species.

Keywords: Genomics; Desert adaptations, Stress response; Camel; Evolution

CS-14. Genetic events and selective pressures on humoral as well as cell mediated adaptive immune responses in Camelidae species

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Abstract

Camelids, such as camels, llamas, and alpacas, have a unique immune system that is adapted to their arid and harsh environment. Their immune system has evolved to cope with a range of challenges, including heat, drought, and high altitude, as well as exposure to a wide range of pathogens. One of the most distinctive features of camelid immune systems is the structure of their antibodies. While most mammals produce antibodies made up of four protein chains (two heavy and two light chains), camelids produce antibodies made up of just two heavy chains. These heavy-chain antibodies (HCAbs) have a simpler structure and are more stable in extreme environments, making them ideal for use in biotechnology and medical applications. Other immune proteins that have been shown to be under positive selection in camels include the Toll-like receptors (TLRs), which are important components of the innate immune system that recognize pathogen-associated molecular patterns (PAMPs) and initiate an immune response. Positive selection has played a role in the evolution of the VHH domain of camelid antibodies, which has undergone multiple rounds of positive selection to optimize its antigen-binding properties. Positive selection has been detected in several TLR genes in camels, which may reflect the evolutionary pressure of exposure to a wide range of pathogens in their environment. Selective pressures on camelid immune systems have been shaped by their unique environment and lifestyle. The domestication and breeding of camels and llamas by humans has also likely influenced the evolution of their immune system. For example, selection for traits such as increased productivity and disease resistance may have led to the accumulation of beneficial genetic variants in the immune system. Overall, the evolution of the camelid immune system is a complex process involving a combination of genetic events and selective pressures. The resulting immune system is highly specialized and effective in defending against the challenges posed by the desert environment and exposure to a wide range of pathogens.

Keywords: Genetic adaptation; selective pressure; adaptive immunity; camelidae

CS-15. Genomic pathways involved in domestication of camel: survival, evolution and challenges

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Abstract

The domestication of camels is thought to have occurred around 3,000-4,000 years ago, and it was a significant event in human history that transformed the way people lived and traded in arid regions. Domesticated camels (*Camelus dromedarius*) are adapted to desert life and have several physiological and behavioral characteristics that allow them to survive in harsh environments. Camels have a unique immune system that allows them to withstand extreme temperatures and dry conditions. The genetic pathways involved in the production of these antibodies have been identified, and they are thought to have played a crucial role in the evolution of the domestic camel. Domesticated camels have adaptations in their metabolism that allow them to survive long periods without water and food. For example, they have a high tolerance for dehydration and can conserve water by producing very concentrated urine. The genes involved in these metabolic pathways have been studied, and they are thought to be important for the survival of camels in arid regions. Domesticated camels have several adaptations that allow them to survive in desert environments, including their ability to tolerate dehydration, their efficient use of water and food resources, and their ability to regulate their body temperature. These adaptations have been developed through natural selection over thousands of years, and they have been further refined through selective breeding by humans. Despite the many advantages of domesticated camels, they still face several challenges, including disease, overgrazing, and competition for resources with other livestock species. Understanding the genomic pathways involved in the domestication of camels can help researchers develop strategies to overcome these challenges and ensure the continued survival of this important species.

Keywords: Domestication; camel; evolution, genomics, adaptations

CS-16. Diversity of camel production in Pakistan

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Abstract

Pakistan is one of the world's top producers of camels, with an estimated population of over 1.2 million. The diversity of camel production in Pakistan is quite significant and includes different breeds, uses, and management systems. Pakistan has a rich diversity of camel breeds, each with unique physical characteristics and uses. The most common breeds include the Bactrian camel, which is found in the high altitude areas of northern Pakistan, and the dromedary camel, which is found in the southern regions. Other breeds include Kharani, Sindhi, Balochi, and Pakhtoon. Camels are widely used in Pakistan for various purposes, including transportation, meat, milk, wool, and hides. In rural areas, camels are used as pack animals to transport goods, while in urban areas; they are often used as tourist attractions. Camels are also a popular source of meat, and their milk is highly nutritious and consumed by people across the country. Additionally, camel wool is used to make clothing and handicrafts, and camel hides are used to make leather goods. The management systems for camels in Pakistan vary depending on the region and the intended use of the animals. In rural areas, camels are often managed by nomadic herders who move with their herds in search of pasture and water. In contrast, urban camels are usually managed by their owners, who provide them with shelter and food. In conclusion, the diversity of camel production in Pakistan is significant, with various breeds, uses, and management systems. The country's rich camel heritage is a vital source of livelihood for many communities, and camels continue to play an essential role in Pakistan's economy and culture.

Keywords: Camel production, desert ecology, Agro-ecological zones, range livestock

CS-17. Camel mastitis: Current scenario and control strategies

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Abstract

Mastitis is the problem of all almost camel rearing countries, causing huge loss in milk production and also effects health of human and suckling camel calves. Many microbes have been involved as causes of mastitis in camels, however, bacterial infections are of prime importance in causing mastitis in camel. The bulk of the infection in the environment, including: infected quarters; efficiency of milking personnel; susceptibility of the camel, which is related to the stage of lactation, age of the camel and level of inherited resistance are key factors of mastitis in camel. Diagnosis of mastitis can be done through clinical examination, pH test, California Mastitis test, Somatic Cell Count, and bacteriological analyses for confirmation may be made by culturing. Subclinical mastitis is more prevalent than other form of mastitis, and unfortunately the affected animal could affect other animals because it acts as microorganism reservoir. The prevalence of mastitis differs markedly due to geographical area and individual herd management. For instance, an overall prevalence of camel mastitis was found to be 30.2%and 76% . Therapeutic approach in treating acute mastitis includes antibiotics and anti-inflammatory drugs, with regular stripping of the mammary glands. Treatment of chronic mastitis is vain and the loss of the affected quarter is ultimate result. Elimination of existing infection, prevention of new infection and monitoring udder health status are main principles of mastitis control methods, Economic importance of mastitis includes: loss of milk production and quality and milk loss due to antibiotic treatment, and veterinary care costs. Therefore, targeting prevention and control effort is needed through early diagnosis, treatment and by avoiding possible risk factors.

Keywords: Mastitis, Camel, treatment, control strategies

CS-18. Testicular thermoregulation in relation to scrotal skin dynamics, season and testosterone in camel and buffalo bull: A comparative study

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Abstract

Albeit the thermoregulatory effect on the reproductive system of female camel in different season has been studied but there is dearth of literature describing the role of scrotal skin in maintaining the testicular thermoregulation in the animals of different habitats. Hence, This study was designed for the comparison the histological dynamics of scrotal skin of camel and buffalo bulls in relation to thermoregulation, season, and testosterone. Skin from different regions of scrotum (neck, body, apex) and blood samples (n=8 each) were collected during breeding and non-breeding seasons. Tissue slides were prepared by the paraffin embedding technique followed by H&E staining and were analyzed by ImageJ®. Temperature along with relative humidity were measured in different seasons for the estimation of stress indicator called thermal-humidity index (THI). Serum testosterone level was estimated through radioimmunoassay (RIA). The data were analyzed by applying ANOVA, the Tukey's test was used as a post-ANOVA interface and the correlation coefficient was also calculated amongst season, testosterone, and skin parameters. The results showed that skin thickness, season, and THI were negatively correlated with testosterone levels. In the neck, body, and apex, the papillary layer was thicker in buffalo bull compared to camel bull during the breeding season, however, the reticular layer followed a reverse trend in the apex when THI was low. The density of SG was found highest in all regions of camel bull as compared to buffalo bull and showed direct relation with THI. To conclude, this study delineates how the histo-dynamics of scrotal skin varies and accommodate itself with testosterone and THI over the different season in camel and buffalo.

Keywords: Bull, scrotal skin, thermoregulation, histology, thermal humidity index, camel, buffalo

CS-19. QR assisted DNA barcoding of camelid meat

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Abstract

Meat is considered as a prime source of proteins, minerals, vitamins containing all the essential amino acids. Camel meat is an important "ethnic food" of Middle East and North East Africa. The climate resilience property of Camel makes it a likely candidate for beef-type animal with a big consumer market across Pakistan. Its nutritional is comparable to any other conventional meat source besides it is also considered as a good functional food. Camel meat is lean, low-cholesterol, and high in protein. This makes it the perfect meat for those who are health aware and for those who have pathological conditions like diabetes and hypercholesterolemia. But meat products are frequently target for species substituted and adulterated due to their high market value among other reasons. DNA barcoding is a potential sequencing based approach for traceability of camel meat. Mitochondrial gene which codes cytochrome c Oxidase I (COI) subunit is used as a standardized target gene for barcoding of most animal species. COI has been identified as a useful tool for identifying species since it demonstrates a moderately low level of variation within species while revealing a substantial amount of variation across species. The main objective of that study was to identify composition analysis of camel meat and its traceability through DNA barcoding. Chemical composition of camel meat was done. Camel meat and blood samples were used to extract DNA, and each sample underwent PCR amplification of cytochrome c oxidase subunit (*Coi* gene). The bi-directional Sanger sequencing method was used to sequence the amplified products, and the chromatogram analysis were used to examine the sequence. A sequence alignment editing programme called BioEdit v7.0.5 was used to assess the generated sequences after manual proofreading. To confirm their identifications, sequences were further identified utilizing species identification techniques found in the BOLD (Barcode of Life Data system) and BLAST GenBank databases. QR codes and barcodes based on DNA sequences were generated by using Bio-rad barcode generator and QR code generator for authentic labeling of camel meat, This study provided Barcodes and QR codes for camel meat authenticity .

Keywords: Camel meat ,*COI gene*, DNA barcoding, QR barcodes, species identity mislabeling

CS-20. Morphometric study of erythrocytes in Barella camel of the Cholistan desert, Bahawalpur

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Abstract

The reference values of hematological parameters indicate health and disease status in wild and domestic animal species. These values can be affected by different environmental and demographic factors. The unavailability of reference values of hematological parameters of indigenous livestock species is one of the major constraints in the correct diagnosis, prognosis, and treatment of various infectious and non-infectious ailments. The present study was aimed at developing the reference values of morphometric parameters of erythrocytes of Barella Camel of the Cholistan desert, Bahawalpur. Morphometric analysis of Giemsa-stained thin blood films (*n=100*) was performed by using Image J software. Subjects were grouped according to gender (male & female); apparent health status (healthy and diseased) and age (2year, 3 year, 4 years, 5 years, 6 years, and 7 years). The overall morphometric measurements of Camel's erythrocytes were: Length=6.66± 0.045, Width= 3.76±0. Area= 19.84±0.26. No significance was observed in gender, however, health status (health and diseased groups) width and area of the erythrocytes parameters were significantly different which was (W=3.80±0.033 A=23.02±0.00), (W=3.56±0.075 A=15 ±0.00) respectively. Furthermore, the influence of age on the parameters of erythrocytes is significant. There was not statistically significant difference between all groups in term of width and area (W=3.77±0.119, A=20.46±0.44, $p<0.05$) as demonstrated by one way ANNOVA. In respect to length there was no statistical difference between the groups (2years, 3years, 4years, 5years, 6years) the length between these groups were (L=6.67 ±0.20, $p<0.05$). There were significant differences between the group (6 years and 7 years) which were (L=6.93±0.14 L=6.51±0.20) respectively. This appears to be the first study reporting the morphometric measurements of Barella Camel erythrocytes and provides baseline data for developing morphometric reference values. The findings of this study envisage a more detailed analysis with higher sample size and considering the effects of environmental and nutritional factors.

Keywords: Morhometry; Image j; Demographics; Reference values; Indigenous Cholistani livestock

CS-21. Miticidal activity of plant extracts against Sarcoptes scabiei in dromedary camel

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Abstract

Herbal drugs have been widely evaluated as an alternative method of parasite control, aiming to slow development of resistance and obtain low-cost biodegradable parasiticides. This study evaluated the efficacy of methanolic extracts of Vitex negundo, Melia azedarach, Tecomella undulata, Caparis decidua, Nicotiana tobacum and Azadirachta indica at the rate of 10 and 20% concentrations and cevasametrina TM-20 (CEVASA S.A. Medicina veterinaria) through topical application on Mange affected skin parental use of ivermectin (0.2mg/ml) of camel and 10, 20 and 30% concentrations of the mentioned plants extracts through laboratory tests on Sarcoptes scabiei (Acarid: mites). In vivo study 10 and 20% methanolic extract concentrations of A. indica, C. decidua, M. azedarach, N. tobacum, T.undulata, V. negundo, cevasametrina TM-20 and Ivermectin at the rate of 0.2mg/kg b.wt s/c injection in comparison to control (Methyl alcohol) were used on 180 numbers each of Camels on 1st, 7th, 14th and 28 th day. The result showed that prevalence was significantly high winter season compared to other. Irrespective of sex, the prevalence was high in older camels compared to young camels. Furthermore, the results indicated that 30% methanolic extract of the plants showed comparable results vis-à-vis synethic drug. In-vitro data showed that V. negundo (at 30%) was effective treatment (95% mite mortality), followed by A. indica and N. tobacum (90%), then C. decidua and T.undulata (80%) and subsequently followed by M. azedarach (75%). The results confirmed the miticidal characteristics of the tested plants.

Keywords: Cevasametrina, camelid, ivermectin, plant extract, Sarcoptes scabiei

CS-22. Epidemiological and therapeutic study on camel mange in Lasbela, Balochistan

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Abstract

In Lasbela, Balochistan, 166 camel herders were interviewed to assess the prevalence of camel mange and the efficacy of ivermectin, trichlorfon, and azadirachta indica aqua extract. Information was collected using a predesigned proforma. The majority of respondents herd animals since childhood and are older and illiterate. Microscopically, 200 camel skin scrapings were analyzed. Prevalence of sarcoptes scabies was 24.50% in scrapings. Age, below three years and above three years, camel mange was observed in either gender. Male animals (20.83%) were more likely to have mange as compared to female animals (24.53%). Highly significant difference ($P<0.05$) was observed among the camels with different body condition. Highest prevalence rate 61.53% was observed in camels with poor body condition. The efficacy of commercially available Ivermectin and Trichlorfon and medicinal plant (Azadarichta indica) was evaluated in mange positive animals detected through clinical and parasitological examination. Forty positive animals were divided in to four groups equally A, B, C and D. Group A treated Ivermectin @0.2mg/kg BW subcutaneously, 02 doses with interval of 07 days, Group B Trichlorfon topically, 02 sprays by interval of 01 week and Group C aqua extract Azadirachta Indica (Neem) leaves @ 300ml/animal, topically, 02 times a day for 03days consecutively. Group D untreated control. Therapeutic efficacy of the each drug was evaluated on recovery response after the treatment by disappearance of the clinical signs on 0, 7th, 15th and 21st day by using clinical grades 0-4 according to Rendle et al., (2007). Complete recovery mange infestation was group A with recovery response of 4.00±0.00 followed by Group B with recovery response of 3.80±0.13 and Group C (Azadarichta indica) with mean recovery response 1.20±0.51. No significant change in lesions was observed in control group D without any response 0.20±0.13. The observations recorded and data analysis revealed that the clearance of skin of mange infested camels of groups A and B occurred subsequently whereas; aqua extract of leaves of Azadarichta indica did not show any remarkable improvement in the condition of most of the camels except with early infestation.

Keywords: Mange, camels, Balochistan, iververmectin, Sarcoptes scabies

CS-23. Camel Milk: An alternate therapy for Diabetes Type 1 and Type 2

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Abstract

Diabetes mellitus is one of the most serious worldwide public health issues, posing a significant global burden on both public health and socioeconomic development. According to the International Diabetes Federation, by 2022, about 26.7% of adults in Pakistan are expected to be affected by diabetes, resulting in an estimated total of 33,000,000 cases. Camel milk (CM) has been found to be similar to human milk and easily digestible by lactose-intolerant individuals. Additionally, it contains immunoglobulins that are effective in fighting diseases and enhancing the immune system. The milk also contains a rich supply of insulin, lactoferrin, and immunoglobulins. Studies suggest that CM consumption can improve glycemic control, insulin sensitivity, and lipid profile in individuals with Type 1 or Type 2 diabetes. The antidiabetic activity of CM is attributed to the existence of insulin-like protein, which ranges from 45-128 IU/ liter of milk, which is coated and can endure stomach pH. CM contains minerals (sodium potassium, iron, copper, zinc, and magnesium) especially high level of zinc, which act as a co-enzyme to stimulate the antioxidant system and enhance insulin secretory activity of the pancreas. It also contains a significantly higher amount of vitamin C, approximately five times more compared to other ruminants' milk, and functions as an antioxidant by activating glutathione The insulin in camel milk is encapsulated in lipid vesicles, which allows for its passage through the stomach and into circulation. Studies have also indicated that CM has a synergistic effect, recovering diabetes-related hematological and serological complications, and protecting the liver and kidneys. However, further research is required to establish the safety and efficacy of CM as a potential treatment option for diabetes in local demographic conditions.

Keywords: Camel milk; diabetes; immuno-globulins; insulin resistance; synergistic effect

2. OTHER LIVESTOCK SPECIES (OLS)

OLS-1. The impact of subclinical mastitis on milk quality in dairy buffaloes

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Abstract

Buffalo milk has manifested superior composition and nutritional attributes among dairy species. Besides, butter and butter oil (ghee) are favorite dairy products made from buffalo milk in Pakistan and several other countries. Moreover, flourishing concern for health and well-being and expanding demand for functional foods rich in minerals added to buffalo milk popularity. Buffalo milk is high in calcium content (1.5 folds) with better calcium/phosphorus and protein efficiency ratio. Therefore, it is considered a better supplement for infants as compared to bovine milk. Subclinical mastitis in buffalo causes huge losses to dairy industries by reducing yield as well as the quality of milk. Therefore, present study was designed to investigate the alterations in milk and mineral composition of mastitic (subclinical) buffaloes. Milk samples (n=40) were collected from healthy and mastitic animals kept at private dairy farms located in the periphery of Islamabad. California Mastitis Test (CMT) was used for screening of milk samples for subclinical mastitis. Milk protein, lactose, fat, solid not fat (SNF), potassium, sodium, calcium and magnesium contents were estimated. Data analysis showed that fat, lactose and solid not fat content were significantly ($P<0.05$) decreased while protein significantly increased ($P<0.05$) with increasing severity of subclinical mastitis. Sodium concentration significantly ($P<0.05$) increased with increasing severity of infection. The concentrations of calcium, magnesium and potassium were significantly decreased ($P<0.05$) with increasing severity of infection. Therefore, in the absence of rigorous control measures it will become an impediment in the boost of the buffalo milk industry.

Keywords: Buffalo, calcium, fat, mastitis, potassium.

OLS-2. Physicochemical composition of milks in the third lactation stage of three species (camelina, bovine and caprine) in the Ziban region, Algeria

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Abstract

Milk is an essential component in maintenance of one's health and the prime necessity of daily food intake for the world population. Indeed, this food is also essential for infants and for all age groups. Only the milk production of a few mammalian species (bovine, caprine) is of immense interest in human nutrition, even if the milk of other animal species may have superior nutritional qualities. Few works have been devoted to the comparative study of the physicochemical quality of milk of various animal species in Algeria. The present study aims to determine the composition of cow's milk, camel and goat during the end of lactation belonging to the same conditions of semi-extensive breeding in the Ziban region. The following parameters were measured using a Lactoscan® (SAP50; CB-011052): pH, acidity (D°), density, fat (gr/l), dry extract (gr /l), ash (%), protein (%) and lactose (%). The results of comparison of the means of the different parameters studied showed very highly significant differences between the three species ($P<0.005$). Camel milk was found to be the least acidic (pH= 7.12 ± 0.13; 1.73 gr lactic acid/L; $P<0.05$) and the least dense (ρ =1025 ± 0.961; $P<0.05$) compared to the others milks, but goat's milk is the richest in fat (49.79 ± 14.06 g/l; $P<0.05$) compared to camel and bovine milk. On other hand, cow's and goat's milk are richer in protein (3.15 ±0.17 g/l and 3.10 ±0.19 g/l; $P>0.05$) compared to camel milk (2.81 ±0.5 g/l, $P<0.05$). As for the lactose content, camel milk contains less of this element (4.23±0.23%; $P<0.05$) compared to the two other species (4.74±0.25% for cow's milk and 4.68±0.30 % for goat's milk; $P>0.05$).

Keywords: Camel, cow, goat, milk, physicochemical quality

OLS-3. Study on hematology, hormonal profile and certain mineral in anestrus, repeat breeding and normal cyclic cattle in Peshawar

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Abstract

Livestock plays an essential role in the socioeconomic development of the country. However, reproductive disorders including repeat breeding and anestrous syndrome in crossbred animals are adversely affecting the productivity and profitability of the animals, thus causing huge economic losses to the dairy sector in the country. Therefore, the current research trial was executed with the objectives to investigate the changes in hormonal levels, certain mineral profile and the hematological indices of the cows diagnosed with repeat breeding and anestrous. It imitates the impact on animal's health and performances and reproductive efficiency under the existing management in Charsadda district, Pakistan. Execution of the current trial was carried out on a total of thirty crossbred animals out of which ten each were used from regular cyclic healthy crossbred animals, ten from repeat breeding and ten from the anestrous animals. Standard protocol was observed during the execution of the research trials. Concentration of calcium, phosphorus, progesterone hormone in addition the hematological indices were examined in repeat breeder and anestrous animals which were compared with regular cyclic animals. Some blood specimens were used for hematological purposes whereas some were used for the appraisal of mineral and hormonal profiles. Blood collection was done from the jugular vein aseptically. Serum was obtained through centrifugation for various tests. Serum Calcium, Phosphorous and Progesterone were investigated through commercially available kits. Furthermore, standard hematological laboratory procedure was adopted for the appraisal of hematological indices including Hemoglobin, TRBC, TLC, TRBC, PVC, Monocytes, Eosinophil, Basophil etc. During the current study the value recorded for calcium concentration was 8.02±0.11 in the repeat breeding cows and 7.34c±0.14 in the anestrous cows whereas it was 10.06±0.15 in the healthy reproductive cows. Likewise, the phosphorus concentration was 6.94±0.18 in the healthy fertile cows whereas it was 4.23±0.13 in the repeat breeding cows and 4.19±0.13 in the anestrous cows. Thus, the current biochemical indices study demonstrated significant decreases ($P<0.05$) of Calcium and Phosphorous. Also the current study elucidated the significant difference in the hematological indices in the reproductive stages such as normal cyclic, repeat breeding and anestrous syndrome in the crossbred cows.

Keywords: Anestrous, repeat breeding, crossbred animals, biochemical profile

OLS-4. Biochemical Profile of serum from cyclic and anoestrus and repeat breeding crossbred cows in Peshawar

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Abstract

Livestock play an essential role in the socioeconomic development of the country. However, reproductive disorders including repeat breeding and anestrous syndrome in crossbred animals are adversely affecting the productivity and profitability of the dairy sector, thus causing huge economic losses to the dairy sector in the country. Therefore, the current research trial was executed with the objective to investigate the changes in biochemical metabolites of the cows diagnosed with repeat breeding and anestrous that imitate the impact on animals' health and performances and reproductive efficiency under the existing management in Peshawar. Execution of the current trial was carried out on a total of thirty crossbred animals out of which ten each was used from regular cyclic healthy crossbred animals, ten from repeat breeding and ten from the anestrous animals. Standard protocol was observed during the execution of the research trial. Concentration of Glucose, cholesterol, total protein and Blood urea nitrogen (BUN) were examined in repeat breeder and anestrous animals which were compared with regular cyclic animals. Blood collection was done from jugular vein aseptically. Biochemical indices including total protein, Glucose, total cholesterol and BUN, were investigated through commercially available kits. During current study the mean total protein, glucose concentration and cholesterol was 6.14±0.41g/dl, 59.76±0.89mg/dl and 159.67±0.67mg/dl in the repeat breeding cow in comparison with normal cyclic cow where it was 8.04±0.63 g/dl, 82.99±0.76mg/dl and 209.78±3.87mg/dl respectively. Furthermore, theses indices were 6.13±0.59, 61.62c±1.05 and 149.73±5.16 in the anestrous cows. On the other hand, the elevated concentration of BUN of 30.99±2.83mg/dl and 28.41±0.15 was recorded in the repeat breeding and anestrous cows in comparison with 22.25±1.27 mg/dl of normal cyclic cow. Thus, the current biochemical indices study demonstrated significant decreases ($P<0.05$) of total protein, glucose and cholesterol. On the other hand, significant increase in BUN ($P<0.05$), in repeat breeding dairy and anestrous cows was observed when compared with those of the normal cyclic cows.

Keywords: Anestrous, repeat breeding, crossbred animals, biochemical profile

OLS-5. Adaptive molecular study of AKT3 gene for positive diversifying selection in mammalian evolution

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Abstract

The V-Akt Murine Thymoma Viral Oncogene Homolog 3 (AKT3) gene is of the serine/ threonine- protein kinase family and influences the production of milk fats and cholesterol by acting on the sterol administrative area restricting protein (SREBP). The AKT3 gene is highly preserved in animals, and during lactation in cattle, its expression increases. The AKT3 gene is expressed in the digestive system, mammary gland, and immune cells. A phylogenetic investigation was performed to clarify the evolutionary role of AKT3, by maximum probability. The AKT3 gene sequence data of various mammalian species was evident even with animals undergoing breeding selection. From 39 mammalian species studied, there was a signal of positive diversifying selection with Hominidae at 13Q, 16G, 23R, 24P, 121P, 294K, 327V, 376L, 397K, 445T, and 471F among other codon sites of the AKT3 gene. These sites were codes for amino acids such as arginine, proline, lysine, and leucine indicating major roles for the function of immunological proteins, and in particular, the study highlighted the importance of changes in gene expression of AKT3 on immunity.

Keywords: Adaptive, AKT3 gene, positive diversifying selection, mammalian evolution

OLS-6. The Productive performance of Azikheli buffalo under traditional management system in Swat

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Abstract

Standard 305-day milk yield is the basis for genetic evaluation and making management and breeding decisions in dairy production. The current paper elaborates standard 305-day milk yield and the effects of parity and calving season on the trait in Azikheli buffalo under traditional management system in Swat, northern Pakistan. Data on milk yield was obtained from 108 Azikheli buffaloes through the A4/2 method of the International Committee for Animal Recording, and analyzed through analysis of variance to study the effect of parity and calving season with pairwise comparison through Student's t-test. The overall mean 305-day milk yield recorded was 2494.02±52.44 liters. Parity was observed as a significant ($P<0.001$) source of variation for 305-day milk yield whereas; calving season has no significant effect on the trait. Azikheli buffalo had a comparable 305-day milk yield to that of the Nili-Ravi and is well adapted to the mountainous terrain and transhumant farming system, hence needing conservation.

Keywords: Azikheli buffalo, conservation, 305-day milk yield, parity

OLS-7. Assessment of various Azikheli buffalo characteristics (morphometric, productive and reproductive) in Swat, Khyber Pakhtunkhwa, Pakistan

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Abstract

The current research was conducted to elucidate the morphometric, productive and reproductive characteristics of Azikheli buffaloes in the Swat Valley - hometract of the breed. Morphometric assessment of the breed indicated that the mean heart girth, body length and height at whither were 191.36±1.26 cm, 140.39±0.94 cm and 131.35±0.57 cm respectively in adult females. Males were comparatively narrow at heart girth (177.68±3.76 cm), but longer (147.89±2.60 cm) with a comparable height to female (130.01±1.08 cm). Mean daily milk production based on the standard 305-day lactation period is 7.19±0.18 liters and the buffalo produces 7.30 to 9.58 liters per day during the first 6 months of lactation with maximum production during the 3rd month (9.58 liters). Buffalo attains pubertal age at 1147.93±13.05 days of age. The expression of heat signs within 90 days postpartum was 50%, first service conception rate 64%, number of services per conception 1.55±0.04 and mean calving interval 489.16±5.82 days. The current study elucidated the basic morphometric, productive and reproductive characteristics of the local Azikheli buffalo in their home tract.

Keywords: Azikheli buffalo, morphological, productive, reproductive characteristics, Pakistan

OLS-8. The Azikheli Buffalo in northern mountains of Pakistan: Conserving indigenous Animal genetic resources to adapt the climate change as a coping strategy

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Abstract

There are clear signs that the agro-pastoralists in the Himalayan and Hindu-Kush mountain ranges will have less cropping opportunities due to reduced possibilities for irrigated agriculture as a result of climate change. The importance of extensive livestock production based on well adapted livestock species may once again increase. This calls for a better documentation and understanding of the adaptation capabilities of indigenous breeds considering a changing environment. The current study investigates the adaptive traits of the Azikheli buffalo to mountain environments through calculating mean, standard error and percentages for different variables. Results from this study suggest that the brown coat color, the small body size and the high fertility are adaptive traits of the Azikheli buffalo that may well suit harsh mountainous environment conditions with greater climate variability. Local farmers find it hard to sustain the Azikheli buffalo's key adaptive traits because of a low bull to buffalo ratio, possibility of insemination with semen from imported breeds and a lack of institutional support to conserve the Azikheli breed. The breed is crucial for sustaining custodian communities in these mountains and thus needs to be conserved.

Keywords: Adaptive traits, Azikheli buffalo, body size, fertility

OLS-9. Testicular thermoregulation in relation to scrotal skin dynamics, season and testosterone in camel and buffalo bull: A comparative study

Shakil Ahmed[1], Anas Sarwar Qreshi[1], Muhammad Usman[2], Sarmad Rehan[1], Farrah Deeba[3], Muhammad Khalil Ateeq[2], Muhammad Younus[4], Muhammad Ahsan Naeem[2], Zaima Umar[5]

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Abstract

Albeit the thermoregulatory effect on the reproductive system of female camels in different seasons has been studied but there is dearth of literature describing the role of scrotal skin in maintaining the testicular thermoregulation in the animals of different habitats. Hence, This study was designed for the comparison of the histological dynamics of scrotal skin of camel and buffalo bulls in relation to thermoregulation, season, and testosterone. Skin from different regions of scrotum (neck, body, apex) and blood samples (n=8 each) were collected during breeding and non-breeding seasons. Tissue slides were prepared by the paraffin embedding technique followed by H&E staining and were analyzed by ImageJ ® . Temperature along with relative humidity were measured in different seasons for the estimation of a stress indicator called thermal-humidity index (THI). Serum testosterone level was estimated through radioimmunoassay (RIA). The data were analyzed by applying ANOVA, the Tukey's test was used as a post-ANOVA interface and the correlation coefficient was also calculated amongst season, testosterone, and skin parameters. The results showed that skin thickness, season, and THI were negatively correlated with testosterone levels. In the neck, body, and apex, the papillary layer was thicker in buffalo bull compared to camel bull during the breeding season, however, the reticular layer followed a reverse trend in the apex when THI was low. The density of SG was found highest in all regions of camel bull as compared to buffalo bull and showed direct relation with THI. To conclude, this study delineates how the histo- dynamics of scrotal skin varies and accommodates itself with testosterone and THI over the different seasons in camel and buffalo.

Keywords: Bull, scrotal skin, thermoregulation, histology, thermal humidity index, camel, buffalo

OLS-10. Effect of Subclinical Mastitis on Milk Quality and Hematological Profile in Goats

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Abstract

Goat is ranked third in terms of global milk production .Goat milk is widely consumed byinfants and adults sensitive to cow milk. Mastitis decreases profitability in goat farming by causing large devastation in terms of decrease in quantity and quality of milk , low quality dairy products, costly treatment and threat to public health . Subclinical form of mastitis is covert in nature and remains for a long time in infected animals. A total of 48 lactating goats from veterinary hospitals and private goats farms in peri-urban areas of Faisalabad were included in the study. Lactating goats including healthy (n=24) and mastitic (n=24) were selected for screening subclinical mastitis based on California Mastitis Test (CMT). Milk samples from healthy and subclinical mastitis infected goats were evaluated for alterations in milk composition with increasing severity of mastitis. Lactoscan was used for estimation of lactose, protein, fat, solid not fat (SNF) in milk. Blood samples were collected and alterations in Hematological profiles were estimated with Automated Hematology Analyzer. Red blood cell count, white blood cell count, hemoglobin (Hb), packed cell volume (PCV) and mean corpuscular Volume (MCV) was estimated. Statistical analysis done by one way analysis of variance (ANOVA). In the present study significant ($P<0.05$) decrease in lactose, fat, solid not fat (SNF) was observed with increasing severity of subclinical mastitis. Regarding hematological profile analysis, significant increase ($P<0.05$) in white blood cell count and significant decrease ($P<0.05$) in red blood cell count, mean corpuscular volume (MCV) and hemoglobin (Hb) was observed with increasing severity of infection. It is concluded that alteration in goat milk composition and hematology with increasing severity of subclinical mastitis might be of diagnostic value.

Keywords: Goat, subclinical mastitis, hemoglobin, diagnosis

OLS-11. Sero-epidemiology and Associated Risk Factors of Caprine Brucellosis in District Muzaffar Garh, Punjab

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Abstract

Brucellosis is an economically important disease of animals causing huge economic losses to the livestock industry in the form of reproductive disorders like abortion, stillbirth and premature delivery. The present study was planned to determine the sero-prevalence of caprine brucellosis and its association with potential risk factors in district Muzaffar Garh, Punjab. For this purpose, a total of 384 blood samples of clinically normal goats were randomly collected from four Tehsils of Muzaffar Garh including 114 from Alipur (A), 89 from Kot Adu (B), 81 from Muzaffar Garh (C) and 100 from Jatoi (D). All the serum samples were subjected to Rose Bengal Plate Test (RBPT) for the detection of antibodies against *Brucella melitensis* infection. Positive reactors to RBPT were finally confirmed through competitive ELISA (c-ELISA). The overall seroprevalence of caprine brucellosis was 5.73% with highest prevalence in Tehsil D (7.0%) followed by Tehsil B (5.62%), A (5.26%) and C (4.94%). Age and history of abortion were found significantly associated ($P < 0.05$) with seropositivity against Brucella melitensis. In conclusion, the study indicates the occurrence of antibodies to Brucella melitensis through both RBPT and cELISA in the target population.

Keywords: Sero-epidemiology; Brucellosis; cELISA; goats; Muzaffar garh

OLS-12. The significant sequences differences and promoters function of Akt3 gene between cow and buffalo for mastitis disease

Farman Ullah[1], Mostafa Gouda[2], Zhang min[3], Xu Sutong[3], Mohib Ullah KaKare[4], Muhammad Salim[5], Momen Khan[6], Zia ur Rehman[3], Hira Sajjad Talpur[3], Faheem Ahmed Khan[2], Nuruliarizki Shinta Pandupuspitasari[2], Saeed Ahmad[7]

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Abstract

A Serine/Threonine Kinase 3 (AKT3) is a protein coding gene that is associated with several cattle immune diseases including the different tumors and cancers. The objective of this study was to investigate the differences in structures and functions of AKT3 of cow and buffalo cattle. The sequence differences of gene–coding sequence (CDS) and core promoter region of AKT3 in cow and buffalo were analyzed by using bioinformatics tools and PCR sequencing. Also, the functional analysis of promoter regulating gene expression by Rt-PCR was performed using 500 Holstein cows and buffalos. The results proved the variation in 6 exons out of 13 exons in CDS of the two species under study. Also, 4 different regions in 3kb promoters of AKT3 gene were significantly different between the two species. It showed that in cow sequences the promoter region from (-371 to -1247) was essential for cow AKT3, while in buffalo sequences it was (-371 to -969) crucial region of promoter. Thus the promoter activity is maintained by two core functional promoter regions. Also, significant differences ($P<0.05$) of expression level dependent on lipopolysaccharide (LPS) stimulation was found in the bovine mammary epithelial cells through the evaluation of AKT3 inflammatory response to LPS-induced mastitis. AKT3 actively responded to LPS-induced mastitis in the bovine epithelial cell line. This study emphasized the great importance of the structure differences of AKT3 between the animal species on their different responses against the immune diseases.

Key words: AKT3, Promoter, pGL3, mRNA, expression, LPS, immune response

OLS-13. Substantial differences and comparative Analysis of V-Akt Murine thymoma viral oncogene homolog 3 (AKT3) gene between cow and buffalo for mastitis

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Abstract

AKT3 gene is a constituent of the serine/threonine protein kinase family and plays a crucial role in synthesis of milk fats and cholesterol by regulating activity of the sterol regulatory element binding protein (SREBP). AKT3 is highly conserved in mammals and its expression levels during the lactation periods of cattle are markedly increased. AKT3 is highly expressed in the Intestine followed by the mammary gland and it is also expressed in immune cells. It is involved in the TLR pathways as effectively as pro-inflammatory cytokines. The aims of this study were to investigate the sequence differences between buffalo and cow. Our results showed that there were substantial differences between buffalo and cow in some exons and noteworthy differences of the gene size in different regions. We also identified the important consensus sequence motifs, variation in 2000 upstream of ATG, substantial difference in the “3UTR” region, and miRNA association in the buffalo sequences compared with the cow. In addition, genetic analyses, such as gene structure, phylogenetic tree, position of different motifs, and functional domains, were performed to establish their correlation with other species. This may indicate that a buffalo breed has potential resistance to disease, environment changes, and airborne microorganisms and some good production and reproductive traits.

Keywords: AKT3, cow, buffalos, TLR, ATG

OLS-14. Taxation of morphometric, productive and reproductive characteristics of Azikheli buffalo in Swat valley

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Abstract

The current research was conducted to elucidate the morphometric, productive and reproductive characteristics of Azikheli buffalo in the Swat Valley - home tract of the breed. Morphometric assessment of the breed indicated that the mean heart girth, body length and height at whither were 191.36±1.26 cm, 140.39±0.94 cm and 131.35±0.57 cm respectively in adult females. Males were comparatively narrow at heart girth (177.68±3.76 cm), but longer (147.89±2.60 cm) with a comparable height to female (130.01±1.08 cm). Mean daily milk production based on the standard 305-day lactation period is 7.19±0.18 liters and the buffalo produces 7.30 to 9.58 liters per day during the first 6 months of lactation with maximum production during the 3rd month (9.58 liters). Buffalo attained pubertal age at 1147.93±13.05 days of age. The expression of heat signs within 90 days postpartum (50% buffaloes), 64% first service conception rate, 1.55±0.04 number of services per conception with a mean calving interval of 489.16±5.82 days were main reproductive characteristics of the breed. The current study elucidated the basic morphometric, productive and reproductive characteristics of the local Azikheli buffalo in their home tract.

Keywords: Azikheli buffalo, morphological, productive, reproductive characteristics, Pakistan

OLS-15. Affect of management and topography on the reproductive attributes of Azikheli buffaloes in Swat

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Abstract

The Azikheli buffalo is a native breed to the Hindukush Mountains of Northern Pakistan. It is kept in its home tract by different social groups (landowners, Gujars, and tenants) under different topographic conditions (hill slopes, undulating areas, and valley bottoms). The present study evaluated the management effect of social groups and topographic conditions on key reproductive traits. Such results are important to identify the likely habitat and management type that can host an indigenous breed conservation programmed with success. Data was collected through a structured questionnaire from a total of 225 households representing the social groups and topographic zones aforementioned and was analyzed through a one-way analysis of variance. The results showed that social groups had no significant effect on the reproductive traits studied except for the postpartum anoestrus interval which was short ($P<0.05$) for the buffaloes reared by tenants than by landowners. Azikheli buffalo reaches puberty earlier at the valley bottom ($P<0.01$) than other zones and has a longer postpartum anoestrus interval at the hill slope ($P<0.05$) than the undulating zone. The better overall first service conception (62.69%), number of services per conception (1.53±0.06) and calving interval (480.62±7.30 days) than other buffalo breeds under a variety of management conditions indicated a genotype-environment adaptability of the breed and warrants its conservation. Gujars with Azikheli herds and having a higher proportion of breeding bulls should be the primary recipients of a conservation program.

Keywords: Azikhali buffalo, reproductive traits, social groups, topographic conditions.

OLS-16. Taxation of prenatal ovarian and serum estrogen concentration in Nili-Ravi buffalo fetus

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Abstract

The current study aims to assess the estrogen concentration in both ovaries and serum in the fetus of the Nili Ravi buffalo. For this purpose, 73 female fetuses were collected from Sihala abattoir Islamabad, Pakistan. Both ovaries were obtained from fetuses with age ranging from day 51 to day 290 whereas; serum was available only for the fetuses ranging from the age of 146 days to 290 days. Radio immunoassay was used to measure the estrogen concentration and the data was analyzed through regression analysis of variance. Analysis of the data revealed mean ovarian estrogen concentration as 16.08±1.87 pg/mg of ovaries during the period of 51 to 290 days with peak value of 37.49±10.81pg/mg at 191-210 days. Ovarian estrogen concentration showed significant ($P<0.05$) increase with the advancing age of the fetus. On the other hand, mean serum estrogen concentration observed was 476.20 pg/ml during 146 to 290 days of fetal life with peak value of 734.11 pg/ml at the age group of 231-250 days. It can be concluded that both fetal ovarian and serum estrogen concentration increases with the advancing age of fetus in Nili-Ravi buffalo.

Keywords: Buffalo, estrogen concentration, fetus, ovary, serum, Nili Ravi

OLS-17. Sustainability challenges of animal Breeding and reproduction and potential solutions

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Abstract

Sustainability in animal breeding for the profitable business and production is a dire need for the future to fulfill the goals of stakeholders, breeders, farmers, livestock keepers, producers, consumers, and others, which will help for animal welfare and sustainable agriculture. The policies of the government and private sector have great effects on animal breeding, which are acting as the main source for providing the legal landscape for national priorities for livestock sector development for institutional arrangements and control measures. There is a need to implement new policies and agreements for the sustainability of animal breeding, production, and reproduction. The global plan of action for animal breeding and resources was maintained to initiate sustainable management of livestock for monitoring, breeding, and conservation. The animal breeding plan needs long-term policies to uplift the livestock sector. This study will highlight the status, significance, facilities, and current challenges repelling in the livestock sector and will further entail the remedial measures including technological advancements, for effective policy making.

Keywords: Livestock, animal breeding, policy, law, sustainability

OLS-18. Pen-side hematological formulae for estimating various CBC attributes in livestock: an approach to earlier diagnosis of Anemia

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Abstract

In human medical practice, while using hematological attributes for diagnosis, a 'rule of three' is implied to ensure the correctness of deduced hematological parameters. This traditional 'rule of three' implies that a) Packed Cell Volume (PCV) (%)= Hb (g/dL) ×3; b) Hb (g/dL)= RBC Count (without the count of 3) ×3; and c) PCV= RBC Count (without the count of 3) ×9. However, there is a paucity of literature regarding such hematological formulae for veterinary medical sciences and scarce research has been reported. The veterinarians, researchers and academicians hence, either use veterinary hematology analyzers or manual hematology for blood analyses. The use of hematology analyzers is quite limited in resource-poor countries (including Pakistan) owing to their expensiveness, high maintenance, need of periodic validation, and expensive chemical reagents. Resultantly, the few of the veterinary hematology analyzers present in various research/academic institutes of Pakistan are non-functional. The present work will overview such formulae devised and validated for various Cholistani livestock (sheep, cattle and goats) at the Department of Physiology, The Islamia University of Bahawalpur through a research grant awarded by the Pakistan Science Foundation. Results of the research work have been published in various peer-reviewed international journals. We have concluded that the hematological formulae being used in human medical practice cannot be implied in veterinary practice and hence a novel set of formulae is being put forth. It is expected that these formulae will help diagnose anemia in livestock at an early stage, ultimately enhancing the productivity and socio-economic profile of livestock-keepers.

Keywords: Pen-side, hematological formulae, CBC attributes, livestock, earlier diagnosis of anemia

OLS-19. The effect of repeated use of PRIVD on serum progesterone, estrogen levels, and ovulatory follicle diameter in pubertal heifers

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Abstract

The purpose of this study was to evaluate the effect of reuse of progesterone-releasing intravaginal devices (PRIVDs) on serum progesterone, estrogen levels, and ovulatory follicle diameter in pubertal heifers. Three pubertal Holstein heifers were used in the study for three different periods with the usage of three PRIVDs up to three times from day 0 to 7 according to the Latin square model. Blood samples were collected on days 0, 3, 5, 7, and 9 for hormonal analysis. Ovulatory follicle diameter was measured by transrectal ultrasonography 60 h after removal of the PRIVD. Serum progesterone demonstrated a significant relationship with device use and day ($P < 0.01$) with the 1st use group showing the highest mean serum progesterone levels. Mean serum progesterone levels of the 2nd and 3rd use did not show any significant difference among them. The peak level of mean serum progesterone was recorded on day 3 of the study, whereas minimum levels were seen at days 0 and 9. Serum progesterone concentrations of days 5 and 7 had no significant differences among them. The interaction between use of PRIVDs and days interval was significant ($P < 0.01$). Serum estrogen concentration ($P > 0.05$) and ovulatory follicle diameter ($P > 0.05$) did not differ significantly with the use of the PRIVD at day 9. In the present study, even the 3rd use of the PRIVD produced similar results as the first use. In conclusion, PRIVDs can be reused or manufactured with low progesterone for heifers to reduce hormonal synchronization cost.

Keywords: Heifer, progesterone-releasing intravaginal device, progesterone, estrogen, follicle diameter

3. QUALITY CONTROL & ENTREPRENEURSHIP DEVELOPMENT (QCED)

QCED-1. The potential of Blockchain technology in improving the quality, safety, and profitability of livestock farming in Pakistan

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Abstract

Livestock farmers in Pakistan face numerous challenges, including lack of access to markets, lack of information about animal movements and place of origin, and high levels of food safety risks, resulting in poor returns on investment and making it difficult for them to sustain their operations and improve their livelihoods. One potential solution to these challenges is the implementation of a blockchain-based traceability system for livestock farmers in Pakistan. Blockchain technology is a decentralized and secure digital ledger that enables transparent and tamper-proof recording of data. By using blockchain, we can provide a secure, transparent, and seamless system for tracking the movement and origin of animals. Our vision under Dairy Science Park is to establish technoparks that integrate the public and private sectors, utilizing academic knowledge to assist outgoing male and female graduates in finding decent employment, and developing entrepreneurship models across the livestock value chain. This system would help raise consumer confidence, provide an appropriate financial return to the producers, and generate decent employment and exportable food and biotech products. Our endeavors will contribute to the growing body of knowledge on the application of blockchain technology in the agriculture and livestock sectors, with implications for food safety and sustainability.

Keywords: Blockchain technology, quality, profitability, livestock farming, marketing, Pakistan

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QCED-2: Camel as social enterprise for vulnerable communities in Pakistan

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Abstract

Camel is a valuable animal in Pakistan, especially for the rural communities who rely on it for transportation, milk, and meat. However, with the advent of modern technologies and changes in lifestyles, the demand for camels has declined. This has resulted in a decrease in the value of camels and has adversely affected the livelihoods of the communities that rely on them. Therefore, promoting camels as a social enterprise can be a beneficial initiative for the vulnerable communities in Pakistan. Camel milk has several health benefits, including being high in protein and low in fat, making it a valuable food item for people who are lactose intolerant or have allergies to cow's milk. Furthermore, it is a valuable commodity for the pharmaceutical and cosmetic industries. Camel meat is also a rich source of protein and is considered a delicacy in some parts of Pakistan. Promoting the production and sale of camel milk and meat can provide a sustainable source of income for the vulnerable communities in Pakistan. Additionally, the production of camel milk-based products such as soap, creams, and lotions can create job opportunities for women in the community, who can participate in the production and marketing of these products. Moreover, promoting camel-based tourism can attract visitors to the rural communities and create job opportunities in the hospitality industry. Camel rides, desert safaris, and camping trips can be popular tourist activities that can showcase the unique culture and landscape of Pakistan. In conclusion, promoting camels as a social enterprise can be a valuable initiative for vulnerable communities in Pakistan. It can provide a sustainable source of income, create job opportunities, and promote tourism in the region. However, the promotion of camels as a social enterprise should be done in a sustainable and ethical manner, taking into account the welfare of the animals and the preservation of the environment.

Keywords: Camel production, socioeconomic, sustainability, milk, meat

QCED-3. Companionship of Camelids: from Bedouin's Tent to Ecotourism

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Abstract

Camelidae, refers to Bactrian camels (*Camelus bactrianus*), dromedary camels (*Camelus dromedarius*) and four species of South American camelids; llama (*Lama glama*), alpaca (*Lama pacos*), guanaco (*Lama guanicoe*) and vicuna (*Vicugna vicugna*). Domesticated camels are essential source of supporting food, products, labor, and sport to millions of people. Ecotourism is one of the fastest growing elements of sustainable tourism industry which prioritize environmental conservation, wild life protection, poverty mitigation and economic development. Ecotourism camel parks are highly beneficial in terms of employment and revenue generation. These parks facilitate and strengthen camel races, camel riding and desert hiking. Camels are an icon for tourist attraction for both local and foreign tourists in Australia, UAE, and Saudi Arabia. Camel tourism is very well established in many countries like India, Australia, Turkey, UAE etc. In Australia, international camel (dromedary) race event was launched in 2008 that covered 160km distance and participants from Australia, Middle East, Asia and Europe are involved. In India, 200,000 visitors attracted towards camel safaris in Rajhasthan, Thar Desert annually. Camel wrestling in Turkey is a part of cultural events since hundreds of years. Dromedary camel racing was a traditional sport in Gulf countries like Saudi Arabia, UAE and Kuwait. Annual camel beauty pageant is held in Saudi Arabia from December until March about 30 to 50 days. A variety of camels color types are presented by each owner and most beautiful camels are ranked 1 (top) to 10 (lowest). The prizes for winners may reach 10 to 120 million Saudi Riyals. In Pakistan, camel fairs are organized in Cholistan, Sibbi, Layyah, Umarkot, Thar, and Sindh, mostly in months of October, November and December. Marecha or mahra (dromedary) camels in Cholistan, Thar and Thal are trained for riding, wedding, dancing and racing. There is a need to well-maintain camel tourism parks in Pakistan. Government should fully support camel fairs. International camel racing events should be organized to attract not only local communities but also foreign tourists and also to support the economy of Pakistan. Selective breeding of specialized racing camels breed should be developed.

Keywords: Camelid; ecotourism; camel parks; camel racing; camel wrestling; camel beauty

QCED-4. Climate smart livestock feed (CSLF): The highly needed dimension of research for product development and entrepreneurship

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Abstract

Cattle, buffalo, sheep, goats and camels are source of methane contribution in the environment. This quantity of methane depends upon animal's feed. The balanced feeds results in efficient digestion and absorption with comparatively less methane production. In contrast, the animals kept on grazing, roughages, or feeds formulated on old conventional concepts of total digestible nutrients, crude protein or fiber contents lowers the production potential as well as contribute more methane in the environment. The feed formulation based on fiber fractions (neutral detergent fiber, acid detergent fiber), effective fiber, bypass protein, microbial nitrogen requirements, bypass fats, chelated minerals results in efficient utilization of ingredients as per requirement and therefore improves the production performance of ruminant animals and less wastage and methane emissions. In Pakistan, the available feeds or feeding systems do not fully utilize the production potential of genetically good animals resulting in significant losses in milk and meat yields. Further, conventional feeding of farm animals produces more methane production resulting in increase in greenhouse gases and consequent negative impacts on climate. Hence, there is need to formulate such type of complete diets that not only increase milk and meat production but also have least impacts on climate. Unfortunately, not even a single feed manufacturing company or government sector is addressing methane emission in their feed products fed to ruminants at national level. In this context, the Department of Animal Nutrition, Lasbela University of Agriculture, Water and Marine Sciences has set its prime preference to conduct research studies on methane emissions by using different ingredients particularly the marine weeds in total mixed rations in addition to production prospects. The studies on inclusion of marine weeds will not only lessen methane emissions but will also explore non-conventional feed resources.This idea of climate smart livestock feed by the principal author worked impressively and it also competed and incubated as startup in National Incubation Center by young team of students. The researcher's team of the LUAWMS and CSLF startup team are optimistic in preparing minimum viable product that will have least methane emissions than conventional commercial feeds along with more production potential. This unique and significant startup in livestock will positively contribute to UN millennium goals of economic growth and decent living, climate change and food security.

Keywords: Climate smart, livestock, feed, methane, production, food security, startup

QCED-5. QASWA-Camel milk Ice cream: The marketing at community level for the first time in Pakistan

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Abstract

The QASWA Ice cream is first camel milk ice cream being marketed at community level in Uthal district, Balochistan. QASWA is newly registered startup. The camel milk (CAM) ice cream was in-fact the research product that prepared with addition of skim milk in third phase of PARC-LUAWMS camel project (AS-010) in the department of Animal Nutrition, LUAWMS. Later, this product was improved without addition of skim milk and then commercially marketed at community level for the first time in Pakistan in GoB-LUAWMS camel milk project. After completion of these two camel projects, the community female and unemployed males were also trained to prepare camel milk ice cream and generate modest earnings for themselves and support farming community. The positive feedback recorded when one of the trained group of participants incubated startup as QASWA-camel milk Ice cream under the mentorship of the research founder. The commitment of the team and successful continuation may soon led them to scale their startup as QASWA Private Limited. The QASWA ice cream is unique in taste, being prepared from pastoral organic camel milk, have super nutrients and rich in medicinal benefits than conventional commercial ice creams. On the other side, the main objective of preparing QASWA ice cream is to solve the problem of milk marketing opportunity for poor pastoral camel farmers and at the same time ensure availability of product for the general public with unique and refreshing taste.

Keywords: QASWA, Camel Ice cream, LUAWMS, Lasbela, Pakistan

4. VETERINARY PUBLIC HEALTH (VPH)

VPH-1: Camel Biofluid derived Nanobodies against Oncogenesis

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Abstract

There are twenty breeds of camel (*Camelus dromedarius, Camelus bactrianus*), including both riverine and mountain camels, found in the desert, costal, and hilly areas of Pakistan and have been domesticated as livestock. Camel products contain high nutritional value and are part of the food chain around the globe. Many antibodies are produced naturally in the circulation of Camelidae family. Camel have 2 heavy chains retaining an antigen-binding domain known as nano bodies. Daily innovative strategies are discovered and adapted for diagnosis and treatment in the modern world. Nanotechnology is an emerging technology with a promising future in modern oncological chemotherapy. Nanobodies are small size biological particles that can penetrate deep into the tissue and remain viable at high temperatures and pH. Nanobodies penetrate the blood–brain barrier and invade in the tumors more than any conventional medication. Camelids nanobodies possess exceptional properties, such as high sensitivity and specificity, a higher level of safety, water solubility, and biostability, allowing them to contribute significantly to drug manufacturing and the treatment of various diseases, primarily cancer, which are leading causes of death around the world. The nanoparticle-based therapy concentrates the medicine into the malignant cells while shielding the surrounding healthy cells and tissues from harmful effects. Polymer nanoparticles have been engineered to carry a "killer gene" that induces apoptosis in mutant cells. Nanoparticles have been successfully coupled with camel nanobodies that express a high degree of specificity for a cancer marker, such as Mucin-1, associated with breast and colon cancers.

Keywords: Nanotechnology, nanobodies, chemotherapy, oncology, malignant cell

VPH-2: Exploration of mammary transcriptome profiling analysis of bovine Escherichia coli mastitis

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Abstract

Mastitis is one of the major diseases causing economic loss to the dairy industry by reducing the quantity and quality of milk. In the present study, advanced bioinformatics was used to analyze the important genes that could be utilized as biomarkers and therapeutic targets for mastitis. Four differentially expressed genes (DEGs) were identified in different regions of the mammary gland (teat cistern, gland cistern, lobuloalveolar and Furstenberg's rosette) that resulted in 453, 597, 577 and 636 DEG, respectively. Also, 101 overlapped genes were found by comparing 27 different expressed genes. These genes were associated with eight immune response pathways including NOD-like receptor signaling pathway (IL8, IL18, IL1B, PYDC1) and chemokine signaling pathway (PTK2, IL8, NCF1, CCR1, HCK). Meanwhile, 241 protein-protein interaction networks were developed among overlapped genes. 57 regulatory events were found between miRNAs, expressed genes and the transcription factor (TFs) through micro-RNA, transcription factors (miRNA-DEG-TF) regulatory network. The 3D structure docking model of the expressed genes proteins identified their active sites and the binding ligands that could help in choosing the appropriate feed or treatment for affected animals. It may be concluded that the distinguished DEG and their pathways in this study can precisely improve the detection biomarkers and treatments techniques of cows' *E. coli* mastitis disease.

Keywords: Mastitis, *Escherichia coli*, microarray, transcriptomic analysis, dairy cow

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