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**Proceedings of the  
International Workshop on  
Dairy Science Park  
November 21-23, 2011**

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inter  
cooperation



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## **Message by the Chairman Higher Education Commission**



I was pleased to know about the International Workshop on Dairy Science Park organized by the Agricultural University, Peshawar. I appreciate the efforts of the Prof Khan Bahadar Marwat, Vice Chancellor and his team for arranging this mega event.

Natural resources of the country still need a lot of efforts for their productive utilization and livestock sector is, definitely, possesses a significant role in helping the national through food security as well as economic revival. Milk, meat and their by-products contribute a lot in meeting the dietary needs of the people and the hides, skin and wools, bones, blood, etc, provide raw material to the local industry. In addition the livestock rearing and associated enterprises provide tremendous employment opportunities to the rural and urban populations. Still we have to work hard to develop these resources further as the potential role of the sector is far beyond that mentioned above. If we say that Pakistanis stands 3<sup>rd</sup> in global milk production, in the next statement we mention that we are having no share in the global livestock exports and world halal food market. The reasons are many but we will have to wake up and find the due place in world market. We can generate new energy generating avenues like biogas that will also result in a healthy environment.

The present workshop is a beautiful attempt to meet the goals. Arrangements of the workshop reflect the well-organized efforts of Prof M Subhan Qureshi. On one the provincial livestock department, NGOs, farmers groups, SMEDA and the Chamber of Commerce and Industries were taken on board and on the other, international organizations like ICRISAT India was persuaded to participate, having a rich experience in developing agricultural activities into business enterprises. I can also see speakers from the inland universities and research organizations and those from Bangladesh and Canada, UK.

I expect this event can prove an important step for linking the livestock farmers with academia, development and business organizations and request the sister federal and provincial organizations for supporting this initiative. The HEC will extend all possible support to make the dream true.

Javaid R. Laghari, Ph.D

## **Message of the Vice Chancellor**



I feel pleasure to welcome the participants, the government functionaries and private sector representatives to the International Workshop on Dairy Science Park. The idea of networking the dairy enterprises with the service providers is fascinating and provides us a food for thought to support the national economy through advanced learning and research.

As a nation we are facing big challenges of poverty, illiteracy and unrest in the society. All these problems are somehow related to poor management of our endowments and little utilization of our knowledge to develop the indigenous resources. This University has been producing graduates in various disciplines of agriculture. Applied research has been our tool to investigate farmers' problems and present feasible solutions.

Livestock has been an integral component of our economy and this University has been producing graduates in animal husbandry for the last three decades and in veterinary medicine since 2004. The launching of STRC project of the Higher Education Commission has been of help in establishing the required infrastructure in the shape of classrooms, laboratories and associated facilities. Good quality research work is under way in the Faculty of Animal Husbandry and Veterinary Sciences leading to MSc Hons and PhD degrees in livestock management, animal nutrition, poultry science and animal breeding and genetics. I appreciate the faculty in establishing an excellent outreach setup.

The present workshop has been focusing on integrating academic, research and business organizations with the dairy farmers and I hope we will be able to shape up a mechanism for implementation of these ideas.

**Prof Dr Khan Bahadar Marwat**

## **Foreword**

This is my privilege to introduce the International Workshop on Dairy Science Park. This is a humble attempt to bring the hidden assets of livestock resources into lime light and to present it as a food for thought for an action plan for all those involved in livestock production, processing, marketing, education, development, financing and investment.



Pakistan has been ranked 2nd in buffalo milk production and 3rd in global milk production. Although the livestock sector contributes 55% to the agriculture added and 11.3% to the gross domestic products in the country, the role of the sector on export and production of certified products for human consumption inland is negligible. During the recent years the government has placed the sector on National Development Agenda and Livestock Development Policy has been implemented focused at private sector led livestock development, with the enabling environment provided by the government.

Livestock and Dairy Development Board (LDDDB) and Pakistan Dairy Development Company (PDDC) have been established in addition to other developmental organizations, to spearhead the development efforts. These two programs have been actively focusing on small and medium dairy farmers. National livestock production comprises US\$ 22.5 b of milk and US\$ 6.0 b meat, contributed by cattle, buffalo, sheep and goats valuing US\$ 73 b. Our province contributes 14% of these assets.

We intend to develop a business incentives package with the help of provincial government and KPCCI for the farmers and graduates to develop the dairy related business and utilize the available resources productively. International investment will be explored through various sources including the foreign missions.

A handwritten signature in blue ink, appearing to read 'M Subhan Qureshi'. The signature is written in a cursive style and is positioned above the printed name of the Chief Organizer.

Prof M Subhan Qureshi  
Chief Organizer

## **ORGANIZING COMMITTEE**

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## **FACULTY OF ANIMAL HUSBANDRY AND VETERINARY SCIENCE**

The Faculty supports the livestock sector through teaching, research and industrial services. DVM degree program has been in place since 2004, before which the degree of BSc (Hons) Animal Husbandry degree was awarded. Postgraduate programs are offered in Livestock Management, Animal Nutrition, Animal Breeding and Genetics, [Theriogenology](#), [Pathology](#) and Poultry Science, qualifying the candidates for award of MSc (Hons) and PhD degrees.

A mega-project has been implemented recently which has added teaching and research facilities to the system. Construction of Academic Block, Veterinary, Reproduction and Surgery Clinics, a Semen Production Unit, a Feed Technology and Dairy Technology Center have been established under the project with a total grant of Rs.168 million funded by HEC. In addition to the already existing dairy herd of Dutch Holsitein Friesian, two more were added comprising a herd of Australian Friesian and another of Australian Jersey. One broiler and one quail unit are also maintained and the products are provided to the campus residents on payment. Dairy cattle, sheep, goats, broilers and quails flocks are maintained for research and production at the Farms Block. A well-equipped hatchery is available producing day old chicks for research and production purposes. Sufficient land is available for forage research at the farm center. The faculty has linked with the research and development stations in the province.

Laboratories setup is available in various disciplines of animal health and production sciences. Microbiological, parasitological, pharmacological and physiological facilities are available at the Academic, farm and clinical blocks. Spectrophotometry, ELISA, hematology, serology, FT-NIR and other essential facilities are shared by various groups in the faculty and are also made accessible to the sister organizations on request. PCR, gas chromatography and other advanced techniques, available in IBGE, PCSIR and Peshawar University are utilized by postgraduate students of the Faculty.

A significant activity in research has been student projects in postgraduate disciplines and research projects funded by other agencies or collaborative research with other departments. The Faculty is linked with outreach organizations, farmers' and business community and NGOs. Various training courses, workshops and seminars are frequently arranged to provide a shape to this activity. Collaboration with the [Livestock Trainers and Consultants](#) has been very effective in organizing trainings for farmers, field officers and industry workers in value addition of dairy products and improved livestock management practices. [Agribusiness Support Fund](#), CAMP Peshawar, Sabawoon Kohat, Lasoona Swat, Pakistan Job Project - USAID and Save the Children funded these activities.



## **LIVESTOCK AND DAIRY DEV DEPARTMENT (EXTENSION)**

The provincial livestock department comprises extension and research wings. The Directorate General of Livestock and Dairy Development (L&DD) (Extension) undertakes to accomplish various assigned tasks in discharge of its responsibility towards the development of livestock sector for the benefits of the public in general and the farming community in particular, in order to raise their income and living standard. Breeding improvement directorate and Animal Husbandry In-service Training Institute are working for their specialized mandates.

The Directorate undertakes various assigned tasks in discharge of its responsibility towards the development of livestock sector for the benefits of the public in general and the farming community in particular, in order to raise their income and living standard.

Animal health facilities and services are provided to livestock farmers through curative and prophylactic measures; establishment and maintenance of veterinary hospitals, dispensaries and centers in functional order. Improvement of local breeds of cattle and buffalo is another focused area through the provision of artificial insemination service to the livestock farmers; establishment and maintenance of artificial insemination centers and sub-centers. Livestock production extension services are provided to the livestock farmers (and female farmers in selected cluster areas) through a network of veterinary institutions.

Training are arranged for farmers and the departmental staff in animal husbandry, extension and animal health disciplines and practical pre-service training to Veterinary Assistant students of Agricultural Training Institute (ATI), Peshawar; training is also arranged for field staff, male and female livestock farmers for various NGOs and projects in livestock management and related subjects. Other focused areas of the Department are:

- Establishment of livestock breeding farms for propagation of improved breeds of different livestock species, wherever feasible.
- Improvement of poultry production through the establishment of demonstration- cum-egg production farms.
- Provision of services to Local Government Department in the meat inspection by conducting ante-mortem and post-mortem examination of animals.
- Undertaking livestock development related activities in collaboration with donor assisted area development projects and NGOs

## LIVESTOCK AND DAIRY DEV DEPARTMENT (RESEARCH)

The Directorate General L&DD (Research) comprises Veterinary Research Institute (VRI) and the Directorate of Livestock R&D. The main campus of VRI takes care of vaccine production and research on bacterial, viral and parasitic infections. With a view to extend research and diagnostic facilities to the remote areas four Veterinary Research and Diagnostic Laboratories (VR&DL) were established at D.I.Khan, Swat, Mansehra and Kohat during 1988-91. In 1992 Center of Animal Biotechnology was established to undertake research in the specialized field of Biotechnology for better disease diagnosis and control in animals through advanced techniques like ELISA, Electrophoresis etc. and enhancement of livestock productivity using appropriate biotechnology. In September 2001 VR&DL Dhodial Mansehra was shifted to the Govt. Poultry Farm Abbottabad building due to the creation of Hazara University. But this building was not fit for a research laboratory hence efforts were started to establish a new center on modern scientific lines. Now the provincial government has approved a scheme for re-establishment of the VR&DL Abbottabad.

It is a privilege of Veterinary Research Institute, NWFP Peshawar that Dr. Najmul Hasnain Shah, Veterinary Officer (Research), Center of Animal Biotechnology won the SAARC Youth Award under the theme New Inventions and Discoveries. Dr. Najmul Hasnain Shah was awarded this honour for his discovery regarding Vacuolating cytotoxic activity of *Pasteurella multocida* serotype B and E in macrophages. Oil-Adjuvant Vaccine for Hemorrhagic Septicemia has been developed. This vaccine produces longer duration solid immunity as compared to the alum-precipitated vaccine and also has prolonged shelf life.

The Directorate of Livestock Research and Development is working on various aspects of livestock production like animal nutrition, dairy technology and fodder production. A well established analytical laboratory is available for feed analysis, covering approximate analysis and aflatoxin assays. A dairy technology laboratory is working on milk analysis and other aspects of dairy technology. Livestock R&D farm is a pioneer farm of its kind in the province and it has contributed a lot in applied research on crossbred dairy cattle and more farms were established in various agro-ecological zones.

The technical staff of the directorate supervises postgraduate thesis research projects, leading to M.Sc. (Hons.) and PhD degrees, of students enrolled in various Universities. The Directorates of VRI and LR&D offer short term training courses in various fields of animal production, livestock management and poultry production. As a result of the Annual Poultry Training Course since 1979 a large number of people have been trained and 1273 number of Poultry farms have been established in the whole of NWFP.

## REPRODUCTIVE BIOTECHNOLOGIES IN DAIRY INDUSTRY IN PAKISTAN

Muhammad Azam Kakar<sup>1\*</sup>, Ehsanullah Kakar<sup>1</sup>, Muhammad Naeem Shahwani<sup>1</sup>, Agha Muhammad Raza<sup>1</sup>, Jaffar Hassan<sup>1</sup>, Muhammad Saeed<sup>1</sup>, Shakeel Babar<sup>2</sup> Ghulam Hussain Jaffar<sup>1</sup> and Muhammad Khalid Baloch<sup>2</sup>

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**Key words:** Milk, cow, buffalo, dairy production, artificial insemination, biotechnology

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Br-1

### ABSTRACT

Biotechnology is founded upon an ever-increasing understanding of the mechanisms that maintains living organisms and allows them to reproduce from generation to generation. We are living in an age of biotechnology, which is developing rapidly to expand further in the next few decades. It is a modern science that deals with the biological process through which technological innovation can be achieved and subjected to deliver goods and services for the benefit of human being. This “august” journey, which started with the production of insulin by the bacteria *E. Coli*, experienced a phenomenal growth since then. Reproductive biotechnologies include, semen processing, cryo-preservation, vitrification, sexing of sperm and embryos, artificial insemination, embryo transfer, *in vitro* fertilization, cloning, transgenesis, juvenile *in vitro* embryo transfer, chimera production, multiple ovulation and embryo transfer, aspiration of oocytes from the live animals and zygote intra-fallopian tube transfer. In Pakistan these modern technologies has yet to play their due role in different areas especially in the fields of agriculture, medicine, dairy industry and environment. In the present post-flood scenario, the dairy supply chain recognized the need to work together in order to address this significant challenge. Especially in Pakistan, this future intra-disciplinary cooperation will also be needed among the industries, consumers and research institutes. Failure to achieve a high level of cooperation can potentially lead to a delay in reproductive biotechnologies application in development and will result in serious long lasting economic losses. This review has an attempt to analyze the current situation of the reproductive biotechnologies in dairy industry in the country and propose means for research and development interventions in the dairy sector through coordinated efforts of academia, government departments, development agencies and private sector organizations to achieve the highest possible benefits.

## **MODELING AND MANAGEMENT OF POST-CONCEPTION DECLINE IN MILK YIELD OF DAIRY BUFFALOES**

Sarzamin Khan<sup>1</sup>, Muhammad Subhan Qureshi, Muhammad Younas\* Rafiullah and Muhammad Inam

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**Keywords:** *Milk yield, pregnancy, nutrition, dairy buffalo*

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**BR-2**

### **ABSTRACT**

Dairy buffalo farmers in Pakistan avoid postpartum rebreeding due to fear in milk yield decline. Under the present study reduction in milk yield due to pregnancy was worked out using 23 pregnant and 17 non-pregnant buffaloes under field conditions and the decline was managed through feed supplementation treatments. The treatments provided were PRT, PRS and NPRT. The animals were categorized into HMY, MMY and LMY, producing 66-75, 56-65, and 46-55 liters/wk, respectively. Milk production was recorded up to 23rd week post-conception. The reduction in milk yield became significant on 7th week post-conception. The line JP8 model gave good fit ( $R^2 = 0.9527$ ). In the high yielders, the predicted reduction was highest (-4.48 liters/wk) than moderate and low yielders (-2.37 and -0.94 liters/wk). In the high yielders the decline in milk yield post-conception was highest in PRT, moderate in PRS and the least in NPRT treatment. In the MMY buffaloes the supplementation support to milk yield was smaller than the higher yielders. In LMY buffaloes the decline was highest in PRT than the other two treatments. It may be concluded that the onset of pregnancy in dairy buffaloes results in a drastic decline in milk yield at an early stage and the high yielder are more sensitive. An animal becoming pregnant, if supplemented at the rate of 1 kg/2 liters of milk will retain milk yield for a longer duration post-conception.

**FORTIFICATION OF DAIRY MILK WITH DOCOSAHEXAENOIC ACID (DHA) THROUGH FEED SUPPLEMENTATION OF DAIRY CATTLE FEED - A NEW HORIZON IN DAIRY INDUSTRY**

Iftikhar Ahmad<sup>1\*</sup>, Umme-e-Aiman<sup>2</sup>, and Khan Bahadar Marwat<sup>2</sup>

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**Keywords:** Milk, docosahexaenoic acid, feed, production

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**BR-3**

**ABSTRACT**

Docosahexaenoic acid (DHA) is an omega 3 fatty acid essential for structural development of the brain and eyes in the infants and maintenance of normal vision and neural functions in adults. DHA is also vital for the integrity of heart and vascular system, and is implicated in relieving inflammatory conditions and arthritis pain and in preventing cancer. Human body cannot synthesize DHA sufficiently, which means it must be obtained through diet. The most common source of DHA is marine food, and interestingly a dietary deficiency of DHA is prevalent both in undernourished developing countries and in well nourished inland areas of the developed world. In a recent study of nursing mothers, lowest breast-milk DHA values (0.06–0.14%) found in Pakistan and inland areas of Canada have been attributed to a lack of dietary intake of marine food in these areas. In Canada, a novel approach of fortifying the dairy milk by supplementing the cattle feed with DHA-rich herring meal has been used to enhance the dietary intake of DHA in the country. In Pakistan, a homegrown source of DHA is needed for supplementing cattle feed since the availability of marine food is limited in the country, and we intend to employ the marine red alga *Cryptocodinium cohnii* for this purpose. The alga is a prolific producer of DHA and has been used as a non toxic microbial source of omega 3 oil in many pharmaceutical supplements. It appears to be an effective dietary supplement since its addition to duck feed has been shown to result in a significant increase in the DHA content of the fed animal. We are therefore aiming at developing a sustainable mass culturing system for *C. cohnii* in Pakistan. The heterotrophic alga has been mass produced industrially both in bioreactors and in open pond fields and we intend to use these two methods for its sustainable production both for large scientifically managed “smart” dairy farms and for small to medium size family owned farms in different parts of the country. Our study is also focused on developing protocols for efficient algal meal supplementation regimes and for monitoring DHA and general nutritional status of the fortified milk. The study adopts a collaborative approach in order to benefit from the Canadian experience in custom designing the DHA-rich cattle feed.

**RELATIONSHIP OF BLOOD METABOLITES WITH REPRODUCTIVE CYCLICITY IN INDIGENOUS AND EXOTIC BREEDS OF DAIRY COWS UNDER TROPICAL CONDITIONS**

Mohammad Hamid Kadwal, Muhammad Subhan Qureshi\*, Anila Mushtaq, Tawheed Ali, Suhail Akhtar, Shakirullah and Zahoor A Swati<sup>1</sup>  
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**Keywords:** Blood metabolites, reproduction, cyclicity, breeds, environment

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**BR-4**

**ABSTRACT**

The improved genetic status alters metabolic priorities of the body compromising fertility. 10 Holstein Friesian (HF), 10 Jersey, 10 Achai and 10 F<sub>1</sub> cows were selected at Peshawar and monitored for 5 months. 65% cows reestablished estrus while 35% remained anestrus. 80% HF and 70% Jersey showed estrus. In Achai only 40 % were cyclic. Blood glucose and daily milk yield (DMY) significantly affected post partum estrus ( $P < 0.01$ ) while blood protein and triglycerides did not affect it. The blood glucose levels were lower ( $39.93 \pm 3.14$  mg/dl) two months before and increased ( $49.63 \pm 2.47$  mg/dl) towards estrus commencement and then declined. Anoestrus cows were deficient in blood glucose ( $35.74 \pm 1.57$  mg/dl). The anestrus cows were deficient in blood glucose concentrations. Higher blood glucose and total protein supported reproductive cyclicity in Jersey while higher triglycerides in Achai lowered fertility. In crossbred cows, the rising levels during pre estrus period indicated greater adaptability to the local environment. It is suggested that overfeeding has an adverse effect on milk yield in the low yielding Watani (local) cows having poor genetic potential to utilize the extra amount of concentrates for milk synthesis; hence the feed may be utilized for crossbred cows. The north zone showed the best efficiency producing 8 kg day<sup>-1</sup> milk while consuming 2.3kg concentrates which may be attributed to the well developed irrigation system supporting production of plenty of fodder. Watani as well as the crossbred dairy cows showed good estrus symptoms for breeding. Blood glucose decreased on 17<sup>th</sup> day of estrus cycle probably due to its utilization for supporting estrus activities. LH reached the highest level on day 17<sup>th</sup> probably which may be sufficient for supporting ovulation.

## **THE EFFECT OF PGF 2- $\alpha$ ANALOGUE WITH OR WITHOUT GnRH ON FERTILITY RATE OF ANESTRUS KUNDHI BUFFALO**

Qismatullah Khan, Zia-Ur-Rehman<sup>1\*\*\*</sup>, M. U. Samo\*, Abdur-Raziq\*\*, Ijaz Ahmad\*\*\* and Din Muhammad\*\*

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**Keywords:** *Prostaglandin, Kundhi buffalo, Insemination, GnRH, Conception rate*

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**BR-5**

### **ABSTRACT**

This study was designed to determine conception rate in Kundhi buffaloes treated with prostaglandin F2 alpha (PGF2  $\alpha$ ) after timed insemination and simultaneous treatment with or without gonadotrophin releasing hormone (GnRH). A total 40 anestrus Kundhi buffaloes were randomly selected in field conditions in the vicinity of Sindh Agricultural University, Tandojam and were divided into 4 equal groups, each group comprising of ten animals (n=10). A separate treatment protocol was followed for each group. In group A, animals were injected intramuscularly with 2 ml Dalmazine, a synthetic analogue of prostaglandin PGF2 $\alpha$  (2 ml Dalmazine = 0.150 mg cloprostenol), on day 1 and the same treatment on day 11 followed by fixed time artificial insemination (72 h) after the 2<sup>nd</sup> dose of prostaglandin injection. In group B, same treatment as in group A but in addition gonadotrophin releasing hormone (GnRH) i.e. 2 ml of Dalmarelin (Lecirelin aetate), a synthetic analogue of GnRH was injected at the time of fixed time AI. In group C, same protocol as in group A, but in this group 2 ml of Dalmazine (PGF2 $\alpha$ ) 2 ml of Dalmarelin (GnRH) were injected simultaneously on day 11. In group D, animals were kept as control. The conception rate in group A, B, C and D was 20.2%, 30.3%, 30.3% and 10.1% respectively. The mean conception rate in treated group was higher (26.6%) than control (10.1%). It was concluded from the present study that 16.6% conception rate increase has been achieved in anoestrus Kundhi buffalo through hormonal therapy in field condition.

## EFFECT OF PREGNANCY ON BLOOD METABOLITES AND MILK COMPOSITION OF COWS

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*Keywords: Pregnancy, Blood metabolites, milk, cow*

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BR-6

### ABSTRACT

Animals were divided into 4 groups according to their fertility status. Group A animals were non pregnant which had not been served. Group B included animals which had been served but not conceived. Group C included 90 days pregnant animals while group D included animals of greater than 90 days pregnancy. Significantly higher glucose values were noted in non pregnant animals which had not been bred followed by animals of 90 days pregnancy and then by non pregnant while lowest values were recorded in animals having greater than 90 days pregnancy with mean values of 43.88,42.80,42.32 and 25.20 respectively. Highest blood protein values were recorded in non pregnant animals which had been served (93.48) followed by animals of 90 days pregnancy (91.28) and then followed by non pregnant animals which had not been served (88.25). Lowest blood protein values were recorded in pregnant animals of greater than 90 days (82.35). Blood Triglycerides were highest in animals having greater than 90 days pregnancy (11.58) followed by 90 days pregnant animals and then by animals which had been served but not conceived(10.33). Lowest Triglycerides were noted in non pregnant animals which had not been served (9.77). Highest milk production was recorded in animals having greater than 90 days pregnancy (10 lit) followed by non pregnant animals which had not been served (8.45lit) and then by animals which had been served but not conceived (7.08) while lowest milk production was noted in pregnant animals of 90 days (6.63). Highest milk fat values were found in non pregnant animals which had not been served (5.18). Milk fat values were same in pregnant animals which had been bred and more than 90 days pregnant animals (5.10). Milk fat values were lowest in 90 days pregnant animals. As pregnancy advances, SNF decreases. Lactose was recorded significantly highest in NP animals (3.61) followed by NPNS animals(3.55) and then by 90 days pregnant animals(3.27).while lactose was lowest in 90 days pregnancy(3.17).Lactose is also inversely proportional to pregnancy. Highest protein values were recorded in NP (21.55) followed by NPNS (2.51) and then by 90 days pregnant animals(2.36). Animals having greater than 90 days pregnancy had lowest values of milk protein (2.26). It is concluded that pregnancy cause significant effect on milk composition and blood metabolites.



## POSSIBLE APPLICATIONS OF HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC) AND GAS CHROMATOGRAPHY IN VETERINARY AND DAIRY SCIENCES

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**Keywords:** *chromatography, veterinary sciences, HPLC, GC*

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BR-7

### ABSTRACT

Chromatography is a common term used for a family of laboratory techniques, used for separation of the components of complex mixtures. Chromatography involves a sample being dissolved in a mobile phase, which may be a gas (in case of gas chromatography) or a liquid (in case of liquid chromatography). The mobile phase is then forced through an immobile stationary phase called the column. The mobile and stationary phases are chosen such that components of the sample have differing solubility in each phase. A component which is quite soluble in the stationary phase will take longer to travel through it than a component which is not very soluble in the stationary phase but very soluble in the mobile phase. As a result of these differences in mobility, sample components will become separated from each other as they travel through the stationary phase. In any analytical laboratory or bio-processing industry, the need to separate, identify and purify a particular product of interest (e.g. drug residue in milk or meat) from a complex mixture is a necessary and important step. There are different methods used for separation of those mixtures, of which chromatography is a vital separation process for two important reasons: Firstly, it can separate complex mixtures with great precision and accuracy. Even nearly identical components, such as proteins that may only vary by a single amino acid, can be separated with chromatography. In fact, chromatography can potentially purify and separate any soluble or volatile substance if the right adsorbent material (stationary phase), carrier fluid (mobile phase), and operating conditions are used. Secondly, chromatography is a non-destructive separation technique and can be used to separate delicate products. This also means that it can be coupled to other analytical techniques such as mass spectrometry. For these reasons, chromatography is well suited to a variety of uses in the field of biotechnology and related disciplines. Chromatography has many applications in the field of veterinary science. During my talk I will focus on the two most commonly used chromatographic techniques i.e. High performance liquid chromatography (HPLC) and Gas chromatography (GC) and will identify the potential areas of veterinary and dairy sciences where these technique can be used.

## STUDIES ON THE FREEZABILITY OF KUNDHI BUFFALO BULL SEMEN

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**Keywords:** Semen Freezing, Sperm membrane integrity, motility, Kundhi buffalo

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BR-8

### ABSTRACT

The study was conducted to assess the post thaw quality of Kundhi buffalo semen diluted in tris based diluents. After collection the ejaculates were pooled and checked for color, volume, pH, mass activity, progressive linear motility% (PLM), and intactness of cell membrane. The semen qualifying these tests was divided into four aliquots A, B, C and D, diluted with tris based diluents; the last three diluents containing sugar types glucose, fructose and lactose respectively. Aliquot A was without sugar and served as control. These were frozen, stored for 24 hrs, thawed and incubated at 35°C for 5 hrs. The incubated semen aliquots were examined for PLM and membrane integrity of sperm cells phase-contrast microscopy and HOST procedures. It was observed that all the ejaculates were creamy white in color. The mean ( $\pm$ SEM) volume, mass activity, sperm concentration, PLM, and intactness of cell membrane were 1.70 ( $\pm$ 0.09) ml, 3.22 ( $\pm$ 0.074), 1.58 ( $\pm$ 0.136)  $\times 10^9$ /ml, 64.53 ( $\pm$ 0.757)% and 55.63 ( $\pm$ 0.945)% respectively for fresh semen. A significant difference was observed in pH values of the fresh semen samples among the bulls. There was a significant decrease in the number of motile cells and the cells with intact membrane after thawing and incubation of the semen at 35°C. Addition of fructose in the diluents was found to be superior in maintaining higher PLM and intactness of membrane after thawing and incubation. The objective method, osmotic resistance test (ORT) was found to be the useful parameter for assessment of in-vitro fertility of Kundhi buffalo semen.

## RAPID DETECTION OF MYCOPLASMA BOVIS FROM MASTITIS MILK SAMPLES OF BUFFALO USING POLYMERASE CHAIN REACTION

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**Keywords:** mastitis, mycoplasma, Polymerase Chain Reaction (PCR.)

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BR-9

### ABSTRACT

This study describes the PCR based detection of *Mycoplasma Bovis* among other mycoplasmal contaminants causing buffalo mastitis. Mycoplasmal mastitis caused by *mycoplasma bovis* is reported in dairy cattle but it is also present in variable quantity in buffalo. As an opportunistic pathogen causing mastitis, *myoplasma bovis* causes considerable economic losses to the dairy industry. Two hundred milking buffalo from Buffalo Research Institute Pattoki were screened for mycoplasma mastitis. Milk samples were collected from all the four quarters and for the detection of subclinical cases Whiteside Mastitis test was performed. Weekly collection showed increase in subclinical cases by 32 from 200 buffalo, 37 from 198 buffalo, 38 from 204 buffalo and 39 from 202 buffalo respectively. Subclinical cases and normal cases were then processed on modified freys medium for the detection of mycoplasma. Among other mycoplasma (*M. bovirgenitalium*, *M. bovirhinus*, *M. dispar*) *M. bovis* was detected in 10 (33%) from 30 subclinical cases by traditional cultural method and biochemical testing. Thirty normal milk samples, positive broth samples and positive agar samples were screened by PCR technique which showed 10%, 60% and 73% prevalence respectively as comparable to old traditional method 3.44%, 28% and 33% respectively. The results of PCR were available within 12 hr, which is far rapid than old conventional culture method. *Mycoplasma bovis* was detected in more than 70% of mastitis milk samples by PCR method while by conventional culture method only 33% positive cases were detected.

## **FUTURE OF TRANSGENESIS – A REVOLUTION IN DAIRY SECTOR (A REVIEW)**

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**Keywords:** *Transgenesis, non-descript animals, draught breeds, dairy sector*

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**BR-10**

### **ABSTRACT**

The aim of this effort is to draw attention to the significance and application of transgenesis in dairy sector to augment the worth and magnitude of milk. Though, this technology has limited application areas but has a dazzling prospect in dairy sector in future. The references have been taken from Science direct, Pub Med etc. on the subject of transgenesis and processed for meta-analytical study. Pakistan has 62.9 million of cattle and buffalo population whose production was 42.01 million tons milk in 2009 which is much too low in quality and quantity according to the number of animals. More than 65 % of the livestock holding comes from farmers possessing 1 to 6 heads. The effort of cross breeding and artificial insemination has not brought satisfactory results in this consideration. Transgenic animals show the potential to deliver positively despite the given circumstances when farmers will appreciate the amount of milk produced is higher. Both in small ruminants and large ruminants of Pakistan, the number of non-descript animals in production is relatively higher than the number of pure bred. These non-descript animals have shown poor performance after the F1 generation despite indigenous blood. The main problem is disease load of tropics and low feed quality. Marked increase in the utilization of low quality feed and maximum output in shape of milk and meat can be obtained by transgenic animals. Moreover the utilization of Pakistani draught breeds is decreasing due to the adoption of mechanization systems in transportation and agriculture. So, this outsized asset of livestock resources will diminish in future. But by applying transgenesis, these breeds can be transformed into high milk producing transgenic breeds which will enhance the social and economic status of farmer as well as overall production of the country. This review highlights the current status of livestock and reviews techniques of transgenesis and their outcomes.

## AMOXICILLIN BIOEQUVALANCE STUDIES OF VETERINARY PREPARATIONS IN PAKISTAN

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**Keywords:** Amoxicillin, Chemical Equivalence, Bioequivalence, Veterinary Preparations, Buffalo Calves

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HEM-11

### ABSTRACT

Amoxicillin is a broad spectrum, semi synthetic penicillin used for the treatment of many bacterial diseases of animals. There are more than twenty veterinary preparations of amoxicillin approved, for use in veterinary practice by the ministry of health Pakistan. This project was designed to evaluate the chemical and bioequivalency of local and imported preparations commonly available in the market. For chemical equivalence study, samples of Farmox<sup>®</sup>, Farmox<sup>®</sup> L.A. Almox<sup>®</sup>, Amovet<sup>®</sup>, Amoxivet<sup>®</sup> and Clamoxal<sup>®</sup> L. A. etc were collected from local market and drug concentration was measured by HPLC. For bioequivalence study two long acting preparations (Clamoxal<sup>®</sup> L. A. and Farmox<sup>®</sup> L.A.) and two short acting preparations (Farmox<sup>®</sup> and Amoxi Vet<sup>®</sup>.) were used in a cross over design using buffalo calves as target animals. Blood samples were collected in heparinised test tubes at 0.166, 0.333, 0.50, 0.75, 1.0, 1.5, 2.0, 3.0, 4.0, 6.0, 8.0, 12.0, 24.0, 36.0 and 48.0 hours after drug administration (15 mg/kg body weight I/M) and amoxicillin plasma concentration was measured by HPLC. Based on rate and extent of amoxicillin absorption (AUC, Tmax, C<sub>p</sub>max) there was no significant difference in these preparations. From this study, it was concluded that both imported and local preparations can be used interchangeably with similar results. Based on plasma concentration time profile, observed in this study, it is also recommended that dosage interval for long acting preparations should be 24 hours (as claimed to 48 hours) and 12 hours for short acting preparations (as claimed to 24 hours).

## **A STRATEGIC INTERVENTION TO IMPROVE THE HEALTH STATUS OF DAIRY ANIMALS THROUGH COMMUNITY BASED VETERINARY SERVICES**

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**Keywords:** *Epidemiology; services; dairy production; animal health*

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**HEM-12**

### **ABSTRACT**

In Pakistan delivery of animal health services is practiced through traditional government and private veterinary workers without any database for comparison with reference to effectiveness/efficiency. The present study was planned to compare the effectiveness/efficiency of traditional government and community based veterinary workers with reference to health and production parameters in the dairy belt of Lahore, Qasoor and Okara districts where community based veterinary services were introduced through German agency for technical assistance (GTZ). The community veterinary workers were selected by the respective community and trained for basic animal health care and emergency services. It was recorded that incidence rate due to all economically important diseases of dairy animals was 36.43% and 16.75% per annum ( $P < 0.05$ ) in the services area of government and community veterinary workers respectively. Mortality rate due to various diseases was 4.18% and 3.53% per annum ( $P < 0.05$ ) in government and community based services respectively. An improved fertility rate was recorded in community based services as compared to government based services which was 64.55% and 52.5% per annum ( $P < 0.05$ ) respectively. In community based services, the average annual cost-benefit ratio per farmer was almost double than government based services ( $P < 0.05$ ). It was concluded that community based services will help in disease control and consequently poverty alleviation if introduced throughout the country.

## OPTIMIZATION OF PROCEDURE TO DETECT FOOT AND MOUTH DISEASE VIRUS IN BOVINE OF BALOCHISTAN

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**Keywords:** FMDV, bovine, detection, Balochistan

HEM-13

### ABSTRACT

Foot and Mouth Disease Virus cause great economic losses in terms of lowered productivity, weight loss, decreased production and mortality in young animals due to myocarditis. Even after vaccination we are not getting desirable results and there are number of outbreaks of the disease. This is because, FMD virus has seven serotypes O, A, C, SAT 1, SAT 2, SAT 3 and Asia 1. All these types have further sub types/topotypes. Vaccination against one serotype does not provide protection against other serotype, that's why disease outbreaks occur even after vaccination. Animal once infected with one serotype is equally susceptible to other serotype of the virus. Typical cases of FMD are characterized by a vesicular condition of feet, buccal mucosa and in females, the mammary glands. Clinical signs can vary from mild to severe, and fatalities may occur especially in young animals. FMD viruses may occur in all the secretions and excretions of acutely infected animals. Including expired air. Transmission is generally effected by direct contact between infected and susceptible animals or, more rarely, indirect exposure of susceptible animals to the excretions and secretions of acutely infected animals or uncooked meat products. Following recovery from the acute stage of infection virus disappears with the exception of low levels that may persist in the oropharyngeal fluid. Animals in which the virus persists in the oropharynx for more than 28 days after infection are referred to as carrier animals. Mastitis is a common sequel of FMD in dairy cattle. Therefore, it is the matter of urgency to screen out the serotype of FMDV present in Balochistan which has dense cattle population. So that vaccination should be done with specific serotype present in the particular area. This will help controlling the disease and economic losses occurring due to FMD in Balochistan.

Epithelial tissue and vesicular fluid samples from mouth lesions of diseased animals were collected from the cattle population Balochistan. Epithelial samples were placed in a transport medium composed of equal amounts of glycerol and phosphate-buffered saline (PBS) with a pH between 7.2 – 7.6 and added antibiotics at 4 C and were stored at -20 C until tested. RNA of Foot and mouth Disease Virus was extracted from the epithelial tissue and vesicular fluid collected from the diseased animals during disease outbreaks. Standard procedures for the RNA extraction with little modification according to the requirement were being adopted later cDNA were synthesized from RNA extracted from FMDV samples using standard procedures described by as per manufacturer's instructions of the kit used for cDNA synthesis.

## EVALUATION OF BIOCHEMICAL EFFECT OF DICLOFENIC SODIUM IN GOATS

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**Keywords:** *Non steroidal anti – inflammatory drugs, Alanine transaminase, Aspartate transaminase, Alkaline phosphatase, diclofenac sodium, goat*

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HEM-14

### ABSTRACT

Diclofenac sodium is one of the most commonly using NSAID worldwide in medical as well as veterinary practices. It has been reported that it may cause damage to liver and kidney in animals during its metabolism and excretion. Effect of diclofenac sodium on ALT, AST, ALK.PO4, serum creatinine, serum uric acid, blood urea and total protein of liver and kidney has been evaluated in this study at Sindh Agriculture University, Tandojam since 2007. The drug was administered in six goats in two phases with adequate wash out period of 21 days between each phase. Dose rates, 2.5mg/kg (b.w) and 1 mg/kg (b.w), of diclofenac was administered in Phase-1 and Phase-2 respectively. For biochemical analysis the blood samples were collected at different intervals up to 96hrs post drug administration. Significant change ( $p < 0.05$ ) with high dose was documented at 2, 3, 6, 12, 24 48 hrs in blood serum level of ALT, AST, ALK.PO4, creatinine, uric acid, and blood urea respectively. Whereas highly significant change ( $p < 0.01$ ) was monitored at 6, 12, 24, 48 hrs in ALT and AST, ALK.PO4, and blood urea respectively. Significant increase in serum level of ALT, AST, and ALK.PO4 was noticed at 12 and 24 hrs with low dose of diclofenac respectively. No significant change in serum creatinine and uric acid was observed but blood urea significantly increased at 48 hrs with low dose. No change was examined in total serum protein with both the doses. The effect of diclofenac was fleeting and most of the parameters go back to normal after 72hrs of drug administration.



## TREATMENT PROTOCOL FOR BOVINE ACTINOMYCOSIS IN A RESOURCE POOR SETTING OF CHOLISTAN DESERT-A CASE STUDY

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**Keywords:** *Cholistan, Actinomyces, Penicillin, Streptomycin, Bacteria*

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HEM-15

### ABSTRACT

Cholistan desert is one of the driest and hottest areas of Pakistan. Although it has a very uncertain, unpredictable harsh weather with scanty rainfall, yet the livestock rearing is quiet high. The economy and livelihood of nomadic herders depends upon their livestock which, in turn, is at the expense of a fragile ecosystem. The aborigines of Cholistan ('*Rohailay*' in local dialect) are mostly below the margins of poverty. Unaffordability in terms of economics, a swarming network of veterinary assistants and quacks, and lack of appropriate veterinary diagnostic laboratories in the area, leads many mistreated and misdiagnosed cows to the slaughter house. Amongst many other bovine bacterial infectious diseases, Actinomyces or *lumpy jaw in cattle* is a significant cause of economic losses in livestock because of widespread occurrence and poor response to the routine clinical treatment. Various treatment protocols documented in the literature for the lumpy jaw have sub-satisfactory responses and are expensive for resource poor settings such as Cholistan. In the present study, three Sahiwal cows with Actinomyces presented to the authors in different periods of time were subjected to three different recommended treatment protocols *viz* cow no. 1 was given potassium iodide 7 g/day, orally for ten days, cow no. 2 was given sodium iodide (1g/12kg b.wt.) intravenously as 10% solution twice at interval of 10 days; and cow no. 3 was surgically debrided along with five day antibiotic course of Penbionic® (Benzyl Penicillin, Procaine Penicillin and Streptomycin) (Nawan Laboratories Pvt. Ltd. Pakistan) injection intramuscularly. In terms of economics and time taken for complete healing, the treatment of the cow no. 3 was least expensive and found to be within the affordance of poor Cholistan dwellers with no untoward consequences.

## MITICIDAL ACTIVITY OF METHANOLIC EXTRACT OF *VITEX NEGUNDO*- LAM. AGAINST *SARCOPTES SCABIEI* IN ANIMALS AND HUMANS

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**Keywords:** *Vitex negundo*, methanolic extract, miticidal effect, ivermectin and mite

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HEM-16

### ABSTRACT

The miticidal effect of methanolic extract from *Vitex negundo* Lam with 10 and 20% concentrations was evaluated through topical application on scabies affected skin of camel, buffalo, goat, dog and people using symptomatic and microscopic examination techniques. The topical application of *Vitex negundo* methanolic extract (10 and 20%), ivermectin (reference compound) and 100% methyl alcohol (control) on scabies affected buffalos gave 43, 73, 81 and 0% protection, on camels scabies 46, 75, 84 and 0% protection, on dogs scabies 42, 77, 83 and 0% protection, on goats scabies 42, 69, 81 and 0% protection and on scabies affected persons 61, 78, 84 and 0% protection, respectively after 5<sup>th</sup> weeks of application. In addition, the effect of *Vitex negundo* methanolic extract with three different concentrations (i.e. 10, 20, and 30%) was studied to know the duration to be taken to kill *Sarcoptes scabiei* using *in vitro* laboratory test. The results revealed that 10, 20 and 30% concentrations of *Vitex negundo* methanolic extract caused 70, 80, and 90% mortality of the *Sarcoptes scabiei* mites, respectively. Whereas ivermectin (reference compound) and 100% methyl alcohol (control) gave 85 and 5% mortality of the *Sarcoptes scabiei* mites, respectively.

## EPIDEMIOLOGY OF BLOOD PROTOZOA OF BUFFALOES OF DISTRICT TOBA TEK SINGH, PAKISTAN

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**Keywords:** *Epidemiology, protozoa, buffalo, Pakistan*

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HEM-17

### ABSTRACT

A cross-sectional study was carried out to determine the prevalence of blood protozoa and associated risk factors in buffaloes of district Toba Tek Singh from April, 2009 to March, 2010. Of the total 481 blood samples examined for the presence of blood protozoa, 60 (12.47%) were found infected with Babesia and 40 (8.32%) were positive for theileria. Peak prevalence was observed during the month of July while zero prevalence was recorded during months of December and January. Calves had significantly higher prevalence than adults in case of Theileria while reverse was in case of babesiosis. Higher prevalence of Babesia was observed in females while sex was found non-significantly associated with Theileria occurrence ( $P=0.1646$ ). Breeds of buffalo were not found associated ( $P>0.05$ ) with the risk of Babesia ( $P=0.3258$ ) and Theileria ( $P=0.3288$ ) infection. Among management and husbandry practices; housing system, feeding system, watering system, floor type and herd size were the factors significantly associated ( $P<0.05$ ) with Babesia and Theileria infection. Babesiosis and Theileriosis were more prevalent in close housing system, ground feeding system, non-cemented floor type, pond watered animals and larger herds ( $P<0.05$ ) as compared to open housing system, trough feeding system, partially cemented floor type, tap watered animals and smaller herds respectively. Body condition of animals were not found risk factors ( $P>0.05$ ) influencing prevalence of Eimeria.

## EFFECT OF AMOXICILLIN TRIHYDRATE ON THE PHARMACOKINETICS OF KETOPROFEN WHEN CO-ADMINISTERED PARENTERALLY IN HEALTHY PAKISTANI BUFFALOES

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**Keywords:** *Amoxicillin Trihydrate, Ketoprofen, Pharmacokinetics, Buffaloes, Pakistan*

**HEM-18**

### ABSTRACT

The purpose of present investigation is to study the effect of Amoxicillin Trihydrate on the pharmacokinetic parameters of Ketoprofen, when both the drugs are co-administered parenterally in healthy Pakistani buffaloes. For this purpose, eight healthy buffaloes were taken and administered an intravenous injection of ketoprofen at the dosage of 3.0 mg/kg body weight through jugular vein. Blood samples (3-5ml) of buffaloes were drawn in vacutainers, pre-medication at zero-hr, 0.08, 0.17, 0.25, 0.5, 0.75, 1.0, 2.0, 3.0, 4.0, 6.0, 8.0, 10, 12.0, 24, 48, 60, 72, 84 and 96 hrs post medication. After a wash out period of 14 days, the same buffaloes were administered first an intramuscular injection of amoxicillin trihydrate at the dosage of 15 mg/kg body weight and after the lapse of 10 minutes, an intravenous injection of ketoprofen at the dose of 3.0 mg/kg body weight through jugular vein. Blood samples (3-5ml) of buffaloes were drawn according to the schedule described above. The concentration of ketoprofen in plasma was measured by a validated HPLC (high performance liquid Chromatography) method. By taking the ketoprofen plasma concentration versus time data, the pharmacokinetic parameters of ketoprofen were calculated as Mean  $\pm$  SEM AUC (Area Under the concentration time Curve)  $\pm$   $\mu\text{g.h.ml}^{-1}$ , Cl (Clearance)  $\pm$   $\text{L.hr}^{-1}.\text{Kg}^{-1}$ ,  $t_{1/2}$  (Half Life)  $\pm$   $\text{hr}^{-1}$ , VD (Volume of Distribution)  $\pm$   $\text{L}^{-1}$ , VD<sub>ss</sub> (Volume of distribution at Steady State)  $\pm$   $\text{L.Kg}^{-1}$ , and K<sub>el</sub> (Elimination Rate Constant)  $\pm$   $\text{L.hr}^{-1}$  respectively. The results of this study indicated that Amoxicillin Trihydrate has no significant change the pharmacokinetics parameters of Ketoprofen when co-administered parenterally.

## EFFECT OF QUALITY AND FREQUENCY OF DRINKING WATER ON PRODUCTIVITY AND FERTILITY OF DAIRY BUFFALOES

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**Key Words:** Heavy metals, minerals, drinking water, dairy buffaloes and BCS, reproduction

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HEM-19

### ABSTRACT

Dairy farms have emerged around big cities and towns to meet the urban demand of milk. The water supply to these farms is exposed to contaminants from industrial wastes, the city drainage and water disposal systems. The present study was conducted to evaluate the mineral contents and heavy metals of drinking water and document the resulting productivity performance of dairy buffaloes. Twenty five dairy farms were selected having 10 to 122 buffaloes. Data were collected regarding milk yield, body condition score (BCS) and services per conception (SPC). Representative samples were collected from the water used for the dairy animals. One liter water sample was taken in labeled plastic bottle from the drinking trough and analyzed of inorganic minerals (Ca, Mg, Fe, Zn, Cu, Mn) and heavy metals (Cd, Cr, and Pb). Water analysis was performed by atomic absorption spectrophotometer. Milk yield was positively affected by Mn and negatively by Fe, Zn and Pb. BCS was adversely affected by Fe and Mg while positively by Zn and Cd. Iron in drinking water significantly ( $P < 0.05$ ) affecting milk yield, body condition score and services per conception. The watering frequency affected buffaloes production and BCS and SPC significantly ( $P < 0.05$ ). It is concluded from this study that free access to drinking water effected milk yield, body condition and fertility favorably. An increase in body condition was noted with enhanced Zn intake in the drinking water. The higher intake of lead was associated with depressed milk yield. Increasing Fe intake in drinking water adversely affected the milk yield, BCS and SPC.

## PHYSICOCHEMICAL / BACTERIOLOGICAL ASSESSMENT AND EFFECT OF AN ACIDIFIER ON WATER SUPPLIED TO LIVESTOCK

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**Key Words:** Water, Dairy, Mineral, Microbial Population, Coliform

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HEM-20

### ABSTRACT

Present study was planned to evaluate quality of water consumed by livestock. Fifty water samples were collected from dairy farms in and around Rawalpindi/Islamabad. Collected water samples were put forth for analysis of different physical and chemical parameters. The mean values of parameters such as *pH*, *Electric Conductivity*, *Turbidity*, *Total Dissolved Solids (TDS)*, *Total Suspended Solids (TSS)*, *total hardness*, *Calcium*, *Magnesium*, *Nitrates* and *sulphates* were 7.57, 857.53  $\mu\text{s}$ , 1.16 NTU, 625.38 mg/L, 324.15 mg/L, 216.15 mg/L, 49.32 mg/L, 166.82 mg/L, 4.46 mg/L and 13.30 mg/L respectively and thus found within safe limits. Heavy metals such as Cu, Ni, Zn, Pb, Cr, and Cd detection was done by using atomic absorption spectrometry and mean values were 0.03 mg/L, 0.03 mg/L, 0.03 mg/L, 0.12 mg/L, 0.29 mg/L and 0/01 mg/L respectively. In bacteriological study, Most Probable Number (MPN) technique was used to determine the coliform counts of water samples. This involved the presumptive test using MacConkey broth with Durham tube, confirmatory test using Eosin Methylene Blue (EMB) agar. Total coliform counts revealed presence of bacterial contamination <100MPN/100 ml in water samples. To eliminate the microbial population, an acidifier (named S.O.S. Liquid Nutega, Spain) dosage trial was also done. It was revealed that acidifier at first inclusion level 10  $\mu\text{l}$  / 50 ml water sample effectively reduced (64.50%) microbial population. Furthermore, at second inclusion level 20  $\mu\text{l}$  / 50 ml water sample, it nearly eliminated (99.98%) bacterial population.

## PREVALENCE AND CONTROL OF MASTITIS IN COWS IN DISTRICT OKARA

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**Keywords:** *White Side Test, risk factors, floor, teat dipping*

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HEM-21

### ABSTRACT

Present study was designed to find out the prevalence, risk factors, control, and treatment measures of clinical and subclinical mastitis (SCM) in cows. 300 cows were screened in and around Livestock Production Research Institute, Bahadurnagar, District Okara by using White Side Test. Overall prevalence of mastitis was found to be 18.6% and 31.6% for clinical and subclinical mastitis respectively. On the basis of reversal of clinical signs and by using white side test pre and post treatment, it was noted that intramammary route was found more efficient for the treatment (80%) as compared to intramuscular (60%) and combination of Intramuscular and intramammary routes (60%). Non pregnant lactating cows suggestively showed higher prevalence (71.42%). Moreover, older cows, lactating in advanced stages, and with higher number of past lactation cycles showed higher relative risk for mastitis. It was also observed that non-paved (soiled) floor minimized the risk of contracting mastitis as compared to bricked floor. Teat dipping also prominently reduces the risk of disease (relative risk factor; 0.32) as compared to not dipping (relative risk factor 0.55).

## DETECTION AND CHEMOTHERAPY OF SUBCLINICAL MASTITIS IN DAIRY CATTLE AND BUFFALOES

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**Key words:** *Subclinical mastitis, detection, somatic cell count, Bacteriology, antibiotic sensitivity, chemotherapy*

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HEM-22

### ABSTRACT

The aim of this study was to detect subclinical mastitis in bovine and to find out the most appropriate antibiotic for its treatment. For this purpose, 500 apparently healthy animals (cattle and buffaloes) were selected for screening tests. Two different tests, *Surf Mastitis tests (SMT) and Somatic Cell Count (SCC)* were used. Milk samples declared positive by both of the above mentioned tests, were subjected to culture sensitivity test. Six different antibiotics were evaluated i.e. *Enrofloxacin, Norfloxacin, Amoxicilin, Oxyteracycline, Genatamicin and pencilin G*. On the basis of sensitivity test; two topmost Drugs were selected and given to two equal groups of animals. To detect the in-vivo efficacy of antibiotic, again the milk samples of all the groups were examined by SMT and SCC on day 10 and day20 of first injection. Subclinical mastitis was found 42.8% in cattle and 37.6% in Buffaloes. Out of the total of 201 mastitis positive milk samples, cultured, bacterial growth occurred in 98(48.75%) of milk samples. The various bacterial species isolated from milk samples of cattle and buffaloes were *E. Coli, Staphylococcus, Streptococcus, Proteus, Klebsiella, Pseudomonus, and Pastreurella* with overall percentage of 50%, 17.34%, 3.06%, 12.24%, 10.20%, 2.04% and 5.10% Respectively. The in vitro efficacy of *Enroflocacin* was found to be the best one i.e 77.75% followed by, *Norfloxacin(67.34%), Amoxicilin(22.44%)*, *Oxyteracycline(30.61%)*, *Genatamicin(53.06%) and pencilin G(4.08%)*. After chemotherapy, there was significant difference between treatments groups and control groups ( $P>0.05$ ). However mathematically, the recovery rate by *enrofloxacin* was greater (93.75%) then *norfloxacin* (87.50%). Recovery rate was at day 20 for both antibiotics.



## **PHARMACOKINETICS OF LONG ACTING AMOXICILLINS IN BUFFALO CALVES IN PAKISTAN**

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**Keywords:** *Pharmacokinetics, Long acting Amoxicillins, Buffalo Calves, HPLC*

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**HEM-23**

### **ABSTRACT**

In this present study pharmacokinetic parameters of two long acting preparations of amoxicillin were compared in buffalo calves. Study was performed on sixteen healthy buffalo calves. Calves were divided in two groups, A, B. Each group contains eight animals. In first phase, calves of group A were administered Farmox L.A and calves of group B were administered Clamoxyl L.A IM at rate of 15mg/kg bodyweight. In second phase, after a washout period of 2 weeks post administration, group A that received treatment with Farmox L.A were administered Clamoxyl L.A and vice versa at same dose rate. Blood sampling was done prior and after drug administration at different time intervals up to 48 hours. Plasma was taken apart and stored at -20 °C till analysis. Amoxicillin concentration in plasma was found out by using HPLC. Pharmacokinetic parameters of both preparations were compared. It was found that there is no significant variation in pharmacokinetics of Clamoxyl L.A and Farmox L.A, but the area under curve of both drugs showed that the drug stay in body maximally up to 24 hours. So, it can be concluded that both the products are bioequivalent in their rate and extent of drug absorption and it should be repeated after 24 hours instead of 48 hours.

## COMPARATIVE STUDIES ON SEDATIVE AND ANALGESIC EFFECTS OF XYLAZINE, AND DETOMIDINE IN GOATS

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**Keywords:** Sedation, goat analgesia, detomidine, xylazine in goat

HEM-24

### ABSTRACT

An experimental study was carried out to compare the sedative and analgesic effects of intravenous administration of xylazine (0.1mg/kg i.v.) and detomidine (50µg/kg i.v.), in six healthy goats. Onset of sedation occurred within  $29 \pm 3.74$  and  $55.66 \pm 5.57$  seconds which lasted for  $77.59 \pm 4.38$ , and  $85.38 \pm 2.76$  minutes with xylazine and detomidine respectively. The duration of sedation was significantly higher ( $P < 0.01$ ) with xylazine and detomidine. Skin analgesia occurred within  $5.66 \pm 3.26$ , and  $12.83 \pm 3.48$  minutes and the mean values for duration of analgesia were  $40.66 \pm 3.32$ , and  $33.5 \pm 3.67$  minutes after administrations of xylazine, and detomidine respectively. The onset and duration of analgesia was rapid ( $P < 0.01$ ) with xylazine as compared to detomidine. Moderate to deep and deep degree of analgesia was achieved by the administration of xylazine and detomidine. Some side effects like salivation, frequent urination, defaecation, tympany, protrusion of the tongue, head drooping and bellowing were observed after administration of xylazine, and detomidine. It is concluded that these alpha<sup>2</sup> adrenergic agonists are safe to be used in goats in field as well as hospital conditions. It is suggested further investigations should be made with increasing doses of detomidine in goats.

## PREVALENCE AND ASSOCIATED RISK FACTORS OF EIMERIA IN BUFFALOES, PUNJAB, PAKISTAN

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**Keywords:** Buffalo, Eimeria, Punjab, Pakistan

HEM-25

### ABSTRACT

A cross-sectional study was carried out to determine the prevalence, species characterization and associated risk factors with Eimeria in buffaloes of district Toba Tek Singh from April, 2009 to March, 2010. Of the total 585 faecal samples examined for Eimeria, 290 (49.57%) were found infected with six species of Eimeria. Amongst the identified species of Eimeria, *E. bovis* was the commonest one (53.14%) followed in order by *E. zeurnii*, *E. canadensis*, *E. ellipsoidalis*, *E. alabamensis* and *E. cylindrica* with percentages 47.27, 33.09, 27.64, 21.45 and 5.82, respectively. Peak prevalence was observed in August. Wet season was found favorable for Eimeria. Calves had significantly higher prevalence ( $P < 0.05$ ) of Eimeria than adults while higher prevalence of Eimeria was observed in female buffaloes. Among management and husbandry practices; housing system, feeding system, watering system, floor type and herd size strongly influenced the prevalence of Eimeria. Coccidiosis was more prevalent in close housing system, ground fed, pond watered animals, non-cemented floor type and larger herds ( $P < 0.05$ ) as compared to open housing system, trough fed, tap watered animals, partially cemented floor type and smaller herds respectively. Breed and body condition of animals were not found risk factors ( $P > 0.05$ ) influencing prevalence of Eimeria. After treatment with toltrazuril, five out of six calves were recovered and signs of clinical coccidiosis were diminished. Results of survey will provide baseline data for designing monitoring program to minimize losses to dairy farming sector inferred by bovine coccidiosis. Since even subclinical coccidiosis may entail economic losses in dairy farming and considering the high prevalence of the pathogenic species *E. bovis* and *E. zeurnii*, appropriate monitoring and control of the disease is advisable.

## PREVALENCE OF BACTERIAL AGENTS ASSOCIATED WITH CALF DIARRHOEA IN KHANEWAL CITY OF PROVINCE PUNJAB

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**Keywords:** *Calf diarrhoea, bacteria, E.coli, Salmonella spp., Clostridial spp.*

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PATH-26

### ABSTRACT

Neonatal calf diarrhoea is the major cause of early calf mortality (ECM) and it has been a threatening alarm for livestock industry around the globe. A number of infectious and non-infectious factors are associated with it. In this paper, only the prevalence of bacteria causing calf diarrhoea in Khanewal city has been taken into consideration. A total of 97 fecal samples from diarrhoeal calves were taken from different farms locally called Bhanas, in 3 months (from November to January). Bacteria were isolated from feces of calves of age ranging 7 to 30 days suffering from diarrhoea. Fecal samples were analysed for enterotoxigenic *Escherichia coli*, *Salmonella* species and *Clostridial* species. *Salmonella spp.* was isolated from only 4% of all calves by using Selenite-F and Tetrathionate broths and then streaking out on MacConkey and brilliant green agar, found higher in calves of age two weeks. *E.coli* was isolated from 59% of all diarrhoeal calves by using MacConkey agar plates and lactose positive colonies were confirmed as *E.coli*, causing severe enteritis during first two weeks of life. Only 8% *Clostridial spp.* were isolated using cooked meat broth and streaking out on horse blood agar. It was concluded that *Salmonella spp.* seems to be less associated with calf diarrhoea in Khanewal. *E.coli* was more prevalent in diarrhoeal calves and *Clostridial spp.* were found to be prevalent at 3 Bhanas due to an outbreak.

**PATHOBIOLOGICAL CHARACTERIZATION OF CONTAGIOUS CAPRINE  
PLEUROPNEUMONIA (CCPP) IN SMALL RUMINANTS OF KHYBER  
PAKHTUNKHWA, PAKISTAN**

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**Keywords:** *Contagious Caprine pleuropneumonia, growth inhibition test, Mycoplasma mycoides Capri*

**PATH-27**

**ABSTRACT**

This study was conducted in selected areas of Khyber Pukhtoonkhwa Pakistan, namely northern, central and southern regions, with the objective to determine clinico-pathological manifestation of contagious Caprine pleuropneumonia in field outbreak. The study included isolation and identification of *Mycoplasma* species from field outbreaks by usage of a selective differentiating hay flick medium, growth inhibition test and a Polymerase Chain Reaction (PCR) test. Out of 120 inoculated samples, 30% and 22.5% were positive on culture from lungs and pleura. Isolates were identified as *Mycoplasma mycoides* subspecies *capri* by a growth inhibition test and PCR. Similarly, tissue samples that were negative on culture were also subjected to PCR analysis. Out of 120 samples 62.5% and 54.16% from lungs and pleura, respectively, were positive. On statistical analysis, a significant difference ( $P < 0.05$ ) was found between results of PCR and culture. This difference reflects that the PCR technique is more sensitive than the culture method. Based upon these findings, disease was prevalent in almost all selected regions of province. The predominant clinical findings include pyrexia, nasal discharges catarrhal initially turned into mucopurulent in the advance stage, excessive laceration, unilateral and bilateral conjunctivitis with corneal opacity, painful cough, dyspnea, weakness, reluctant movement, extended neck, abduction of the elbow and diarrhea. The majority of animals presented pathological lesions in the form of consolidation and marbled appearance of lungs with fibrinopurulent membrane on pleural surface. Straw colored pleural fluid was present in pleural cavity with pleural adhesion, hydro pericardial fluid in pericardial sac, necrotic foci on surface of the liver and pus in the pelvis of kidneys. Histopathological lesions revealed emphysema, atelectasis with interstitial and bronchopneumonia and thickening of interlobular septa with extensive infiltration of polymorph nucleated cells. It was concluded that CCPP is caused by *Mycoplasma mycoides* subspecies *capri* in all the three region of Khyber Pakhtunkhwa.

## SERO-SURVEILLANCE OF HEMORRHAGIC SEPTICEMIA IN BUFFALOES IN DERA- GHAZI-KHAN, PUNJAB, PAKISTAN

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**Keywords:** Sero-surveillance, hemorrhagic septicemia, cattle, buffaloes

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PATH-28

### ABSTRACT

Hemorrhagic septicemia (HS) is a fatal systemic disease of buffaloes and cattle. In South East Asia, HS is caused by infection with *Pasteurella multocida* serotype B: 2. The disease often occurs as an acute septicemia form and is clinically characterized by high rise in temperature (104-108°F), respiratory distress, nasal discharge, salivation, tongue protrusion, reluctance to move, development of hot painful swelling and edema on throat, brisket or occasionally forelegs. In the present study, a buffalo population (n=2963) from 10 villages of Dera Ghazi Khan (DGK) with outbreak, was subjected to study the sero-surveillance on HS. The animals were divided into two groups on the basis of their age *i.e.* Group A (n=1042): less than 2 years old and Group B (n=1921): more than 2 years old. Ten other villages free of infection/outbreak were also surveyed in the same geographical area, for the purpose of comparison. The average geometric mean titre (GMT) recorded against HS in diseased buffaloes was 5.7 in contrast to 34.3 in healthy animals. The morbidity, mortality and case fatality rates were 18.42, 15.45 and 27.00 % in young male buffalo calves; and 39.15, 36.75 and 63.83% in young female buffalo calves, respectively. Similarly, the morbidity, mortality and case fatality rates were 0.78, 0.57 and 18.03% in adult male buffaloes; and 2.39, 1.35 and 42.62% in adult female buffaloes, respectively. The overall morbidity, mortality and case fatality rates were 57.58, 52.30 and 90.83% in young buffalo calves; and 3.17, 1.92 and 60.65%, in adult buffaloes, respectively. The present study revealed that the young ones and the females of buffalo are more susceptible to the disease than the adults and males.

## **PREVALENCE AND BIOCHEMICAL STUDIES IN CATTLE SUFFERING FROM BABESIOSIS IN DISTRICT SWABI, KHYBER PAKHTOONKHWA**

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**Key words:** *Cattle Babesiosis, biochemical indicator, supportive therapy*

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**PATH-29**

### **ABSTRACT**

The present study was designed to check prevalence of Babesiosis in cattle in District Swabi Khyber Pukhtoonkhwa, to determine its effect on the liver, kidney function tests and to check the role of supportive therapy. For this purpose 100 suspected animals were selected. Out of 100 suspected animals only 10 were positive for Babesiosis on Giemsa staining. Study of serum biochemistry revealed that there was increase in level of SGPT, SGOT, total bilirubin, BUN and creatinine while the level of total protein and albumin were decreased. Administration of supportive therapy showed that the serum biochemical values of the animals administered with supportive therapy were come near to normal values as compared to the animals without supportive therapy. This study showed that Babesiosis damaged the kidney and liver and the use of supportive drugs along with specific drug is effective.

## A STUDY OF SUB CLINICAL MASTITIS IN NILI RAVI BUFFALOES IN KHANEWAL DISTRICT OF PAKISTAN

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**Keywords:** SFMT, Kirby Bauer Antibiotic Sensitivity Test, Norfloxacin, Bacitracin

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PATH-30

### ABSTRACT

A retrospective data was analyzed in prevalence of sub clinical mastitis and subsequent *In vitro* antibiotic susceptibility against mastitis causing pathogens of Nili Ravi Buffaloes (n = 1236) using surf field mastitis test (SFMT) and antibiogram assay, Kirby Bauer Antibiotic Sensitivity Test, with commonly practiced antibiotics. The prevalence was found to be (61.48%) (n = 760). Nevertheless, Norfloxacin (33.49%) was found to be more susceptible antibiotic (p < 0.05) followed by Enrofloxacin (29.12%), Ciprofloxacin (20.55%), Cholramphenicol (15.12%), Amoxicillin (13.99%), Gentamycin (12.62%), Colistin sulphate (10.27%), Sulphamethoxazole (9.70%) and Bacitracin (3.80%).



## PREVALENCE OF SUBCLINICAL MASTITIS AND TRENDS ON ANTIMICROBIAL SUSCEPTIBILITY AGAINST MASTITOGENS IN CATTLE IN DISTRICT KHANEWAL

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**Keywords:** SFMT, Antibiogram Assay, Norfloxacin, Bacitracin

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PATH-31

### ABSTRACT

This retrospective study describes the prevalence of sub-clinical mastitis and consequent *In vitro* antibiogram assay in cattle population of District Khanewal, Punjab province. The lactating cows (n = 706) were screened through Surf Field Mastitis Test (SFMT) and only positive samples were subjected to antibiogram assay, Kirby Bauer Antibiotic Sensitivity Test, using a range of antibiotics commonly used against mastitogens. The prevalence of sub-clinical mastitis was found to be 68.55% (n = 484), whereas, antibiogram assay revealed Norfloxacin (42.06%), the most sensitive antibiotic (p < 0.05) followed by Enrofloxacin (30.31%), Chloramphenicol (19.83%), Ciprofloxacin (13.88%), Amoxicilline (12.88%), Gentamycin (8.92%), Colistin sulphate (6.79%), Sulphamethoxazole (6.79%) and Bacitracin (3.68%).

**STUDY ON PATHOGENESIS OF CONTAGIOUS CAPRINE  
PLEUROPNEUMONIA (CCPP) IN SMALL RUMINANTS OF KHYBER  
PAKHTUNKHWA, PAKISTAN**

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**Keywords:** *Contagious Caprine pleuropneumonia, growth inhibition test, Mycoplasma mycoides Capri*

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**PATH-32**

**ABSTRACT**

A study was conducted in selected areas of Khyber Pakhtunkhwa Pakistan, namely northern, central and southern region with the objective to determine pathogenesis of contagious Caprine pleuropneumonia in field out break. A total of 120 goats were examined exhibiting clinical signs of pneumonia suspected for CCPP during disease out break. Animals in serious illness conditions were purchased, sacrificed and lesions in different visceral organs were recorded. On necropsy, samples were collected from the organs including lungs, trachea, heart, liver, spleen, kidneys and intestine were processed for histopathological examination. The predominant clinical findings includes pyrexia, nasal discharges catarrhal initially turned into mucopurulent in advance stage, excessive lacremation, unilateral / bilateral conjunctivitis with corneal opacity, painful cough, dysponia, weakness, reluctant movement, extended neck, abduction of elbow and diarrhea. Arthritis was not observed in any animals in the study area. Majority of animals presented pathological lesion in the form of consolidation and marbled appearance of lungs with fibrinopurulent membrane on pleural surface. Straw color pleural fluid was present in pleural cavity with pleural adhesion, hydro pericardial fluid in pericardial sac, necrotic foci on surface of liver and pus in pelvis of kidneys. Histopathological lesions revealed emphysema, atelactasis with interstitial and bronchopneumonia and thickening of interlobular septa with extensive infiltration of polymorph nucleated cells. It was concluded that CCPP is widespread disease in all the three region of Khyber Pakhtunkhwa.

## HISTOPATHOLOGICAL AND SEROLOGICAL STUDIES ON PARATUBERCULOSIS IN CATTLE AND BUFFALOES

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**Keywords:** Cattle; Buffalo; Paratuberculosis; *Mycobacterium avium subsp. paratuberculosis*; Histopathology; ELISA.

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PATH-33

### ABSTRACT

Paratuberculosis (Johne's diseases) is responsible for massive economic losses to dairy industry, both in the industrially advanced as well as in the developing countries. To detect its occurrence in cattle and buffaloes locally, Blood and tissue samples from clinically weak and grossly suspected slaughtered animals were collected from two abattoirs of Jhang, Municipal Area, Pakistan. Acid-fast smear staining, Gross/Histopathology and indirect ELISA was done for the detection of *Mycobacterium avium subsp. paratuberculosis* (MAP). Total 134 samples illustrating gross pathological lesions were collected, only 11.19% (Cattle:6.67%, Buffaloes:12.5%) showed acid fast bacilli through smear staining and were taken as confirmed cases. Thickening of intestines alone was not a reliable indicator of Johne's disease. Tissue sections from intestines and mesenteric lymph nodes from these Acid fast positive animals were stained with Hematoxylin & Eosin (H&E) and Ziehl Neelsen (ZN) methods. Sum of (15/134) impression smear staining as well as (15/15) tissue sections of the intestines were found ZN positive, and only 6.7% (09/134) of impression smears and 100% (09/09) of tissue sections of mesenteric lymph nodes showed acid fast bacilli. Through ELISA, Two cattle and five buffaloes (07/134) gave positive optical densities, while one cattle and seven buffaloes (08/134) were judged as doubtful. It is concluded that infection of MAP can be identified by Histopathology and ELISA. The present study was the first record of paratuberculosis among the dairy animals slaughtered at Jhang abattoirs.

## EFFECT OF BREEDS AND FEEDING ON MILK COMPOSITION AND BLOOD METABOLITES IN DAIRY COWS

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**Keywords:** Milk Composition, Blood Metabolites, Feed combinations

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FM-34

### ABSTRACT

A research study was designed to investigate effect of different feed combinations on milk composition and blood metabolites with feed intake based on different kharif crops and feed concentrates fed to dairy cows in Peshawar region. The animals were divided into 5 groups and five different feed combinations were fed to them. Milk and blood samples were analyzed using commercial kits. The effect of feed on blood metabolites and milk composition was highly significant ( $P = 0.000$ ). Highest blood glucose values were observed in group B followed by group E, A, D and C. Similarly, highest blood protein values were observed in group D, followed by group C, B, E & A with mean values of 93.32, 93.23, 90.69, 89.30 and 87.60 respectively. Blood Triglycerides were higher in group D followed by group C, E and A with mean values of 11.06, 10.29, 10.03, 9.77 & 9.77 respectively. Highest milk fat values were recorded in animals of group D followed by C, B, A and E with mean values of 6.90, 6.84, 6.37, 6.35 and 6.27 respectively. Animals of group D were noted for their highest milk Lactose values followed by C, B, A and E with mean values of 3.74, 3.71, 3.345 and 3.4 and 3.38 respectively. Similarly, highest milk protein values were attained by animals of groups D followed by C, A and E with mean values of 2.65, 2.62, 2.45, 2.41 and 2.41 respectively. Different feed combinations had significant correlation with blood Triglycerides. Blood Glucose was correlated with blood protein, triglycerides, milk lactose, protein, fat, milk yield and SNF. Blood Triglycerides was significantly correlated with milk lactose, protein, fat, milk yield and SNF. It is suggested that different feed combinations influence the milk yield and composition and blood metabolites probably through influencing biological reactions in the body. Highest blood glucose were maintained by dairy cows having more than 75% exotic blood levels and highest milk lactose levels were exhibited by buffaloes. Blood glucose and milk lactose levels showed an opposite pattern in NPNS (non-pregnant non-served), NP (non-pregnant) and pregnant dairy animals ( $R^2=0.81, 0.99$ ).

## **STRATEGIC FEEDING MANAGEMENT FOR ENHANCED DAIRY PRODUCTION**

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Keywords: Body condition, dairy, livestock, management, feeding

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**FM-35**

### **ABSTRACT**

Body condition relates to the animal's overall performance and body condition scoring can be an important tool in dairy herd management, which can be achieved through better managed feeding plan. The application of reliable body condition score is a desirable feature to get optimum productivity from a dairy herd of cows and buffaloes. Not only it helps in maintaining proper production and reproduction but also necessitates evaluating feeding management program leaving ample space for annual culling. A careful feeding management strategy can bring the desired results and will help to maintain desirable body condition of the lactating animals at all physiological stages. However, for management purposes, sustainable improvement can be achieved by following different strategies suitable at any given condition to avoid reproductive disorder and a smooth and efficient functioning of dairy enterprise. This paper will deal with the two important aspects covering the body condition scoring and the strategic feeding management and their role in enhanced productivity.

## **EFFICIENCY OF TOTAL MIXED BALED RATION (TMBR) FOR MUTTON PRODUCTION AND ITS COMPARISON WITH OTHER FEEDING SYSTEMS**

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**Keywords:** *Baled ration, mutton production, efficiency*

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**FM-36**

### **ABSTRACT**

The present study was planned to compare the efficiency and economic of Total Mixed Baled Ration (TMBR) with other feeding systems by feeding them to Beetal kids and Lohi lambs. Eighteen male young ones (8-9 months) each of Beetal and Lohi were selected and randomly divided into six groups. Group A, B and C comprised of kids while group D, E and F were allotted to lambs having six animals in each group. Groups A and D were fed on conventional feeding system comprising of chopped green fodder ad libitum along with supplementation of concentrate (T3) @ 1 % of body weight of lamb/kid. The groups B and E were given berseem hay ad libitum along with the supplement of concentrate @ 1 % of body weight (T2). Group C and F were given TMBR (T1) ad libitum for 90 days. The results showed that average daily feed intake was 1376, 1283 and 1130 g for lambs and 821.6, 857.95 and 714 g for kids in T1, T2 and T3, respectively. The average daily weight gains were 153, 116 and 66 g in lambs and 100, 90 and 50 g in kids in T1, T2 and T3, respectively. The carcass percentages were 42.29, 40.94 and 37.99 for lambs and 40.32, 42.28 and 39.46 for kids in T1, T2 and T3, respectively. Results indicated that use of TMBR was more economical in lambs while in kids, TMBR and fodder plus concentrate were statistically comparable.

**CALCIUM AND PHOSPHORUS CONCENTRATION IN WATER, SOIL,  
FEEDSTUFFS AND BLOOD OF SMALL RUMINANTS OF THAL  
IRRIGATED AND DERA GHAZI KHAN IRRIGATED AREAS OF PUNJAB,  
PAKISTAN**

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**Keywords:** *minerals, soil, water, feed, blood, Punjab*

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**FM-37**

**ABSTRACT**

Calcium (Ca) and Phosphorus (P) status of soil, water, feedstuffs and blood plasma of sheep and goats in Thal Canal Irrigated and Dera Ghazi Khan Irrigated areas of Punjab, Pakistan was determined during summer and winter season. The samples were taken from five different sites which were selected on the basis of sheep and goats population, topography, soil type and feedstuffs availability and analyzed for Ca and P by Atomic Absorption Spectrophotometer and Spectrophotometer. Higher values of Ca and P were observed in soil for Thal Canal Irrigated zone as compared to the D. G. Khan Irrigated zone during winter and summer season. Water from tube well and motor pump showed higher Ca and lower P status during winter and summer season in D. G. Khan Irrigated Zone as compared to Thal Canal Irrigated zone. Rice grain and wheat grain showed significant ( $P < 0.05$ ) for Ca level whereas millet grain and wheat grain showed significant ( $P < 0.05$ ) difference for P level. Comparatively significant ( $P < 0.05$ ) difference was observed for sheep and goats between Thal Canal Irrigated zone and D. G. Khan Irrigated zone.

## EFFECT OF PRE-WEANING FEEDING REGIMENS ON POST-WEANING GROWTH PERFORMANCE OF SAHIWAL CALVES

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**Keywords:** *Calf Nutrition, Post-weaning growth*

FM-38

### ABSTRACT

The objective of the study was to establish the post-weaning growth potential of Sahiwal calves reared on four different pre-weaning diets. Sahiwal calves (n=48; 24 of each sex 3±2 days of age) were divided into four groups of 12 animals each (6 of each sex) and were offered one of the following dietary treatments from day 3±2 *post-partum*: A: whole cow's milk + starter ration (SR; CP=20%, TDN= 72%) plus Berseem hay (H; Egyptian Clover; CP= 21% TDN=63%); B: Milk + H; C: Milk replacer (MR; reconstituted to specification; Sprayfo®) + SR+H and D: MR + H. Milk or MR was offered at the rate of 10% of their body weight until day 56 and then withdrawn gradually until weaned completely by day 84. The SR and H were continued until day 84. During the post-weaning period the calves were fed a single total mixed ration containing 16% CP and 70% TDN, from the 13<sup>th</sup> to the 24<sup>th</sup> week of age. This ration was fed *ad libitum*, daily feed intake was measured and live-weights were recorded weekly. The data were analyzed by MIXED procedures of SAS. The growth rate, total live-weight gain and final live-weight of calves at 24 weeks of age were 746±33, 660±34, 654±33 and 527±33 g/d; 63.2±2.6, 55.2±2.7, 54.9±2.7 and 44.2±2.6 kg; and 119±4.2, 102±4.3, 95±4.3 and 75±4.2 kg for the pre-weaning treatments A, B, C and D, respectively; these were influenced (P<0.05) by the pre-weaning treatments. Offering whole milk from birth at the rate of at least 10% of bodyweight with concentrates leads to a higher weaning weight and post-weaning growth rate and hence a greater possibility of early maturity.



## EFFECT OF DIFFERENT DIETARY ENERGY LEVELS ON MILK PRODUCTION IN LACTATING NILI-RAVI BUFFALOES

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**Keywords:** *Dietary energy levels, lactation performance, NRC, Nili-Ravi Buffalo*

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FM-39

### ABSTRACT

Multiparous lactating Nili-Ravi buffaloes (n= 27) were selected and randomly divided into three groups with nine animals in each under a completely randomized design. Three diets were formulated, being iso-nitrogenous diets but having varying energy, viz; A=100 (Control), B=80 and C=120 percent of the NRC level recommended for lactating cows, with each group of animals being fed one of these diets. Milk yield did not differ between diets A and C (10.63±0.165 and 10.87±0.124 kg/day, respectively) but was lower (P<0.05, 8.41±0.135 kg/day) on diet B. Dry matter intake (DMI), daily gain and milk composition did not differ (P>0.05) among the dietary treatments. However, feed efficiency in terms of fat corrected milk (FCM) per unit /DMI was lower (P<0.05) in animals fed diet B (0.89 ± 0.019) than in animals fed either of the other two dietary treatments. Likewise, cost of feed per kg FCM was higher (P<0.05) on diet B (17.85 ± 0.28 PKR). It was concluded that feeding lactating Nili- Ravi buffaloes a diet containing more ( i.e., 120 %) than the NRC level of ME recommended for large breed dairy cows conferred no advantage whilst feeding a diet containing less than the recommended level decreased both milk production and feed efficiency.

**(Abbreviations:** : CP, crude protein; NDF, neutral detergent fiber; ADF, acid detergent fiber; ADG, average daily gain; DMI, dry matter intake; NRC, National Research Council; ME, metabolizable energy; PKR, Pakistan rupees)

## FEEDING AND ECONOMIC ASPECT OF SUPPLEMENTAL FAT IN SAHIWAL COWS

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**Keywords:** *Dairying, Fat feeding, Economics, Sahiwal cows, Pakistan*

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FM-40

### ABSTRACT

This study was conducted to determine the influence of feeding supplemental fat on the milk production and its composition in four primiparous Sahiwal cows. Animals were randomly assigned to receive one of four diets containing 0, 2, 4 and 6 % levels of animal fat (tallow), respectively. All the diets were made nitrogenous and isocaloric and fed for four periods each of 21 days duration, including 21 days as adjustment period. The cows were housed individually in a tie stall barn and fed *ad libitum* the total mixed ration (TMR). Dry matter (DM) intake decreased linearly with increasing level of tallow in the diet. Daily intake of organic matter were significantly lower in cows fed different levels of tallow as compared to control diet; however there was no significant difference between cows fed diets containing 2% tallow and control. Production cost per kg of milk from cows fed control diet was lower than the other diets. Costs were similar between the 2 and 4 % tallow supplemented groups while production cost per cow was higher for cows fed diet containing 6% tallow. The income from milk produced increased quadratically with increasing level of tallow. The study inferred that tallow is an economical source of energy for supplementation up to 4 % level of the diet dry matter in Sahiwal cows.

## **EFFECT OF PROTEIN SUPPLEMENTS OF VARYING RUMINAL DEGRADABILITY ON NUTRIENTS INTAKE, DIGESTIBILITY, NITROGEN BALANCE AND BODY CONDITION SCORE IN EARLY LACTATING NILI-RAVI BUFFALOES**

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**Keywords:** *Protein, degradability, nutrients, intake, nitrogen, digestibility, body condition score*

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**FM-41**

### **ABSTRACT**

Study on effect of varying protein supplements of varying ruminal degradability on nutrients intake, digestibility, nitrogen balance and body condition score was conducted in early lactating Nili-Ravi buffaloes. Twenty four multi-parous early lactating (22± 10 days) Nili-Ravi buffaloes were selected and randomly divided into four groups (six animals in each group) and fed diets A, B, C and D containing 30, 40, 50 and 60 % rumen undegradable protein (RUP), respectively in a completely randomized design. Results showed that DM, CP, NDF and ADF intakes were similar ( $P>0.05$ ) on all diets while, nutrients digestibility was similar on all diets except NDF which was highest ( $P<0.01$ ) on diet C. Nitrogen intake and nitrogen output (g/d or % of intake) was similar on all diets. Of the N output fractions, fecal N excretion as g/d or percent of intake was similar ( $P>0.05$ ). Urinary N excretion as g/d was same, however N excretion as percent of intake was highest ( $P<0.01$ ) on diet A and lowest on diet C. Milk N output as g/d ( $P<0.001$ ) or % of intake ( $P<0.05$ ) was maximum on diet C. Nitrogen utilization as g/d or percent of intake was similar on all diets. Change in body condition score of the early lactating Nili-Ravi buffaloes was also unaffected ( $P>0.05$ ) by the diets.

## **EFFECT OF PROTEIN SUPPLEMENTS OF VARYING RUMINAL DEGRADABILITY ON MILK PRODUCTION, AND COMPOSITION IN EARLY LACTATING NILI-RAVI BUFFALOES**

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**Keywords:** *Protein, degradability, milk production, FCM, milk composition, cost of production*

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**FM-42**

### **ABSTRACT**

Study on effect of varying protein supplements of varying ruminal degradability on milk production, and composition was conducted in early lactating Nili-Ravi buffaloes at Livestock Experimental Station, Khushab. Twenty four multiparous early lactating (22± 10 days) Nili-Ravi buffaloes were selected and randomly divided into four groups (six animals in each group) and fed diets A, B, C and D containing 30, 40, 50 and 60 % rumen undegradable protein, respectively in a completely randomized design. Results showed that whole milk yield was highest ( $P<0.05$ ) on diet C and lowest on diets D and A while, 4% fat corrected milk (FCM) and fat yield (g/d) was maximum ( $P<0.001$ ) on diet C while, statistically similar on other three diets. Protein yield (g/d) was also highest on diet C and lowest on diets D and A. Fat, solid not fat, lactose, salts and total solid percentages were unaffected by the diets, however, protein percent was highest ( $P<0.001$ ) on diet C and lowest on diet D. Cost of production per liter milk yield and 4% FCM was least on diet C and highest on diet D. Live weight change in early lactating buffaloes remained same ( $P>0.05$ ) on all diets.

## USE OF GAS PRODUCTION TECHNIQUE FOR DETERMINATION DIGESTIBILITY OF FEED IN RUMINANT FEED INDUSTRY

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**Keywords:** animal feed, digestibility, gas production technique

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FM-43

### ABSTRACT

The most widely existing economical feedstuffs for ruminants in tropical countries are usually native pastures, agro-industrial by-products and wastes. Ruminants require a dietary supply of protein, sugars, starch and non-structural polysaccharides for the maintenance and synthesis of microbial biomass protein which is the major protein source needed for their growth and development. Rumen degradation is critical in the supply of nutritional nutrients to meet the nutrient demands of the anaerobic microorganisms and body tissues of ruminant animals. So, it is important to study the dynamics of rumen degradation of various feedstuffs before their potential use to express nutritious diets for ruminants. In vitro technique has been tested as possible substitutes to the in sacco technique, to study rumen degradation of feeds. There is a need to develop in vitro methods that do not require surgically adapt ruminants to obtain rumen fluid to study rumen degradation. This review has clear objectives, to study the capacities and factors associated with the gas production method to study rumen degradation and their implications for the animal industry in different situations.

## SEASONAL EFFECTS ON CALCIUM AND PHOSPHORUS STATUS IN FEEDSTUFFS, SOIL, WATER AND SHEEP BLOOD PLASMA OF DISTRICT SHEIKHUPURA OF PUNJAB, PAKISTAN

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**Keywords:** calcium, phosphorous, feedstuff, plasma, sheep

FM-44

### ABSTRACT

In spite of a large population of sheep and goats in Pakistan, a lot of hurdles are ahead regarding their production especially nutritional. The minerals become more important for small ruminants because they are mainly fed on grazing without balanced feed and mineral supplementation. These animals have to rely on grasses and forages. The availability and concentration of minerals in forages are influenced by rainfall, soil type and the stage of maturity and variety of the forages. A study plan was made to estimate the variation in the status of Ca and P of feedstuffs, water, soil and plasma of sheep in district Sheikhpura of Punjab, Pakistan during summer and winter seasons. The district was categorized into five sites depending on the population of sheep in the area, fodder production and topography of the soil. The samples of blood (10 samples × 5 sites × 2 seasons = 100 samples), soil (6 samples × 5 sites × 2 season = 60 samples), water (6 samples × 5 sites × 2 season = 60 samples) and available feedstuffs were taken and analyzed for Ca and P using Atomic Absorption Spectrometer and Spectrophotometer. The Ca was found statistically deficit in sorghum fodder (0.248%), grasses (0.38%) and wheat grain (0.225%), whereas, Ca (2.15%) of toria fodder was found in normal range. There were normal P values for cotton seed cake (0.974%), corn grain (0.458%) and barseem (0.369%) fodder were estimated however, wheat straw (0.0891%) value was found deficient in phosphorus. Significant ( $p < 0.05$ ) difference was observed for P in blood of sheep during winter and summer season and non-significant difference ( $p > 0.05$ ) was observed for Ca during the winter season. The Ca and P of soil showed significance ( $p < 0.05$ ) among the sites and between the seasons while there was no change ( $p > 0.05$ ) in Ca and P profile in water throughout the year.

## **DISTRIBUTION OF VARIOUS MYCOTOXINS IN DAIRY FEED AND SILAGE IN PAKISTAN**

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**Key words:** mycotoxin, feed, silage, co-contamination.

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**FM-45**

### **ABSTRACT**

Present study was planned to assess the spectrum of natural occurrence of aflatoxins, zearalenone, ochratoxin A, deoxynivalenol and A-B Trichothecenes in dairy feed, silage and total mixed ration. One hundred and sixty-five (n=165) samples were analyzed by chromatographic technique. In compound feed, present study revealed high percentage incidence of aflatoxin B<sub>1</sub> (97.31%) followed by aflatoxin B<sub>2</sub> (50.33%), aflatoxin G<sub>1</sub> (10.74%), aflatoxin G<sub>2</sub> (1.47%), zearalenone (39.25%), ochratoxin A (37.5%) and deoxynivalenol (2.96%) with average values of 29, 8, 21, 10, 862, 64 and 813 ppb respectively. Out of total analyzed samples, only one sample was tainted with T-2 toxin (582 ppb), nivalenol (285 ppb) and fusarenon-x (1625 ppb) respectively. However, frequency distribution showed that positive seventy-seven (51.67%) found to be contaminated with aflatoxin B<sub>1</sub> levels higher than permissible level of European Commission (<20 ppb). For zearalenone, forty-four (32.50) samples were tainted with levels ranging from ≥500 to 3750 ppb i.e. higher than recommendations by European commission (<500 ppb). In contrast to compound feed, results of silage demonstrated the high prevalence of ochratoxin A (77.77 %) followed by AFB<sub>1</sub> (25%) with mean of 115 and 9 ppb respectively. A scrutiny of mycotoxin for total mixed ration depicted that all samples (100%) were contaminated with aflatoxin B<sub>1</sub> and ochratoxin A with an average of 30 and 230 ppb respectively. Furthermore co-contamination phenomenon of mycotoxins also observed in all type of analysed samples predominately in compound feed.

## **INFLUENCE OF GENETIC AND ENVIRONMENTAL FACTORS ON LACTATION COMPONENTS AND PRODUCTION PERFORMANCE OF HOLSTEIN FRIESIAN CATTLE IN BALOCHISTAN**

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Key words: Genetics, environment, lactation performance, Friesian, Balochistan

**FM-46**

### **Abstract**

Data on 100 Holstein-Friesian cows for a period of 15 years (1988-2002) were analyzed using least squares and maximum likelihood methods. Lactation components such as lactation length, peak yield, milk yield, and age at calving averaged 319±56, 474±42 liters, 3661±785 liters, 1963±636 days respectively. The h<sup>2</sup> estimates were 0.49, 0.29, 0.32 and 0.535 for lactation length, peak yield, milk yield and age at calving respectively. Seasonal effects revealed that there is no influence of season of calving on lactation components. Summer, Autumn, Winter and Spring had lactation length 323±50, 317±49, 313±56 and 321±55 days, monthly peak yield 477±77, 472±70, 466±53 and 482±73 liters, and milk yield 3685±766, 3593±817, 3645±677, 3724±864 liters, respectively. Parity-wise (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup>), average lactation length was, 312±51, 319±59, 337±55, 311±50 and 318±54 days, monthly peak yield 470±81, 464±69, 481±79, 475±68 and 480±57 liters, and milk yield, 3657±786, 3740±813, 3938±750, 3486±645, 3484±670 liters, respectively. Positive correlations were observed between lactation length and peak yield (0.56), lactation length and milk yield (0.693), peak yield and milk yield (0.38), and peak yield and age at calving (0.11), while negative correlation was recorded between milk yield and age at calving (-0.171) and lactation length and age at calving (-0.104). The regression coefficient between lactation length and peak yield (0.04), lactation length and milk yield (0.05), peak yield and milk yield (0.03), and peak yield and age at calving (0.94) was positive, while negative correlation was recorded between milk yield and age at calving (-0.13) and lactation length and age at calving (-0.01).



## **COMPARATIVE STUDY OF DIFFERENT TREATMENT METHODS FOR IMPROVING THE NUTRITIVE VALUE OF RICE HUSK**

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**Key word:** Rice husk, sulphuric acid, urea, in situ dry matter digestibility, TMR, feed intake,

In vivo digestibility, buffaloes.

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**FM-47**

### **ABSTRACT**

Study conducted to know the effect of sulphuric acid and urea treatment on voluntary intake and digestibility. The data obtained were analyzed using completely randomized design. Results showed that highest crude protein contents were recorded in case of urea treated (T3) but highest reduction in crude fiber, Ash and silica contents in case of Sulphuric acid treatment (T2). As cellulose and hemicelluloses contents were concerned T2 followed by T3 while there was no significant difference ( $P < 0.05$ ) in EE, lignin, NDF and ADF among treatments. Buffalo bull was used for determining the disappearance of dry matter by nylon bag technique for 24 and 48 hours incubation respectively. T2 having highest dry matter digestibility as compared to T3 in case of 24 hours incubation, however no significant differences in T3 and untreated rice husk (T1) were observed but for 48 hours incubation there was no significant difference among treatments. Feeding trail was conducted for one month on twelve non lactating Nili Ravi buffalo randomly divided in three groups A, B and C (4 animal in each) with similar body condition score and weight. Three total mixed rations (TMR) based untreated (TMR-A), sulphuric acid (TMR-B) and urea treated (TMR-C) were prepared. The buffalo fed TMR-B showed ( $P < 0.05$ ) higher feed intake as compared to TMR-C and TMR-A. The apparent digestibility co-efficient for dry matter, crude protein, crude fiber and ether extract measured by total collection method and indicated that TMR-B was significantly ( $P < 0.05$ ) better digestible as compared to other rations.

## PREVALENCE OF SUB-CLINICAL MASTITIS IN ONE HUMPED CAMEL OF LESSER CHOLISTAN, PAKISTAN

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**Keywords:** *Subclinical mastitis, one humped camel, SFMT, Lesser Cholistan*

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ALP-48

### ABSTRACT

Mastitis is the most expensive disease of the dairy industry in terms of economic losses. Subclinical mastitis causes hidden losses in the milk production. Reports of mastitis in the camels have augmented immensely during the past decade. So, this study was performed to find prevalence, causative pathogens and antimicrobial agent for cure of subclinical mastitis in one humped camel (*Camelus dromedarius*) during summer season in Lesser Cholistan, Pakistan. For this purpose, total 106 milk samples were collected and examined by surf field mastitis test (SFMT). Ninety six (90.57%) of 106 samples were recorded as positive for sub clinical mastitis, while remaining four samples were positive for clinical mastitis ( two samples, 1.89% ) and blind quarters (one quarter in each animal) (two samples, 1.89%). It was found that there was 75%, 91.43% and 94.44% sub clinical mastitis in animals of age 4 to 7 years, 7 to 10 years and more than 10 years of age respectively. The predominant bacterial colonies identified on culturing the samples include Staphylococcus and Streptococcus species. Ciprofloxacin, Florfenicol, Amoxicillin, Gentamicin and Oxytetracycline were the most effective antibacterial drugs (in descending order).

## PROSPECTIVE OF DAIRY FARMING IN CHOLISTAN

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**Keywords:** *Cholistan, Southern Punjab, Nomads, Yazman, Jattal goat*

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ALP-49

### ABSTRACT

The Cholistan Desert, once a prosperous, lively, and thriving jungle is now by and large a desolated piece of land. Its productivity potential is on the decline despite the fact that the number of animals in this desert is on the increase. The Cholistan desert is located in southern Punjab extending through the Nara and Thar deserts of Sindh (Pakistan) between latitudes 27° 42' and 29° 45' N and longitudes 69° 52' and 75° 24' E, covering about 2.6 million hectares. It supports a human population of 110,000 pastoral nomads depending exclusively upon livestock for their livelihood. To address the rising demand for milk and milk products, the large stake holders of dairy industry are looking to boost the milk collection area and want to bring remote areas in their milk collection chain. In this view, Cholistan is of great importance as it has great potential for dairy farming. A large population of cholistani cow, camels and jattal breed of goat, are present in this area, can produce a large quantity of milk for country. By working on the different natural vegetation, this desert can be a great pasture for the dairy animals. After the monsoon, the herds of dairy animals from the nearby urban areas like Yazman, Bahawalpur, Bahawalnagar, and Rahim Yar Khan migrate to the cholistani areas for grazing. There is need of time to establish a proper dairy industry in Cholistan. By providing technical and market facilities to the local farmers in Cholistan help to achieve this task. Dairy farming not only provides the livelihood and food to the peoples of cholistan but also help to meet the food need of whole country.

## LIVESTOCK PRODUCTION SYSTEM AND DAIRY POTENTIAL AT CHOLISTAN DESERT

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**Keywords:** Cholistan, camel, cattle, arid, desert, livestock

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ALP-50

### ABSTRACT

Cholistan desert a prosperous, lively forest once is now by large a deserted piece of land. There is a range land which contributes to the country's supply line of milk and other Dairy Products. Its present productive potential is now on decline in spite of the number of the animals in the desert is on the increase. The desert is situated in the south west of Punjab province (Pakistan) and is spread over an area of 26000 sq km. Subsoil aquifers or water is highly saline and brackish. The length of the desert is 480 km and breadth is 32 Km at the lowest and 192 km at the longest part. Low line sand dunes mostly smaller than those found in the greater cholistan are typical for lesser cholistan. These two are the divisions of cholistan desert. The only source of fresh water is tobas which is surface water collected in natural depressions or man-made ponds collected during the monsoon period. This water does not last long due to seepage in sandy soil and high rate of evaporation during summer. The secondary source of water is around 30-40 meters deep underground water which is very brackish with salt content as high as 24000 ppm. The climate is arid hot sub-tropical and monsoonal. The livestock has a great socio-economic impact on the population of cholistan. The human population surviving in this desert is mostly nomadic with a tendency to rear camel, cattle, sheep and goats for their daily milk, meat and transportation needs. The total livestock population is 1209528 heads out of which camel population is 1,11,328. The main dairy animals are 47% cattle, 30% sheep, 22% goat and 1% camel. The milk production per camel ranges from 10-20 litre milk per day. A camel fed 1.9 kg of DM can produce 1 L of milk as compared to cow which requires 9.1 kg of fodder to produce 1 L of milk. Camel milk is high in Vitamin C and can be used to treat Tuberculosis and Dropsy. It consists of 5.1 % lactose, 4.8% fat, 3.8% protein and 0.9% ash. Marketing and processing of milk produced from the Cholistan are the areas to be explored.

**MILK PRODUCTION POTENTIAL OF PAKISTANI CAMEL  
(*CAMELUS DROMEDARIUS*) UNDER THE DRY LAND CONDITIONS OF  
THE PUNJAB**

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**Key words:** Milk production, Camel, Dry land, Pakistan

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ALP-51

**ABSTRACT**

The study was undertaken to assess the dairy character of single humped camels raised under dry land conditions in Pakistan. Milk production of five she-camels was recorded monthly from 7<sup>th</sup> day post-calving till the completion of six months lactation. The browsing/grazing for these animals in the mountainous rangeland mainly comprised local natural resources. Common salt and water were provided *ad-libitum*. All the camels were hand milked after the calves suckled the udder. Experimental animals produced 2100.61±163.32 litres milk in a period of 180 days. The mean milk production was 11.66 ± 0.90 liters per day, with the peak milk production in the second month of lactation. The results of the study revealed that camel possess an appreciable dairy potential even under the ranges or dry land conditions. This can be further exploited under good feeding and management conditions coupled with their careful selection and breeding.

## **EFFECT OF OXYTOCIN ADMINISTRATION BEFORE MILKING ON MILK PRODUCTION, SOMATIC CELLS COUNT AND FAT CONTENTS IN MILK OF NILI-RAVI BUFFALOES**

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**Keywords:** *buffalo, oxytocin, milk production, somatic cells count, fat*

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**FT-52**

### **ABSTRACT**

The present project was escorted to determine the effect of oxytocin administration before milking on milk production, somatic cells count and fat contents in milk of Nili-Ravi buffaloes. The research was accompanied during July to September 2011 at Buffalo Research Institute, Pattoki, District Kasur. Twenty lactating Nili-Ravi buffaloes were randomly divided into two groups. Group A (n = 10) buffaloes were treated intramuscularly with 30 IU of oxytocin daily before the start of milking for the period of 7 days, whereas group B (n = 10) buffaloes were given no treatment and served as control. Milk samples were collected from all buffaloes 7 days before (Phase I), during (Phase II) and 7 days after (Phase III) the treatment for the determination of milk production, somatic cell count and fat percentage. There were non-significant ( $P > 0.05$ ) differences in mean milk production between group A and B during phase-I and III whereas significantly higher ( $P < 0.05$ ) milk production was recorded during phase-II in group A buffaloes in comparison with group B. Somatic cells count varied from 72.96 to 97.01  $\times 10^3$  and 71.86 to 77.14  $\times 10^3$  cells per ml in group A and B, respectively. Mean somatic cells count were significantly higher ( $P < 0.05$ ) in group A as compared to group B during phases II of study whereas there were non-significant difference in somatic cells count between group A and B during phase-I and II. The mean fat percentage ranged 5.36-5.39 and 5.34-5.39 in group A and B buffaloes. During phase I, II and III, there were non-significant differences ( $P > 0.05$ ) in fat percentage between two groups of buffaloes. It was clinched that somatic cell count in milk of Nili-Ravi buffalo were affected by oxytocin injection before milking whereas there was no effect of oxytocin on fat percentage in milk and milk production.

## **CHALLENGES OF MEAT PRODUCTION & TECHNOLOGY IN PAKISTAN**

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**Keywords:** *meat, production, technology*

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**FT-53**

### **ABSTRACT**

Pakistan has not been able to effectively apply a systematic approach for meat production and the predominantly agriculture country stands far away in meat sufficiency. While the main functional use of our cattle and buffalo has been for milk and as draft purposes. Pakistan possesses all types of animals except pigs. Lamb, sheep and goat meat is popular in this order but the price hikes in sheep & goat meat is changing the priority towards comparatively cheaper beef. The ruthless middleman system of live animal trade in the country is and has been an impediment to meat animal production. It prevents the animal raisers from justified compensation of their efforts and inputs. Govt. has neither been unable to break the monopoly of wholesale dealers in markets nor provide an alternate system so far. Insufficient feed supply is another important impediment towards improved stocks. Buffalo, a dual purpose animal in the subcontinent, holds high potential for the future meat and milk supply of the region. Regulatory control & prevention of a large number of buffalo calves slaughter can add significant amount to our national meat supply. Some scientific studies have shown that buffalo meat (beeflo) has better and preferable meat quality parameters as compared to beef. Tenderness, leanness and marbling get better scores for beeflo than beef at the same age & under similar conditions. On the other hand milk potential of our buffalo breeds in terms of quality and quantity is already well established. So, there is strong and dire need to deeply investigate this under-researched dual purpose animal. Pakistan needs to develop its meat production, meat science and technology on modern scientific & hygienic lines. Public awareness needs up-gradation regarding nutrition, balanced diet and the importance of animal proteins in the diet for different age groups. Another important area is graduate and post-graduate education and training and curricula development in the field of livestock products technology with special reference to meat technology. Meat eating habits and our typical cooking practices (curry making) need scientific evaluation. There is much more emphasis laid on dairy products & projects as compared to meat in our public and private sector policies which needs balancing. Development and implementation of national and international Halal Food Standards, specially for trade in meat and meat products, in the light of WTO / SPS would improve regional & global Halal meat trade as well as meat production.

## **EVALUATION OF MICROBIOLOGICAL QUALITY OF BOILED AND RAW MILK SOLD IN THE MARKETS OF BAHAWALPUR**

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**Key words:** *Coliform, E. coli, Indicator microorganisms, microbial quality, Total Aerobic Count*

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**FT-54**

### **ABSTRACT**

Total aerobic count, Coliform count and E. coli count are used as indicators of poor quality of milk and meat. The present study was conducted to evaluate if chilled raw milk contains less bacterial count, marker bacterial count than boiled milk sold in the markets of Bahawalpur City. This was achieved by doing Total Bacterial Count (Total Microscopic Count), Colony forming Unit (CFU) Count (Total Aerobic Count, TAC) and Coliform Count. A total of 50 samples (250 ml.) were taken from 10 milk shops selling milk, from 6 shops selling raw milk (30 Samples) and 4 shops selling boiled milk (20 Samples). Both categories were investigated to evaluate in the month of December. The results obtained were surprising in fact an eye opener. All samples from the raw milk yielded 100,000 cfu/ml and a coliform count exceeding 3,000 colicount/ml. Total Microscopic count yield the approximately no significant variation to the previous data. Boiled milk on the other hand yielded significantly lower 5,000 cfu/ml and colicount less than 20 colicount/ml of milk. Consumers should in fact find a lot of difference between the raw milk sold in the market and boiled milk sold in the market.



## **PRESERVATION OF FRESH BUFFALO MILK BY ACTIVATION LACTOPEROXIDASE SYSTEM**

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**Key words:** Milk, buffalo, dairy production, lactoperoxidase system, preservation

**FT-55**

### **ABSTRACT**

The aim of this study was to study the preservation of buffalo raw milk by the activation of their natural lactoperoxidase system to extend its shelf life at different temperatures. Milk samples treated with equal concentration of sodium thiocyanate ions and hydrogen peroxide ranging from 10, 20 and 30 ppm and stored at 35, 40 and 45 °C. A total of 30 fresh raw milk samples from buffalo were used for the present study. For each treatment group, 10 raw milk samples at different temperatures were used for acidity, pH, clot on boiling test, alcohol test, methylene blue reduction and thiocyanate values. Each test was performed from 0 to 9 hours with an interval of three hours except thiocyanate values, which was recorded initially and at curdling. Acidity percentage was analyzed at 35°C for 0h, 3h, 6h and 9h. At 6h and 9h, all the combinations were significantly ( $P<0.01$  and  $P<0.001$ ) different, except 0ppm versus 10ppm at 9 h. At 40°C for 0h, 3h, 6h and 9h, all the combinations were significantly different at 0h and 3h except 20ppm versus 30ppm. The remaining combinations were significantly ( $P<0.01$  and  $P<0.001$ ) different. pH, were significantly ( $P<0.05$ ) different at 0h between 0ppm versus 30ppm, 10ppm versus 20ppm; at 3h, 20ppm versus 30ppm; at 6h and 9h all the combinations. The remaining combinations were highly significant ( $P<0.01$  and  $P<0.001$ ) from each other. Thiocyanate at 35°C, 40°C and 45°C there was significant difference ( $P<0.01$ ,  $P<0.001$ ) at all the stages except at 10ppm and 30ppm at 35°C. Clot on boiling test at 35°C and 40°C, 10ppm and 30ppm at 3rd h, and 20ppm COB started positive at 4<sup>th</sup> h. Alcohol test of the samples were positive for control and 10ppm at 6h and for 20ppm at 7h respectively. At 40°C, for 10ppm, 20ppm and control the positive reaction started at 3rd h. At 45°C, the reaction were positive at 1st h for control, at 3rd h for 10ppm and at 6th h for 20ppm and at 8th h for 30ppm. Methylene blue reduction test of the control samples were positive at 3rd h. At 35°C, for 10ppm, 20ppm and 30ppm positive reaction started at 5th h, 7th h and 7th h respectively. At 40°C, for 10ppm, 20ppm and 30ppm positive reaction started at 1st h, 2nd h and 2nd h respectively. And at 45°C, for 10ppm, 20ppm and 30ppm positive reaction started at 2nd h, 5th h and 6th h respectively. Milk samples stabilized with 30 ppm were acceptable up to nine hours as compared to control which curdled within seven hours post milking. In Pakistan preservation of buffalo raw milk can be carried out by its lactoperoxidase enzyme system, which helps in collection of milk of high quality from widely scattered remote areas.

## PRODUCTION AND PROPERTIES OF RENNET FROM BUFFALO CALVES ABOMASA

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**Keywords:** *Rennet, Calf, Abomasa, Chymosin, Clotting activity*

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### ABSTRACT

Present study was planned to produce and evaluate liquid rennet from buffalo calves abomasa. Total 30 abomasa out of which 20 collected samples were selected for the study and analyzed for proteolytic activity, clotting activity, productivity, shelf life, pH and sensory evaluation. Non protein nitrogen (NPN) contents of rennet coagulated milk ( $1.33 \pm 0.02\%$ ) was significantly higher ( $P < 0.01$ ) than that of raw milk ( $0.25 \pm 0.001\%$ ) indicating the significant proteolytic activity of rennet. Clotting activity (per unit volume) of group A abomasa ( $22437 \pm 1593.60$ ) was higher than that of group B abomasa ( $9948.10 \pm 647.74$ ). Curd yielded by fresh laboratory made rennet (LMR) ( $32.2 \pm 0.24\%$ ) was significantly higher ( $P < 0.01$ ) than that of stored LMR ( $29.3 \pm 0.11\%$ ) and commercial rennet ( $28.20 \pm 0.13\%$ ). All the rennet samples were active up to 3 months storage, whilst 15% samples became inactive after 6 months storage periods. Strength (per unit volume) of fresh LMR was comparatively high ( $17256 \pm 1599.40$ ) and decreased gradually with the period of time i.e. 3m stored rennet ( $12430 \pm 1167.90$ ) and 6m stored rennet ( $7106.8 \pm 539.78$ ). Clotting activity of LMR on buffalo milk ( $14716 \pm 3911.70$ ) was found to be non significant ( $P > 0.05$ ) than that of cow milk ( $11014 \pm 2507.80$ ). pH value of stored LMR ( $5.75 \pm 0.02$ ) was significantly higher ( $P < 0.01$ ) than that of fresh LMR ( $5.47 \pm 0.02$ ) with the period of time. Scores rated for appearance ( $4.06 \pm 0.001$ ) and odor ( $4.22 \pm 0.01$ ) of fresh rennet were significantly different ( $P < 0.05$ ) from that of stored rennet ( $3.55 \pm 0.0004$  and  $4.07 \pm 0.001$ , respectively). While there were no significant different ( $P > 0.05$ ) in the score of color intensity of fresh ( $3.93 \pm 0.02$ ) and stored rennet ( $3.88 \pm 0.02$ ). It was concluded from the study that liquid rennet can be prepared at local level with adequate clotting activity, better productivity and reasonable shelf life.

## **CHANGES IN MILK FAT PERCENTAGE WITH ADVANCEMENT IN PREGNANCY AND LACTATION**

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***Keywords:*** *Milk fat percentage, Pregnancy, Lactation and Pakistani breeds of livestock*

**FT-57**

### **ABSTRACT**

Thirty five dairy animals were selected at Livestock Research and Development Station Surezai Peshawar from various species, Nili Ravi and Azakheli buffalo, Sahiwal, Cross (Sahiwal and HF), and Achai breed of cattle, Hashtnagri sheep and Beetal goats. Experimental animals were selected within 3<sup>rd</sup> to 4<sup>th</sup> parity. Four milk samples were collected from each selected animal at weekly interval. Each sampling comprised collection of 100 ml milk at morning and evening according to the prevailing milking practice. Milk fat percentage was significantly affected by stage of pregnancy ( $P < 0.01$ ). In Nili Ravi buffalo Achai and Cross bred cattle the highest milk fat percentage (6.68, 3.63 and 5.82 respectively) was found in non pregnant lactating stage. In Sahiwal breed cattle and Beetal goat the highest fat percentage (5.84 and 7.30  $R^2$  0.30 and 0.96) was found in non pregnant lactating stage. In Nili Ravi buffalo Achai and Cross bred cattle the milk fat percentage was significantly ( $P < 0.05$ ) increased with advance in pregnancy and lactation. The breed effect on milk fat percentage was highly significant ( $P < 0.01$ ). The highest level of milk fat percentage was found in Azakheli buffaloes (6.94%) followed by Beetal goats (6.2%). The mean fat percentage of Nili Ravi buffaloes, Sahiwal, Cross F1 and Friesian cattle were (5.79, 4.5 and 4.9 % respectively). While lowest fat percentage was found in milk of Achai breed cattle (3.02%).

## FERMENTED DAIRY PRODUCTS IN BANGLADESH

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**Keywords:** *food, fermentation, animal products, Bangladesh*

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FT-58

### ABSTRACT

Fermented foods, exclusively and traditionally prepared from milk or its byproducts, are very popular in Bangladesh. Almost all of these foods are functional in nature. Among these functional fermented products like dahi, lassi, matha, borhani, acidophilus milk, fermented whey drinks and cheese are noteworthy. These products are widely manufactured throughout the Bangladesh. Out of the entire fermented products available, people of all classes and age prefer dahi (usually sweet curd) either as a part of the daily diet or as a refreshing dessert. Dahi is prepared by using a mixed culture of *Streptococcus lactis*, *Streptococcus thermophilus*, *Streptococcus cremoris*, *Lactobacillus bulgaricus*, and *Lactobacillus plantarum*. Nutritionally, dahi is nearly complete food since it is made from milk and additional nutritional feature also formed due to use of *Streptococcus* and *Lactobacillus* organisms. The metabolic product of these organisms also plays beneficial role in different health aspects like blood pressure, cholesterol content and antimutagenicity. Lassi, a refreshing beverage made from sweet curd, sugar syrup and rose flavour, is liked by all especially during summer when served with ice. Matha which is prepared from butter milk and sour in taste; a little amount, 0.5% salt may be added to increase the palatability. Borhani is prepared from sour dahi to which various spices are added to give a spicy flavour. Acidophilus milk and fermented whey drinks are new additions to the industry. Cheese, in the name of the “Dhaka cheese”, is sold in different cities of Bangladesh. Four per cent of the total milk production is used to prepare dahi and 10% of the milk used for the production of all other fermented products, but the amount of milk used for various dairy products is gradually increasing.

## QUALITY ASSESSMENT OF DIFFERENT COMMERCIAL AND SMALL-SCALE PRODUCED YOGHURT MARKETED IN FAISALABAD, PAKISTAN

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**Keywords:** *Physicochemical, Microbiological, Yoghurt, Commercial market*

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### ABSTRACT

Yoghurt is one of the oldest products, tremendously popular food in Europe, Asia and Africa. Yoghurt is derived from milk; it provides protein, calcium and other minerals, and a range of vitamins. The present study was concerned with the physicochemical and microbiological analysis of commercially available yogurt samples obtained from different localities of Faisalabad. The two branded and three unbranded yoghurts were collected. The data obtained was analysed using complete randomized design (1-factor factorial) and comparison of means was done by Duncan's multiple range tests. The viability of coliform was found more in unbranded than branded. The viability of *S. thermophilus* was much more in branded than unbranded while the viability of *L. bulgaricus* found only in unbranded. The fat, lactose and total solids were lower in unbranded than branded. Acidity and Syneresis value of branded were low as compare to branded. The result showed that only branded yoghurt fulfilled the quality criteria and better for human health.

## ADULTERATION AND QUALITY OF MILK SUPPLIED TO CANTEENS OF VARIOUS EDUCATIONAL INSTITUTES IN FAISALABAD CITY

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**Keywords:** *Adulteration, Quality, Milk, Educational Institutes, Faisalabad*

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FT-60

### ABSTRACT

Detection of adulterants, chemical composition and hygienic status of the samples of milk marketed at the canteens of various educational institutes located in the city of Faisalabad were determined using the standard techniques. The results indicated that water was added to 96.66% samples. While 63.33, 23.33 and 86.66 percent samples were found adulterated with urea, formalin and cane sugar. No sample was found to be adulterated with starch, hydrogen peroxide, detergents and oil. The result depicted that samples analysed did not conform legal standard, had poor physical appearance and adulterated with chemicals injurious to health. The following percent values for the major constituents of physical examination were observed: 33.33% samples were clear while 66.66% samples showed presence of dirt; 33.33 % samples showed normal, 60% very mild, 6.66% cowey odor; 80% samples showed normal milk white, 13.33% light yellow, 6.66% bloody color; 20% samples had normal while 80% showed thin consistency; 30% had no sediment while 70% showed sediments. The tests carried out for evaluating the chemical composition and physical property of the milk samples showed the following mean values: Protein%,  $1.12 \pm 0.09$ ; Fat%,  $2.06 \pm 0.11$ ; Solid-not-fat,  $5.10 \pm 0.17$ ; Total solids,  $7.18 \pm 0.27$ ; % Acidity,  $0.07 \pm 0.00$  and average Specific gravity,  $1.01 \pm 0.00$ . The test for assessing the hygienic quality showed the following results: The time for the reduction of Methylene blue dye in milk samples 0-2 Hours, 3.33 %; 2-6 Hours, 26.66 %; 6-8 Hours, 23.33 %; Over 8 Hours, 46.66 %.

## CHEMICAL COMPOSITION, HYGIENIC STATUS AND ADULTERANT FOUND IN MILK AVAILABLE AT CANTEENS OF VARIOUS PUBLIC PLACES IN FAISALABAD CITY

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**Keywords:** *Chemical Composition, Hygienic Status, Adulterant, Milk, Public Places, Faisalabad*

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FT-61

### ABSTRACT

The samples of milk marketed at the canteens of various public places located in the city of Faisalabad were analysed to determine the physical examination, chemical composition, hygienic status and adulteration using the standard techniques. General appearance showed that 66.66% samples had presence of dirt; 33.33 % samples showed normal, 63.33% very mild, 3.33% cowey odour; 100% samples showed white normal colour; test showed 86.66% samples had thin consistency and 66.66% had sediments in it. The tests carried out for evaluating the chemical composition and physical property of the milk samples revealed the following mean values: Protein%,  $1.33\pm 0.24$ ; Fat%,  $1.40\pm 0.15$ ; Solid-not-fat,  $4.77\pm 0.58$ ; Total solids,  $6.17\pm 0.68$ ; % Acidity,  $0.07\pm 0.00$  and average Specific gravity,  $1.01\pm 0.00$ . The test for assessing the hygienic quality showed the following results: reduction of methylene blue dye took zero to two hours in 16.66% samples; 2-6 hours in 10%; 6-8 hours in 16.66% and over 8 hours in 56.66% samples. The tests carried out for the detection of various adulterants showed that water, urea, formalin, hydrogen peroxide and cane sugar had been added to 93.33, 86.66, 26.66, 3.33 and 100 percent samples of milk, respectively. No sample was found to be adulterated with starch, detergent and oil. The results suggest that milk sold at these canteens is extensively put to adulterations and malpractices such as skimming that are probably carries out during the handling of milk starting from milking till it reaches the consumers. Such malpractices resulted in not only deteriorating the milk quality and low nutrients but also had a potential threat to human health.

## EFFECT OF BREEDS, PHYSIOLOGICAL STATES AND STORAGE CONDITIONS ON MILK FAT IN DAIRY ANIMALS

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**Keywords:** *dairy animal, breed, milk fat*

FT-62

### ABSTRACT

Milk is very valuable food substance as it contains all the essential food constituents, viz. proteins, carbohydrates, fats, and vitamins in addition to a considerable percentage of minerals. Important component of milk next to protein is fat, either freely available in globular form or complex form of lipoproteins. The present study was conducted in Dairy Technology Center at Livestock Research and Development Station Surezai, Peshawar. 100 ml milk samples were collected from 35 animals; five animals each from two breeds of buffaloes (Nili Ravi and Azakheli), three breeds of cattle (Crossbred, Sahiwal and Achai), one breed from goats (Beetal) and Sheep (Hashtnagri). The experimental animals fell within 3rd to 4<sup>th</sup> parity. The experimental animals comprised Non pregnant lactating (NPL), Early pregnant Lactating (EPL), Mid pregnant lactating (MPL) and advance pregnant (AP). Four milk samples were collected from each selected animal at weekly interval. The milk samples were processed as per standard protocol for the estimation of milk fat percentage through Gerber method. The breed effect on milk fat percentage was highly significant ( $P < 0.01$ ), being highest in Azakheli buffalo (6.94%) followed by Beetal goats (6.2%), and lower levels in Nili Ravi buffalos, Sahiwal, Crossbred (F1) and Friesian cattle (5.79, 4.5, 4.9 and 4.57 % respectively). The fat percentage in milk of Achai cattle was 3.03%. Pregnancy and lactation affected milk fat percentage significantly ( $P < 0.01$ ), the highest being in NPL animal (5.34 %). It was concluded that Azakheli buffalo and Beetal goats possessed the highest level of milk fat. In Nili Ravi buffalo, Achai and Crossbred cattle the highest milk fat percentage (6.68, 3.63 and 5.82 respectively) was found in NPL group and it increased with the advancement in pregnancy and lactation. In Azakheli buffalo, the fat percentage was decreased with advancement of lactation and pregnancy ( $R^2 0.19$ ).



## RELATIONSHIP OF BLOOD METABOLITES WITH MILK FATTY ACID COMPOSITION IN DAIRY BUFFALOES

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**Keywords:** *blood metabolites, milk fat, buffalo*

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FT-63

### ABSTRACT

The blood metabolites concentration determines the animal energy status. Milk synthesis is influenced by the flow of substrates from the blood circulation to the mammary tissues. The present study was conducted to investigate changes in milk yield and fatty acids profile in relation to blood metabolites with advancing age. A total of 12 multiparous lactating dairy buffaloes were selected from military dairy farm, located in Peshawar. The animals were kept in uniform management conditions. All the buffaloes were stall fed and green fodders were provided ad libitum and concentrate mixture at the scale of 1 kg/2L of milk production. The animals were divided into two groups younger (1-4 lactation number) and mature (8-10 lactation number) having six animals in each, which were further subdivided into early (1-3 months) and late (7-10 months) of lactation stage. The experiment continued for six weeks starting from 1st week of November upto 2<sup>nd</sup> week of December 2009. A total of 72 milk and blood samples were weekly collected for analysis of blood triglyceride and milk fatty acids profile. The fatty acid methyl esters (FAMES) were determined using gas chromatograph mass spectrometer (GCMS). Concentration of triglyceride and glucose were higher in elder group compared with younger ones. Saturated fatty acid (SFA) has the highest concentration out of the total milk fatty acids and was averaged about 70.41g/100g ranging from 64.96 to 78.83g/100g. Within SFA the highest concentration was of C16:0 (31.24g/100g) followed by C14:0 (12.02g/100g) and C18:0 (11.43g/100g). The sum of three hypercholesteremic fatty acids (HCFA C12:0, C14:0 and C16:0) was 45.79g/100g. The average concentration of unsaturated fatty acids (UFA) was 35.04g/100g varying from 21.17 to 29.59g/100g. The concentration of SFA as well as HCFA were significantly higher in elder buffaloes (71.91g/100g and 48.11g/100g, respectively) compared with younger ones (68.94g/100g and 45.47g/100g, respectively). The UFA and cardioprotective fatty acids were higher in younger animals as compared with mature. It was concluded that the younger animals at early lactation stage has produced healthier milk.

## PROMPT COMMUNITY BASED VETERINARY SERVICES DELIVERY SYSTEM AND ITS IMPACT ON DISEASE BURDEN AND PRODUCTION IN THE DAIRY ANIMALS

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**Keywords:** *Epidemiology; services; dairy production; animal health*

LD-64

### ABSTRACT

The lack of animal health services is a major hindrance in control of livestock diseases in Pakistan. Consequently decreased production is a major factor in poverty alleviation in a developing country like Pakistan where small livestock owners are the backbone of agriculture. The present study is therefore designed to evaluate the effectiveness/efficiency of an alternative model of animal health services delivery system through community participation which will ultimately help in reducing disease burden and consequently increase livestock production. For this purpose two concurrently working veterinary services delivery systems i.e. conventional government based system and community based system were compared in terms of services delivery, epidemiological parameters and cost-benefit ratio of an average farmer for a period of one year from July, 2005 through June, 2006 in peri urban areas of central Punjab. It was noted that community based system has significant impact ( $P < 0.05$ ) on epidemiological parameters (incidence rate, mortality rate and fertility rate), services delivery (vaccination, deworming, treatment & nutritional support) and cost-benefit ratio of an average farmer as compared to government based system. There was 50% decrease in incidence rate of economically important diseases in community based system as compared to government based system which was 16.75% & 36.43% respectively. Similarly the mortality rate in community based system was 0.65% less than the conventional government based system which was 3.53% & 4.18% respectively. An improvement of 12% in fertility rate was observed in community based system as compared to government based system which was 63% and 51% respectively. The average annual cost-benefit ratio per farmer was almost double than government based system. The delivery of services was much better in community based system as compared to government based system. From the present study it is concluded that community based veterinary services delivery system is helpful in reducing disease burden and will consequently boost the agricultural economy by increasing livestock production if replicated through out the country.

**Performance of crossbred cows in the province of Balochistan, Pakistan**

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*Key words: artificial insemination, crossbred, diseases, cows, Balochistan, Pakistan*

LD-65

**Abstract**

Balochistan province is rich in cattle varieties; its climate also favors the imported breed especially in the cold region. Since the imported breed of the cattle Holstein Friesian came in the province many of the dairy farmers took advantage and crossed their existing cattle in order to improve the milk production. Since the farmer is quite unfamiliar whether this cross breeding have an impact over the reproductive performance of their animals keeping the environmental, nutritional and other factors. Therefore this study was designed to evaluate the present status of artificial insemination and its reproductive performance in crossbred cows in the province of Balochistan. Conventional economic evaluations of crossbreeding programmes have overestimated their benefits by ignoring subsidies, the increased costs of management such as veterinary support services, and the higher levels of risk and socio-environmental costs associated with the loss of the indigenous genotypes. The data from the all over the province has been collected. The sample was so collected randomly from different dairy farms where mostly crossbred animal were used for dairying purposes. The data was statistically analyzed. The parameter was fixed by obtaining the sample from the already existing data of the livestock department. This data was used as inferential to that which was collected randomly to testify the hypothesis. Results suggest that crossbreeding has had a positive impact on Balochistan society's welfare, although taking into account important social cost components substantially lowers the net benefits. Farm-level performance is, however, little improved under certain production systems by replacing the indigenous zebu with exotic breeds.

## **VARIATION IN MILK PRICES AT COLLECTION AND RETAILER SHOPS IN BAHAWALPUR**

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**Keywords:** *Milk Retailer, Milk Sale, Milk economics, Bahawalpur City*

**LD-66**

### **ABSTRACT**

Milk is a complete diet and is taken in daily routine by all ages, alike. Human race has been utilizing Milk since the dawn of domestication. As the advent of civilization groomed the trade of milk has also improved. Bahawalpur City has a unique trend for milk retailers. It is observed that milk is sold at large in shops after boiling. This hot milk is not only free from bacterial count but also more nutritious. The only dilemma is that the buffalo and cow milk is mixed with goat milk. The present study embarks on the journey to highlight the socioeconomic status of milk retailers in the Bahawalpur City. For this the Bahawalpur was divided into main four segments. Model Town A & B, Satellite Town, Farid Gate and Model Town C. The economic data was procured based on a specially designed proforma. It was observed that the onset of 2011 saw an increase in the price of milk to Rs. 45.00/Liter due to an increase in the procurement price of Rs. 38.00/Liter. Goat milk retailers remained fixed to a selling price of Rs. 35.00/liter with an non increase in the procurement price of Rs. 25.00/liter of milk. On an average daily milk sale of 100 Liters is more common with an estimated profit of Rs. 700.00/day. The goat retailers generate a higher profit ratio of Rs. 10/liter but a lower average sale of 25-50 liters, yielding a total profit of Rs. 250-500/Day. The study further elaborates the different shop costs and expenses which lower the profitability of the dairy retailer.

## **PROBLEMS OF DAIRY FARMING IN CHOLISTAN**

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**Keywords:** *Cholistan, Cholistani cow, Nomads, Milk, Daily Income.*

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**LD-67**

### **ABSTRACT**

The Cholistan Desert, once a prosperous, lively, and thriving jungle is now by and large a desolated piece of land. Its productivity potential is on the decline despite the fact that the number of animals in this desert is on the increase. This sandy desert is situated in the southern part of Punjab with highly saline soils and a brackish subsoil aquifer. It supports a human population of 110,000 pastoral nomads depending exclusively upon livestock for their livelihood. Milk is the most nutritious constituent of their food and main source of daily income. It is natural habitat of Cholistani cow, which is considered to be the ancestor of Sahiwal cow, have a great potential for milk production. Cholistani cow on an average is capable of producing 1,000 liters of milk per annum and if improvement plans are implemented, this average can be enhanced up to 1,700-1,800 liters per annum, but still the milk production of this area is very less. A long list of problem account for this, which are unplanned breeding, use of inferior bulls for breeding, lack of infrastructure, Informal production, lack of milk collection chain, involvement of middle man, improper methods for preservation of milk, unavailability of market, inadequate feed resources, epidemics of infectious diseases, low investment and less interest of authorities, limited credit availability, seasonality, high temperature, lack of co-operation between local farmers. All these problems can be solved by proper planning by government and by developing interest of private stake holders in this region.

## **PERFORMANCE PROFILE OF FRIESIAN COWS KEPT IN BALOCHISTAN, PAKISTAN**

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Key words: Friesian, Holstein, cow, performance, sex ratio, Balochistan, Pakistan

**LD-68**

### **ABSTRACT**

Holstein-Friesian heifers were imported from Denmark in 1977 by Balochistan Govt. to meet the milk demand of the province. The study was planned to see their potentials in productive [age at first calving, birth weight, lactation length or milk yield, milk yield per lactation, culling and mortality etc] and reproductive performance [service period, age at first service, gestation period and calving interval etc.]. Profiles of these animals kept under the local conditions of Balochistan. Overall average values for AFS were 660.42±12.42d, GP 280.62±0.25d, AFC 944.08±12.71d, BWT 30.12±0.15kg, MY 3731.26±40.52 liters, DIM were 313.56±3.83d, SP 240±9.61d, DP averaged as 59.15±20.61 d while CI 451.10±5.55d. The effect of year, season, age and location were studied and the results revealed that the year affected the AFS, AFC, BWT, Middle and SP (P<0.01); GP (P<0.05) but not DIM and CI (P>0.05). No effect of season on AFS, AFC, DIM, MY, SP and CI (P>0.05) was observed except GP and BWT (P<0.05). The age affected the GP and SP (P<0.05) but not on BWT, DIM, MY and CI (P>0.05). No effect of sex of the calves, type of birth and calving number on GP (P>0.05) was seen. Location of the farm did exert effect on AFS, AFC, BWT and MY (P<0.01), CI (P<0.05) but on GP, DIM and SP (P>0.05). Based on the results of the study, efficient and proper management demands that we take care all the productive and reproductive parameters of these animals for improved production.

## **AZIKHELI BUFFALO: PRODUCTIVE PERFORMANCE UNDER TRADITIONAL MANAGEMENT SYSTEM**

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**Keywords:** *Azikheli buffalo, indigenous breed, mountainous climate adaptation, productive performance, 305-day milk yield, Parity*

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**LD-69**

### **ABSTRACT**

Buffaloes are generally considered suitable for hot, humid and gentle riverside climates. However, in the semi-arid Hindukush Mountains the pastoral communities retain a yet un-documented buffalo breed called Azikheli. The home tract of the breed is Swat valley in Northern Pakistan. The breed is well adapted to mountainous terrain and transhumance. In comparison to other buffalo breeds of Pakistan, Azikheli has a shorter stature and the breed is known for its persistent milk production. Mean 305-day milk yield recorded was 2494.02±52.44 liters. Significant effect of parity was observed on mean 305-day milk yield with higher milk production in second (P<0.001) and third parity (P<0.001) in comparison to first parity. No significant effect of calving season was observed on 305-day milk yield.

## INFLUENCE OF NON-GENETIC FACTORS ON QUANTITY AND QUALITY OF WOOL FROM SHEEP REARED AT RAWLAKOT AZAD JAMMU & KASHMIR

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**Keywords:** Sheep, Rawalakot, Non-Genetic Factors, Fleece yield, Staple length

LD-70

### ABSTRACT

The data on body weight and greasy wool yield was collected from 35 animals maintained in the HEC-sponsored project at Faculty Experimental Farm, during July, 2007 to July, 2009. The animals were weighed in the first week of each month and shorn annually in March. The wool samples were collected from different parts of body and analyzed for various parameters at NARC wool laboratory, Islamabad. The least squares means for annual greasy fleece yield, staple length, fiber diameter, medullation, clean yield percent, clean wool yield and wool bulk were 2.28±0.20 kg, 7.66±0.44cm, 26.23±0.60 percent, 69.67±2.34 percent, 1.59±0.14 kg cm<sup>3</sup>/gm, respectively. The analysis of variance revealed that the years of shearing and breed were the significant (P<0.05) sources of variation for greasy fleece yield, however, sex showed non significant difference. The least squares means for greasy fleece yield was 2.29±0.10 kg 2.84±0.91 and 2.34±0.09,kg during 2007, 2008 and 2009, respectively. However, least squares means for Crossbred, Poonchi and Rambouillet genotype was 2.19±0.08, 1.92±0.12 and 2.36±0.091kg, respectively. The annual greasy fleece yield was 2.15±0.135 and 2.17±0.05 kg in male and female lambs, respectively. The differences due to year of shearing was significant (P<0.05), however, sex and breed were non significant for staple length. Least squares means for staple length (cm) during the study period (2007-09) was 8.75±0.58, 7.75±0.53 and 9.46±0.53 cm, however, 8.88±0.05, 7.89±0.67 and 9.00±0.48 cm, for Crossbred, Poonchi and Rambouillet genotypes, respectively. Males produced more staple length (9.01±0.78 cm) when compared with female lambs (8.09±0.29 cm). Least squares means for fiber diameter and medullation were 27.47±0.09, 26.77±0.65, 27.06±0.65 micron and 6.40±1.28, 5.77±1.17, 5.89±1.17 percent during 2007 through 2009, respectively. However, least squares means for Crossbred, Poonchi and Rambouillet sheep were 26.36±0.83, 27.93±0.58 and 20.02±0.65 cm and 3.08±1.49, 8.89±1.05 and 6.09±1.17 percent respectively. There was an over all improvement in greasy wool yield in crossbred lambs over that of the local Poonchi sheep. Crossing of local sheep with exotic Rambouillet results in the over all improvement in wool quality. However, it was recommended that the estimated environmental effects are important and needs more extensive study on a large volume of data. The base for this purpose has been established to study the magnitude of genetic and non genetic factors for improvement and planning in sheep breeding in future.



## **ROLE OF WOMEN IN LIVESTOCK AND DAIRY DEVELOPMENT IN BALOCHISTAN, PAKISTAN**

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**Key words:** Women, cow, buffalo, milk, dairy production, livestock, Balochistan

**LD-71**

### **ABSTRACT**

Livestock is a very important sector of economy of Balochistan. It is the main source of income for nomadic families specially. They involve their women and children in the rearing of livestock. Women take care of feeding the livestock, cleaning the abodes, and even in providing traditional cures from diseases. They are further involved in milking and milk processing, poultry, and egg selling. Women have a significant role in the development of livestock in Balochistan. They are engaged in almost all sorts of activities pertaining to livestock in the province. Since livestock plays major part in agriculture sector, its role can be enlarged when women are allowed to participate commercially in this field. Hence, training and development may be the first drop of water towards agriculture base economy and the consequences will be positive in terms of prosperity of the people specially living in this province. Balochistan constitutes two significant belts in terms of cast of tribe, Baloch and Pashtoon belt. Women, living in Baloch belt, are more active and agile to part her share in handling the livestock herds. On the other hand, women who are residing in Pashtoon belt can only take part fewer activities of livestock, which is within the boundary walls of house. But still their role in livestock's handling is noticeable. There is acute need to give them proper training regarding the livestock management. Interestingly, livestock business can easily be managed by small, young, old, at home and margin of profit is very high as compare to crop cultivation. More importantly, women can manage them indigenously at home as the do the other chores at home. The extent to which women have access to the benefits of livestock depends on men's approval. Role which women play in livestock marketing is best addressed by improving their access to livestock development activities in general. Increasing women's involvement in livestock development activities could be encouraged by making training and activities directly available to women instead of expecting knowledge to trickle down to them from men. This paper is an attempt to highlight the role of women especially focusing the present livestock production systems in Balochistan.

## **PROSPECTS AND LIMITATIONS OF DAIRYING IN GUJRANWALA DISTRICT (PUNJAB-PAKISTAN)**

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**Keywords:** *Epidemiology, milk production, disease load, management*

**LD-72**

### **ABSTRACT**

A survey study involving 120 respondents of different categories from district Gujranwala (Punjab-Pakistan) was conducted to investigate the trends in dairying. Average milk production of cows and buffaloes was found to be 4.50 and 6.53 lit./day respectively. Milk is mostly (98.3%) consumed and marketed to milk collector in raw form @Rs. 28.25 / lit. Combined animal feeding was the common practice with no special allowance for high yielder. Average green fodder offered to lactating cows and buffaloes was found to be 43.49  $\pm$ 2.67 and 59.03  $\pm$ 1.39 kg/head/day, whereas corresponding values for dry cows and buffaloes were 26.46  $\pm$ 2.13 and 39.48  $\pm$ 1.58 kg/day, respectively. Lactating animals were preferred for concentrate feeding i.e 1.84  $\pm$ 0.221 and 2.13  $\pm$ 0.216 kg/head/day respectively. Animals are vaccinated mainly against foot and mouth disease and haemorrhagic septicaemia. Average cost of milk production was found to be Rs.19.21 /lit. Disinfection of the naval cord, dehorning (in cows), natural breeding, teat dipping, washing of udder and culling, and adoption level was 8.3, 25.8, 51.7, 20.8, 74 and 61.7% respectively. Special feeding of dairy animals before calving was also reported by 41.7 % respondents. Record keeping was utterly lacking (91.7 %). Age at first breeding, age at first calving, lactation length, dry period, calving interval and productive life in case of buffaloes was 40.87 $\pm$ 0.43, 52.48 $\pm$ 0.48, 10.66 $\pm$ 0.085, 4.35 $\pm$ 0.051, 15.13 $\pm$ 0.18 months and 9.22  $\pm$  0.18 years respectively while in case of cattle were 29.11 $\pm$ 1.280, 43.20 $\pm$ 6.33, 9.12 $\pm$ 0.37, 2.56 $\pm$ 0.11, 12.50 $\pm$ 0.50 months and 8.36  $\pm$ 0.42 years respectively. It may be inferred from these results that adoption of modern husbandry practices is still grossly lacking with a variable degree. As a consequence, low productivity is a common feature, leading to very low profitability of the producer. Evidently, low productivity and profitability stem from lack of extension services by trained people.

## **A STUDY ON LIVESTOCK PRODUCTION AS AFFECTED BY DIFFERENT MANAGEMENT PRACTICES IN TEHSIL BABOZAI, DISTRICT SWAT**

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**Keywords:** *Livestock production, managerial practices, Swat*

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**LD-73**

### **ABSTRACT**

A survey study was carried out through a pre-tested questionnaire involving 135 farmers belonging to sub-urban, peri-urban and rural areas of Tehsil Babozi, district Swat. The main parameters focused upon included: socio-economic profile of farmers, production systems, farm size, category of dairy animals kept, livestock husbandry practices in vogue, gender involvement, level of farmers awareness, access to extension services and identification of constraints being faced by the farming community in various livestock production activities. Irrespective of the areas /social groups of the farmers, the average land holding was 4.75 acres. Majority of the farmers (62.92 %) own 1-5 animals/family while farmers on an average owned 6.53±0.73 animals /family. Buffaloes and cows were found in a ratio of 3.27 and 2.88, respectively. Among various feeding resources, grazing was found to be the main source practiced by 71.64 % farmers. On overall basis 85.25 % farmers offer 2.5 kg concentrate and 24 kg green fodder daily to their lactating animals. Farming was the foremost source of income among all the interviewed respondents. Natural breeding of animals was followed by 96% respondents. Only 54% farmers provide health cover to animals. Hardly 23.75 farmers have awareness about extension/improved agricultural and animal husbandry practices. Moreover, as a whole livestock related activities was mainly male dominated (66.99%). The constraints mainly faced by the respondents include: inadequate feeding resources, limited breeding facilities, lack of education, social check towards gender community, various health issues, lack of proper marketing/loaning system, primitive husbandry practices. The study inferred that implementation of the solutions towards the aforesaid problems will not only improve the dairy animals productivity but will certainly improve the socio-economic status of the farming community.

## **THE ROLE OF EXTENSION IN CHANGING THE DAIRY INDUSTRY IN PAKISTAN: A REVIEW.**

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***Keywords:*** Dairy, extension methods, drivers of change, milk production

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**LD-74**

### **ABSTRACT**

Pakistan is primarily an agricultural based country, and livestock plays a pivotal role in its economy by providing essential items of human diet in the form of milk, meat and eggs. The population of the country is nearly 180 million, and 36 million in the rural areas depend directly on the livestock and dairy sectors. Pakistan has recently been ranked as the world's third largest milk producer, with the recent growth in per capita milk production being driven by an increase in the number of dairy animals rather than by milk yield improvement. The current growth in population and increasing demand for food has created the need to produce more milk. Pakistani dairy farmers need to be aware of the key drivers of future change so that they can plan for increasing demand. This review is focused on the key factors influencing the change in the dairy industry and the role of extension in the change process. The potential for further utilization of new technologies for farmers with the assistance of dairy extension services is highlighted.

## SUB CLINICAL MASTITIS AND PREVALENCE IN BUFFALOES OF SWAT AREA

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**Key words:** buffaloes, milk. Sub clinical mastitis, SFMT, quarters, prevalence rate

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LD-75

### ABSTRACT

The present study was designed to determine animal's wise and quarter wise prevalence rate and associated microorganisms in sub clinical mastitis in buffaloes of swat area. The samples were collected from apparently mastitic free 800 quarters, of 200 buffaloes. The samples were subjected to surf field mastitis test (SFMT) and the data obtained was analyzed by Chi-Square test. Animal wise prevalence rate of sub-clinical mastitis was recorded higher in village, Kula Deer (50%), followed by Bela (48%), Takhta Band (42%) and Totano Bandai (38%) of swat district. Out of 183 positive samples the quarter wise infection was recorded as: In front quarters 58 (31.25%) right and 40 (22.00%) left teats were found positive for sub-clinical mastitis, similarly in hind quarters, 64 (35.05%) right and 21 (12.00%) left teats were also found positive. A relatively higher prevalence of bacterial mastitis was noted in hind quarters as compared to front quarters and in the same way higher prevalence in right side than left side of quarters in buffaloes. Nine bacterial species were isolated and identified from positive milk samples. The descending order of bacterial species detected was: *Staphylococcus aureus* 35.51%, *Escherichia coli* 16.39%, *Streptococcus agalactea* 14.75%, *Streptococcus dysgalactae* 7.83%, *Proteus vulgaris* 4.37, *Citrobacter* sp. 4.18%, *Streptococcus uberis* 3.82%, *Bacillus cereus* 3.27% and *Pseudomonas aeruginosa* 1.63%.

**STUDY OF THE IMPACT OF ANIMAL HUSBANDRY INSERVICE  
TRAINING INSTITUTE (AHITI) PESHAWAR, ON BUFFALOES  
PRODUCTION PERFORMANCE IN THREE DISTRICTS OF KHYBER  
PAKHTUNKHWA**

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**Key words:** Farmers, Trainings, Animal husbandry practices, Model questioner, interview, Evaluation, Buffaloes performance

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**LD-76**

**ABSTRACT**

A survey study was conducted to investigate and evaluate the impact of trainings carried out by AHITI on the overall production performance of buffaloes in three districts. Sixty farmers were randomly selected from each district and divided into four groups and each group having 15 members of farmers, without training (controlled), one week, two weeks and four weeks trainings which were considered as G-I, G-II, G-III and G-IV respectively. Ten years data were collected from one hundred and eighty farmers on different parameters like, feeding practices, de-worming frequency, health status, buffaloes performance regarding productive and reproductive traits, through a model questionnaire/ interview schedule. The data analyzed through an analysis of variance and means were compared using DMT test. Milk production was the highest ( $P<0.05$ ) in Peshawar district while de-worming frequency in Nowshera when compared with Charsadda district. Location had a significant ( $P<0.05$ ) effect on parameters studied regarding buffaloes performance, disease incidence and concentrate feeding of animals of trained farmers were higher ( $P<0.05$ ) than those untrained farmers. It was concluded from the findings of the present study that the long term training significantly increased per animal production and indirectly reduces herd size and health status improved of concerned area.

## PRODUCTION AND EVALUATION OF COMBINED OIL BASED FMD AND HS VACCINE

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**Keywords:** FMD, HS, Vaccine, business, livestock, development

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BS-77

### ABSTRACT

In Process Quality Control Factors affecting potency of Foot and Mouth Disease (FMD) virus vaccine were evaluated. These factors were immunogen titer (biological titer of sero-type “O”, “A” and “Asia-1” of FMD virus) and colony forming units of *Pasteurella multocida*, in-activants, safety and sterility tests, adjuvants and keeping quality of the vaccine. The virus serotypes were re-confirmed by using reverse transcription polymerase chain reaction (RT-PCR), serum neutralization test and indirect sandwich enzyme linked immunosorbant assay (ELISA). The biological titer of 7<sup>th</sup> passage of the serotypes on BHK-21 cell line was 10<sup>7.4</sup> mean tissue culture infective dose (TCID<sub>50</sub>) per ml. The dose of immunogen was directly proportional to the titer of complement fixing antibody titer against virus serotypes and CFU of *Pasteurella multocida* in rabbits. The culture of the virus suspension was inactivated effectively with 0.02 M binary ethylene-imine (BEI) at 37°C for 48 and bacterial suspension with 0.25 percent formaldehyde at 37°C for 12 hours. The sterility of the inactivated virus and the bacterial suspension was determined by inoculating the culture on laboratory bacteriological media. The safety of the inactivated culture was monitored by inoculating the virus suspension on monolayer of BHK-21 cell line and by injection of bacterial suspension (2 ml) in susceptible rabbits. Each microbial suspension culture thus qualified for vaccine production. The effect of the adjuvant such as aluminum hydroxide gel (AHG) and oil base-montanide ISA70 (OB) was the same in inducing immunity in rabbits. Antibody response of rabbits to both of the vaccines was better than that of lanolin based vaccine. The storage of the vaccine at 6(±2)°C for 6 months did not affect its potency to induce complement fixing antibody titer in rabbits. The studies of “*in process quality control factors*” during its production improved the quality of adjuvant containing FMD virus + HS vaccine.

**THE DEVELOPMENT OF A SIMULATION MODEL TO ANALYSE THE  
PRODUCTIVITY AND FINANCIAL VIABILITY OF DAIRY FARMS**

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**Keywords:** *Simulation model, production, finance, dairy farm*

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**BS-78**

**ABSTRACT**

This simulation model is a predictive tool, being developed for adoption in the Pakistani dairy production system. Previously Mr. Cam McDonald (CSIRO) has developed an Integrated Assessment Tool (IAT) for beef farming systems in Indonesia. The model is being fed with data collected in Pakistan to make the model more suitable for the dairy sector in Pakistan. The data collected include livestock production, livestock management, fodder production, environment and soil. The whole country has been divided into eleven various agro-ecological zones based on environmental and geographical differences to minimize complexity. This tool is being developed for successful adoption in the various sectors of the Pakistani dairy production system. The model will explore the key factors affecting the farm budget and help in decision making on the farm. This will forecast production outcomes for the next 10 years including cattle live weight, milk production, fodder availability, supplements availability, heifers' replacement, labour availability, revenue, cash balance and gross margin. The model will be very helpful for extension workers and livestock and dairy experts to assist farmers or investors in establishing their current status of production efficiency and their potential to improve both outputs and farm profit. Innovative farmers will use the tool for calculating profit and loss over short periods and be able to evaluate the impact of changes they implement on farm to the farm budget both in the short and long term.



## **RHETORIC AND SCIENTIFIC STUDY OF HALAL FOODS IN THE LIGHT OF QUR'AN AND HADITH**

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**Keywords:** *Halal foods, cow, meat, dairy, Qur'an, Hadith, Kosher*

**BS-79**

### **ABSTRACT**

To meet human needs, the nature has blessed him with plenty of resources. He has been given options to utilize those resources rightly or wrongly. Food is one of the biggest needs of human life and its selection and processing varies between different regions, religions and cultures. Religion is the most powerful factor influencing the dietary habits. In various religions the food items are allowed and forbidden meaning halal or haram. Muslims and Jews are very much careful in choosing foods. This manuscript has attempt to refer to different Qur'anic verses, Ahadith and sayings of Imams and Muftis of different opinions, while describing the various principles and guidelines for the selection of halal food. The first section clarifies the meaning of halal with reference to various dictionaries such as the Lisan-ul-Arab and the Taj-ul-Uroos. The word Halal has been discussed from different aspects. The second section includes the various verses from different Surahs, like Al-Baqarah. The man has been ordered to take advantage of halal food and refrain from obeying Satan. Haram food, if consumed, will give energy to the body only, and not the soul, which may lead to sinful actions. The third section deals with liquid and solid food items, such as water, vegetables and fruits. All these items are originally lawful, unless contaminated with impurity. And the fourth section is called "the halal meat from cattle," and mentioned the interpretation of the cattle. The meat has been chosen especially without vegetables, fruits, and other food items, because the Muslims and Jews are more cautious about meat and slaughtering procedures. Fifth section deals with the types of animals as some are Land Animals like the camel and the cow and buffalo and rabbit. Some of the birds are discussed like chickens, ducks, sparrows, ostriches, pigeons and quail and all of them are Halal. Some doubtful birds like the crow and the parrot are described. The sixth section addresses the marine animals. Some of them are halal such as fish and some are doubtful like prawn, starfish, crabs, oysters, dogfish and shark. The seventh section deals with Haram animals such as pigs. Every wild animal with fangs and talons of a bird is haram. The eighth section deals with slaughtering and its important requirements. Because the Halal animal becomes Haram if not slaughtered properly. And the slaughtering process should be according to Islamic principles; cutting of blood vessels properly and mentioning Allah Almighty's name while slaughtering. The ninth section deals with halal food trade and its importance as a support to Muslim economies. Pakistan should use the huge food resources in order to obtain a prominent place in the food markets. The last section deals with Rhetoric study of Qur'anic Verses.

## THE MILK SECTOR OF PAKISTAN AND ITS PRODUCTION SYSTEM

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BS-80

### ABSTRACT

*Dairy Production and the Environment:* Livestock activities have a significant impact on virtually all aspects of the environment, including air and climate change, land and soil, water and biodiversity. Two major sources of environmental pollution are peri-urban production systems and large-scale processing facilities. Waste management practices in these facilities contribute to unchecked emissions of greenhouse gases and contaminate water sources. There is little understanding or awareness of dairy-related environmental damage. No resources are committed to research on and discussion of the environmental effects of the dairy sector, although there has been some recent interest in the development of biogas. Overall, Pakistan faces a deficit of feed sources and fodder availability is the major limiting factor for milk production. The country's formulated feed industry is underdeveloped.

*Safety of Milk and Dairy Products:* The perishable nature of milk, the long distances between production and consumption sites, inefficient marketing infrastructure, and the number of intermediaries involved in hauling milk through the marketing chain are all factors that can lead to the adulteration or contamination of milk. Lack of hygiene, adulteration by various agents, and absence of a cold chain are the primary contributors to low-quality milk. The dairy industry is highly unregulated in Pakistan, and the marketing chain is exclusively in the private sector. In the absence of checks and balances, adulteration is rampant, as each agent in the marketing chain seeks to maximize profits. Pakistan does not have an integrated legal framework for food safety, but rather a set of food safety laws. These national standards are not aligned with international standards for quality in dairy products. Existing laws already have the capacity to achieve at least a minimum level of food safety. However, they are very poorly enforced. Current food laws are inadequate for meeting market demands. Implementation capacity of Health Department and Local Government at the grassroots level is extremely limited. Existing food regulations do not explicitly prohibit or limit the use of harmful preservatives.

*The Dairy Value Chain:* The production unit in smallholder subsistence and smallholder market-oriented production systems is family-owned and operated using non-cash resources such as family-owned land and labour. Peri-urban production systems employ family and hired labour, the latter being paid at local urban rates. In both of these systems, women are involved in major management activities such as feeding, watering and housing, while men are involved in marketing. Owing to consumer preferences and lack of technology, almost 95 percent of the milk in Pakistan is marketed raw through informal marketing chains; the remaining 5 percent is processed by the formal processing industry and marketed through the formal chain. The major difference between the two types of marketing chain is the sophistication of their storage and handling infrastructure and practices.

## **DETERMINANT ATTRIBUTES OF CUSTOMER CHOICE OF BANKS, SUPPLYING MORTGAGE PRODUCTS**

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***Keywords:*** *customers, banks, products*

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**BS-81**

### **ABSTRACT**

This study focuses on finding out the main attributes that determine the customers' choice of bank for supplying the mortgage products. The data was gathered through questioners from 400 customers using the mortgage products of different banks like Muslim commercial bank, Al-Falah bank, first women bank, Habib bank limited, Askari bank and etc. Results indicate that choice of customers for the mortgage product depend on the quality of services, cost of mortgage product, confidence level of customers build by the bank and convenience of the customers. To attract more and more customers, bank must provide mortgage product with the low or reasonable cost and high services related satisfaction to the customers. Confidence and convenience both are also important factors in the selection of the mortgage providers. But In Pakistan people are more conscious about the cost and services related factors because Pakistan is a developing county. So by providing the low cost but high quality services can attract the more and more customers.

## **DAIRY AND MILK PROCESSING AND ITS FUTURE PROSPECTS IN BALOCHISTAN, PAKISTAN**

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**Key words:** Milk, cow, buffalo, dairy production, artificial insemination, Balochistan

**BS-82**

### **ABSTRACT**

Livestock sector in Balochistan is generally characterized by low per animal productivity. The average productivity of ruminants is far below than its potentially achievable levels. Dairy animals though are in low numbers but are somehow meeting the basic requirements of people of the province. The buffalos are confined mostly in canal-irrigated districts of the province which are badly affected by the recent flood. Indigenous cattle have low potential both in terms of milk and meat but well suited to the local conditions. Balochistan has a success story in the acclimatization of pure breed Friesian and establishment of Friesian crossbred animals all over the province by employing the artificial insemination techniques. Though improved feed, control of parasites, and most importantly through better breeding strategies and introduction of modern biotechnologies productivity gap can be narrowed. However, so far no serious attempts have been made to take the new knowledge of dairy technology on the farmers' level nor have these new research findings been adequately disseminated to those concerned in the province. The main constraints in transforming the traditional dairy farming into commercial enterprise includes nomadic way of life, small herd size, scarcity of water and poor range lands. Conventionally, many efforts have been launched to transfer knowledge and skills to dairy farming community but those could not sustain due to their faulty design. They use practices which are not conducive to enhanced dairy production since no system exists for their training in modern dairy and husbandry practices. The public sector infrastructure and institutional base needs to be strengthened and reorganized to meet the emerging needs of the growing animal population in the province. So far, emphasis has been mainly on the animal health side, on prevention of livestock diseases and their control measures. Time has now come to devote equal attention towards the dairy production and management through modern biotechnologies and their application. But we are still away from the starting line of advancement especially in animal production. The current situation especially after the post-flood scenario, the dairy and milk processing in Balochistan demands a review of the whole system and could be a blessing in disguise to correct the situation for future dairy development in the province.

## **DAIRY ANIMAL FEEDING AND FOOD SAFETY SYSTEMS IN PAKISTAN WITH SPECIAL REFERENCE TO WORLD TRADE ORGANIZATION**

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Key words: feed, food, safety, toxins, food laws, WTO, SPS, Pakistan

**BS-83**

### **ABSTRACT**

Pakistan being its member as a developing country has already availed a grace period of ten years in 2005, to adopt and amend its rules to fulfill the requirements of WTO. There are several main agreements in this regard but the agreement on Sanitary and Phytosanitary Measures (SPS) is important and most relevant with the aim to protect human, animal and plant life and health from any risks, hazards or disease. The global trade is further expanding rapidly and significantly due to increase in consumer demands, education and awareness of the consumer, internationalization of food tastes and habits, development in food science and technology, improvement in transportation and cold chain linkages. In recent years potential risks have been reported to human health associated with the contamination of dairy feed with chemical or biological agents at international level, thus raising public concern about the safety of foods of animal origin. These concerns have been further aggravated due to problems that have arisen with bovine spongiform encephalopathy (BSE), mycotoxins, dioxin contamination, outbreaks of food borne bacterial infections, as well as growing apprehension about veterinary drug residues and microbial resistance to antibiotics. These problems have drawn attention to dairy feeding practices within the livestock industry and have prompted health professionals and the feed industry to scrutinize food quality and safety problems that can arise in foods of animal origin as a result of animal feeding systems. The objectives of the present paper are to elaborate the existing procedures and legislation regarding the food /feed safety issues in Pakistan, to describe the potential hazards and safety procedures like HACCP, GMP and GHP etc. associated with food/feed production, along with recommendations to strengthen food/feed safety procedures in the country.

## GROWTH PERFORMANCE OF BEETAL GOAT KIDS ON DREID SUGAR BEETPULP BASED CONCENTRATES

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**Key words:** Beet pulp concentrate, commercial concentrates, weight gain, *In Sacco* degradability, Beetal goat kids.

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BS-84

### ABSTRACT

An experiment was conducted on beetle goat kids for sixty days to compare the feeding value of sugar beet pulp based concentrate and commercial concentrate and its effect on growth performance. The data were analyzed with the analysis of variance procedure according to CRD and means were compared for significance of difference with the LSD. Twenty seven female kids (3-4 months age) with a mean body weight 16.49 kg were divided in three groups A, B and C (9 kids / group). Each group was assigned to different diets. All the animals were grazed 4 hours daily and thereafter stall feeding ad-libitum. Animals on diet A was control while animals on diet B and C were offered 750 g (DM/day) commercial concentrate and a test concentrate, respectively. The test concentrate was having 20.31% crude protein (CP) and metabolizable energy (ME) 2.43(M Cal /kg/DM) while the commercial concentrate 19.71%CP and ME 2.41 respectively. Due to higher fiber conten in the test concentrate its *In sacco* Dry Mattar degradability at 12 and 24 hours incubation was lower ( $P<0.05$ ) than the commercial concentrate. However, the *In sacco* degradability of protein was higher ( $P<0.05$ ) in the test concentrate than the commercial concentrate at 12 and 24 hours incubation. Hay DM intake was highly reduced ( $P<0.0001$ ) in control diets (319) followed by diet B (216) and C (206g/day) respectively. Body weight gain(BWG) was influenced ( $P<0.001$ ) by diets and averaged 27.33, 84.19 and 73.92 g/day on diets A, B and C respectively. BWG on the control diet was lower ( $P<0.05$ ) than the other two diets and did not vary significantly ( $P>0.05$ ) in kids on diets B and C. Mean feed conversion ratio (feed/gain) on diet A, B and C were 26.81, 10.75 and 12.9, respectively and significantly influenced ( $P<0.05$ ) by diet composition. Both diets B and C exhibited the same feed conversion ratio (FCR). Feeding of concentrates increased the net return over feed cost. Both the concentrates mixtures were found equally cost effective in promoting growth rate in kids. The present study concluded that nutritive value of beet pulp based concentrates and commercial concentrate was the same and were equally effective in supporting BWG in goat kids.

## **KEEP DAIRY ANIMALS STRESS-FREE FOR BETTER PROFITS**

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**Keywords:** dairy, stress, nutrition, tropical, buffaloes, cattle, crossbred

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**BS-85**

### **ABSTRACT**

Ovulation in mammals requires a stress free environment and availability of nutrients, appropriate hormonal levels and an activated pre-ovulatory center of the hypothalamus. A series of experiments were conducted in dairy buffaloes and cattle for documenting the relationship under various feeding, management and stress conditions. Literature was reviewed for mechanism of how the various factors correlate with each others and how they impede the process of ovulation. Main findings are reproduced below. Excess intake of crude protein increased serum urea levels, delaying postpartum ovarian activity in dairy buffaloes under field conditions. Low energy intake and poor body condition reduced reproductive efficiency. The buffaloes conceiving at an earlier stage of lactation were also good milk producers. The postpartum ovulation intervals increased with the prolonged suckling duration and the use of injections of oxytocin for milk let down in dairy buffaloes. Supplementing concentrate feeds raised the progesterone levels. The milk progesterone levels and milk yield were negatively correlated.

In studies on peri-urban dairy buffaloes by the author, the protein contents of the concentrate feeds were highly degradable. Relationship of the degradable protein intake: 4% fat-corrected milk production ratio with conception rates was worked out. Conception rates decreased linearly as the ratio increased. Protein supplements were fed to lactating buffaloes irrespective of their milk production following the conventional practice on the farms in the study. Consequently, the low producers had excessive intake of dietary protein. Such a practice of indiscriminate use of CP of higher degradability, adversely affects conception rates in low milk producing buffaloes. As milk production increases, more degradable protein is utilized reducing its detrimental effects, and resulting in enhanced conception rates.

**COMPOSITION AND PHYSICO-CHEMICAL CHARACTERISTICS OF BUFFALO MILK WITH PARTICULAR EMPHASIS ON LIPIDS, PROTEINS, MINERALS, ENZYMES AND VITAMINS**

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**Keywords:** Milk, products, physiochemical, nutrients, vitamin, enzymes

**BS-86**

**ABSTRACTS**

The businesses community will be provided information on milk composition comprising various nutrients and enzymes. The nutrients determine the dietary value of milk for human consumption and helps in selecting milk for various types of human population like growing children, nursing mothers, young persons involved in hard jobs or elderly people. The enzymic profiles as well as the nutrient molecules determine the suitability of milk for various processes and end products. These two sets of parameters determine the market value of milk and milk products and its suitability for export to various regions. During my stay at INRA France, I got an opportunity to interact with scientists of international stature and learned various techniques how to add value to our milk and how to tailor this natural resource with the needs of local and international market. I will review results of my several research studies and would try to link them for addressing our local issues.

By modifying the forces (hydrophobic and electrostatic interactions, hydrogen bonding and presence of micellar calcium phosphate) responsible for the structure and the stability of casein micelles, alkalisation induces a disruption of casein micelles in milk. A study was conducted to compare the alkalisation-induced physico-chemical changes of casein micelles of buffalo and cow milks with a special attention to the mineral fraction. Between pH 6.7 and 10.8, the whiteness decreased from 73.5 to 50.9 and from 71.3 to 50.9 units and the viscosity increased from 1.8 to 10.2 and from 1.5 to 4.8 mPa·s for buffalo and cow milks, respectively. Simultaneously, >90% of nitrogen contents were in the supernatants of ultracentrifugation at pH 9.7 and 8.6 for buffalo and cow milks, respectively. Chromatographic analyses showed that caseins were totally solubilised at these pH values. Calcium and inorganic phosphate concentrations progressively increased in the supernatants of ultracentrifugation and decreased in the ultrafiltrates. At alkaline pH, the negative charge of caseins increased and the inorganic phosphate ion changed its ionisation state from  $\text{HPO}_4^{2-}$  to  $\text{PO}_4^{3-}$  form. This form has a greater affinity for calcium and can demineralise casein micelles. The consequences were modifications of protein-protein and protein-minerals interactions resulting in micellar disruption. The dissociations took place at pH 9.7 and 8.6 for buffalo and cow milks, respectively. These differences were due to higher concentrations of casein and minerals in buffalo than in cow milk, which were also our criteria of selection of the former as a model.



## DEVELOPING MICROBIOLOGICAL AND BIOCHEMICAL PROTOCOLS FOR THE PRODUCTION OF FRESH MOZZARELLA CHEESE FROM WATER BUFFALO MILK IN PAKISTAN

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BS-87

### ABSTRACT

In Italy, large herds of Asiatic water buffaloes have been traditionally farmed for the production of mozzarella cheese. Italy has a long history of making this popular soft cheese from water buffalo milk (Mozzarella di Bufala), and the fresh handmade mozzarella produced in Naples is still regarded as the best in the world. Italy and Brazil with 200,000 and 400,000 water buffaloes, respectively, are the two major suppliers of buffalo mozzarella in the world; however, they are unable to meet the growing world demand for this popular culinary product. In North America a substitute for buffalo mozzarella is produced with cow milk. Pakistan has also started producing mozzarella commercially, however, both in terms of their taste and texture these, these domestic products appear at an early stage of development. Most importantly, the production of fresh mozzarella has not yet started in Pakistan. With 30 million water buffaloes producing 20 million metric tons of milk annually, Pakistan has an immense potential for producing buffalo mozzarella cheese. The current study is aimed at developing a viable domestic base for the production of fresh mozzarella cheese in Pakistan. Our focus is to promote its production at a cottage industry level, where the local yoghurt and paneer producers can add buffalo mozzarella to their list of products. A modeling of mozzarella cheese formation employing milk acidifying bacteria and microbial rennet for curd formation, optimizing biochemical conditioning for yielding traditional *pasta filata* (spun paste), and setting hygienic conditions for packaging and storage of the finished product is presented here. The qualitative traits of intended mozzarella products are also described. We believe that by adopting proper microbiological and biochemical strategies for producing highly prized *pasta filata* from the protein and fat rich milk of water buffaloes, Pakistan can successfully join the rapidly growing buffalo mozzarella market in the world.

## **GROWTH PERFORMANCE OF BUFFALO CALVES IN KHYBER PAKHTUNKHWA**

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Key words: Buffalo calves, feed-lot fattening, growth performance

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BS-88

### **ABSTRACT**

Data from feedlot Fattening farms: operating under Livestock and Dairy Development Board; having at least one buffalo calf were collected for analyzing comparative performance of buffalo-calves for beef production. A total of 1408 animals present in 56 farms scattered over eight districts of Khyber Pakhtunkhwa were studied. In order to control for the variables that could potentially affect the growth but the data for which is not available e.g. ambient temperature and humidity, nature of green fodder, ingredients of concentrates, the model is augmented with location, year and specie specific fixed effects. The model fitted the data and suggests 30 percent of the variation in the daily weight gain as explained by variation in the independent variables. Mean weight at purchase were  $139.4 \pm 1.77$  and  $131.4 \pm 1.40$  kg of buffalo and cattle calves which fattened over a mean period of 94 days at different seasons in two years. The species, over the fattening period, gained mean weight of 70 and 72 kg for which the farmers received extra Rs. 3211.8 and Rs. 3030.6 per buffalo and cattle calf, respectively. The study estimates the effect of specie (buffalo and cow), year (2007 and 2008), location of farm (the eight districts), initial calf weight and season on the growth performance measured as daily weight gain of cows and buffaloes. The growth model while controlling for other variables, suggests that daily weight gain during winter is higher as compared to other seasons. However, the effect of herd size and specie on daily weight gain is non-significant. On overall, the combined effects of location and year on daily weight gain are significant implying that overlooking these effects in the analysis may result biased estimates similar to omitted variable in regression analysis.

## **DO RETURNS TO SCALE EXIST IN DAIRY FARMING IN PESHAWAR VALLEY?**

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**Key Words:** Dairy farming; supply elasticities; returns to scale; buffaloes

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BS-89

### **ABSTRACT**

The study estimated the effect of number of labours working on dairy farm, experience of dairy farmer, green fodder, concentrates and wheat bran on milk yield measured as milk per lactating animal. The study accepts constant returns to scale and found that the effect of concentrates and additional labour on milk yield were statistically significant. The effect of additional labour on milk yield was relatively higher as compared to other variables.

**THE EFFECT OF BREED, AGE AND SEX ON MEAT PRODUCTION  
POTENTIALS OF CATTLE IN THE SUB TROPICAL CONDITIONS OF KHYBER  
PAKHTUNKWA**

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**BS-90**

**ABSTRACT**

Variation in dressing, offal's, skin, head and trotter's percentages of cattle in relation to breed, age, sex and body condition were studied in 300 animals of Achai (38, 27m+ 11f), Dajal (21, 7m+14f), Dhanni (34, 16m+18f), Frisian cross (103, 30m+73f), Lohani (16, 6m+10f), Sahiwal (18, 9m+9f) and Non Descript (70, 33m+37f) cattle slaughtered at the municipal slaughter house, Peshawar during April 19 to May 22, 2009. All animals slaughtered were categorized on the basis of their age (six groups) and body condition score (1-9), where most animals fall under body condition scores (BCS) 3, 4, 5 and 6. The effect of breed, age and sex was highly significant on dressing percentage ( $P < 0.01$ ). Dressing percentages was 50.29, 55.40, 50.48, 52.57, 53.54, 51.99 and 53.54% in Achai, Dajal, Dhanni, Frisian cross, Lohani, Sahiwal and Non Descript cattle, respectively. However, no effect of breed, age and sex on offal's proportion was there. Proportional weight of skin and trotter varied ( $P < 0.01$ ) among breeds and between sexes. However, the head weight was affected ( $P < 0.01$ ) by breed only. Dajal proved as leading breed for highest dressing rate (55.40%), followed by Lohani and Non-Descript (53.54%), and the lowest for Achai (50.29). Mean proportional weight of offal's ranged between 1.89 and 1.94%; of skin 9.05 and 11.07; of head 3.73 and 4.20 and of trotter 1.94 and 2.30, respectively among the breeds under study. BCS 5 showed highest dressing (53.19) and head (4.01) percentages and lowest offal's percentage while BCS-6 gives highest percentages of skin (10.40) and trotters (2.27).

## **BODY HAIRS HELP IN DIAGNOSING PREGNANCY IN DAIRY COWS**

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***Key words*** *Pregnancy, body hair, hair diameter, fiber weight and dairy cattle*

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BS-91

### **ABSTRACT**

Pregnancy is a dynamic state associated with a number of hormonal changes. Present study reports the effect of pregnancy and parturition on body hair growth in dairy cattle. For this purpose Holstein Friesian cows, three early pregnant and two post-parturition were used. The hairs samples from neck, thoracic and back areas were collected twice a week for a period of two months to measure hair weight and the diameter. An increase in hair diameter and weight with advancing days of pregnancy was observed, whereas the hair weight decreased after parturition. In pregnant cows, a persistent increase of diameter and weight along the individual fibers from tip to end was observed. Furthermore, a similar pattern of increase in weight and diameters was also observed for the neck thoracic and back hairs. A positive and significant correlation between hair fiber diameter and weight was observed in pregnant cows. These results indicated that the hair growth is affected by the pregnancy status in dairy cattle.

**ADDITIONAL TITLES TO BE PRESENTED:**

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- Habib, Ghulam*; STRATEGY FOR DEVELOPMENT OF SMALLHOLDER DAIRY SECTOR IN KPK. Livestock & Dairy Development Department, Punjab, Pakistan. Email. [habibnutr@gmail.com](mailto:habibnutr@gmail.com). AT-88-2
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**Subject codes:** **BF**, Biotechnology and Reproduction; **HEM**, Health and Environment Management; **PATH**, Pathology; **FM**, Feeding and Management; **ALP**, Arid Livestock Production; **FT**, Food Technology; **LD**, Livestock Development; **BS**, Business Support; **AT**, Additional titles to be presented

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