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**EXPLORING THE BENEFITS OF FEEDING TANNIN  
CONTAINING DIETS FOR ENHANCING THE NUTRITIONAL  
VALUES OF MILK AND MEAT OF RUMINANTS**

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There have been growing interests among the researchers to improve the nutritional value of ruminant derived milk and milk products. The targets have been to decrease the content of saturated fatty acids, and to increase the concentrations of n-3 fatty acids (FAs) in milk and meat. Furthermore, ruminant products in particular contain healthpromoting FAs such as rumenic acid (*cis*-9, *trans*-11 C18:2). The changes in FA composition could beneficially be achieved by inhibiting the rumen microbial biohydrogenation process of FAs. Tannins, which have antimicrobial properties against rumen microbiota, have been exploited to enhance nutritional properties of meat and milk by inhibiting the biohydrogenation and other microbial metabolism occurring in the rumen. Though tannins inhibit FA biohydrogenation in the rumen, the changes in milk and meat FA composition are not always conclusive because some studies reported high concentration of rumenic acid and n-3 FAs due to supplementation of tannins, while these FA concentrations were either not changed, even lowered in other studies. Contrasting findings among the studies might have resulted due to different tannin source and dose used in feeding of ruminants. Another important feature of beneficial effects of tannins is that they may reduce volatile compounds such as skatole and indole (responsible for off-flavour) and improve antioxidant activities in ruminant products. More research would be required to confirm if tannins have consistent beneficial responses to improving nutritional quality of meat and milk.

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**EFFECT OF NITRIC OXIDE ON IN VITRO LYMPHOCYTE  
PROLIFERATION RESPONSE IN BUFFALOES  
(*Bubalus bubalis*) EXPOSED TO ACUTE HEAT STRESS**

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The present investigation was aimed to study the effect of nitric oxide (NO) on in vitro lymphocyte proliferation response in high yielding Murrah buffaloes (N=12) exposed to acute heat stress. The blood samples were collected from the experimental animals before exposure and after 3h of exposure to acute heat stress (45°C, 55% RH) in climatic chamber. Lymphocytes were separated and proliferative response of lymphocyte was estimated after culturing the lymphocytes with nitric oxide donor - S-Nitroso-Nacetylpenicillamine (S-NAP) and Nitric oxide synthase inhibitor namely N<sup>l</sup>-nitro-Larginine methyl ester (L-NAME) and L-Mono-methyl-arginine (NMMA) at different concentrations with or without mitogen phytohemagglutinin (PHA-P). SNAP reduced lymphocyte blastogenesis in both pre and post exposure group at 0.1 mM concentration. In both pre and post exposure group lymphocyte blastogenesis reduced significantly (P<0.001) at 0.2 mM level of both L-NAME and NMMA which remain unaltered with increased level of NMMA. The present study suggests that lymphocytes were responsive to NO compounds in dose dependent manner even after exposed to acute heat stress. But, no ameliorative effects of NO compounds were found on heat stressed buffalo lymphocytes.

**SEROEPIDEMIOLOGY AND VECTORS FOR BLUETONGUE  
DISEASE IN SMALL RUMINANTS IN RAJASTHAN**

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Bluetongue disease (BTD) in India is devastating in recent years particularly in Southern and Western states of Indian union. The vector borne viral bluetongue disease causes high mortality in small ruminants, specially in sheep and goats. In Rajasthan, the seroprevalence remained high in sheep (45.99%) and very high in goats (69.36%). The seroepidemiology of BTD in semiarid districts remained significantly more (56.06%) than arid districts (34.92%) in sheep while in goats both the arid (44.69%) and semiarid (49.61%) regions the seroprevalence remained almost similar. The seroprevalence of bluetongue antibodies remained higher in goats than in sheep both in arid and semiarid districts. Districtwise overall seroconversion in sheep and goats population found highest in Kota 80.91% followed by Jhalawar (75.72), Sirohi (60.0), Jodhpur (57.93), Jodhpur Farm (53.75), Baran (40), Chittorgarh (37.41), Karauli (34.69), Tonk (33.58), Bikaner (33.07), Bikaner farm (30.4), Barmer (30) and Rajsamand (12.5) districts. The vector midge was identified from the field cases was of *Culicoides schultzei*. The circulation of virus into host sheep and goats followed by seroconversion depends on climatic factors like temperature, humidity and rainfall.

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**ADOPTION OF SCIENTIFIC MANAGEMENT PRACTICES  
BY FARMERS REARING CROSS BRED CHICKEN**

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Namakkal chicken-1 crossbred chicken suitable for traditional backyard rearing was evolved to solve the problems of traditional backyard strains. However, the production performance is significantly affected by adoption of scientific management practices at field level. Hence an attempt was made to study the adoption level of scientific management practices by the farmers along with socio-economic characteristics among 50 farmers rearing Namakkal Chicken-1 in Tamil Nadu. The farmers adopted almost all the scientific management practices except hatching of eggs indicates that the respondents have taken interest to know more about the innovative technologies to make backyard poultry farming as a profitable venture. Thus, farmers need to be sensitized about the hatching of eggs either by using natural brooding with desi chicken or using incubator to exploit the high genetic potential of Namakkal chicken-1. Flock size, livestock possession, training attended and education were playing main role in the adoption of scientific management practices.

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**PREVALENCE OF SALMONELLA IN CALF DIARRHOEA**

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*Salmonella* infections in dairy calves and adult cattle continue to be significant disease problems on Indian Sub-continent. Calves continue to suffer from infectious diarrhoea due to *Salmonella* as do adult dairy cows. The situation is getting more aggravated by the ever

increasing rate of antimicrobial resistance strains. A total of 106 fecal samples from diarrhoeic calves were collected from organized and unorganized farms of Kashmir Valley. In all, 14 *Salmonella* isolates were obtained. All the 14 isolates were confirmed as *Salmonella typhimurium* making the total prevalence of 13.21% and belonged to 4,12:i:1,2 O antigen.

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### **STATUS OF CONCENTRATION OF SOME ELECTROLYTE IONS IN SERUM OF CORRIEDALE SHEEP IN KASHMIR INDIA**

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Sheep is unique to the economy of the Kashmir for its wool, mutton, hides and manure. The typical extensive and trans-human (migratory) managemental system of domestic animals in Kashmir, especially sheep, gives it a specific significance to be studied. The present work was to evaluate serum sodium, potassium, and chloride ions in clinically normal Corriedale sheep in Kashmir. Two hundred blood samples of Corriedale sheep were taken and animals were grouped as (85 males and 115 females) aged about 8-48 months, divided into males (lambs and rams), females (lambs, pregnant and lactating ewes) according to the age and physiologic status. The results showed that the range and mean  $\pm$  standard error (SE) were as follows: serum sodium 101.10-191.20 mmol/L and  $155.43 \pm 1.46$  mmol/L, serum potassium 3.20-15.10 mmol/L and  $7.33 \pm 0.23$  mmol/L, and serum chloride 70.40-184.20 mmol/L and  $110.85 \pm 1.85$  mmol/L respectively. However significant differences ( $P < 0.05$ ) in those serum ions levels was recorded between males and females, but there was no significance between male groups and female lambs nor among different female subgroups (except significantly higher in sodium concentration recorded in the first gestation  $P < 0.05$ ). Correlations noticed in this study in males between serum sodium and potassium ( $r = 0.28$ ,  $P = 0.04$ ), and between serum sodium and chloride ( $r = 0.41$ ,  $P = 0.001$ ), while the females showed correlation between potassium and chloride ( $r = 0.54$ ,  $P = 0.0001$ ), as well as certain correlations either positive or negative between male and female subgroups. In conclusion, present data recorded the range reference and mean  $\pm$  SE in serum levels of (Na, K, and Cl) which in general were significantly higher in males compared to females with significant differences according to physiologic status in female groups.

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### **CLINICOPATHOLOGICAL CHANGES OF CHRONIC ARSENIC INDUCED TOXICITY IN BROILER BIRDS**

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An experiment was conducted by oral administration of  $As_2O_3$  @ 16.25 mg/kg body weight (1/10th of ALD50) in deionised drinking water daily from day-old to 6 weeks of age broiler birds to study the clinicopathological changes in chronic arsenic intoxication. Toxic signs of gastrointestinal disturbances and mild depression were developed from 3 weeks onwards with progressive loss of body weight gain without any mortality. Arsenic intoxicated birds had a significant ( $P < 0.01$ ) decrease in feed consumption with marked reduction in body weight gain from 3 weeks onwards. Maximum growth depression (22.46%) was observed in arsenic intoxicated birds on 6 weeks posttreatment. Haematological changes comprised a significant ( $P < 0.01$  or  $P < 0.05$ ) decrease in hemoglobin (Hb), packed cell volume (PCV) and total erythrocyte count (TEC) in arsenic treated birds on 3 and 6 weeks post-treatment. A

significant ( $P < 0.01$ ) decrease in total leucocyte count (TLC) with the significant ( $P < 0.01$  or  $P < 0.05$ ) decrease in lymphocyte count was also observed in arsenic treated birds indicating the suppressive effects of arsenic on haemopoietic system. Arsenic treated birds had a significant ( $P < 0.01$  or  $p < 0.05$ ) decrease in total serum protein with simultaneous reduction in A:G ratio and a significant ( $P < 0.01$  or  $P < 0.05$ ) increase in serum glucose, serum bilirubin, cholesterol, creatinine and serum transaminase activities (AST and ALT) and alkaline phosphatase (ALP) activity on 21 and 42 days post-treatment. The biochemical alterations in the serum indicated a wide range of degenerative and / or necrotic and inflammatory conditions in parenchymatous organs, particularly in liver and kidneys in the arsenic treated birds.

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### **DIAGNOSTIC ARTHROSCOPY OF STIFLE JOINT IN HORSES : THREE CASES**

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Clinical, radiographic and arthroscopic evaluations were carried out in three Indian Thoroughbred horses with stifle lameness. Radiographic examination of the stifle joint did not show any bony lesions. Arthroscopic examination of the stifle joint revealed partial rupture of cranial cruciate ligament with avulsion of tibial eminence at the point of insertion of cranial cruciate ligament in first horse. osteochondritis dissecans on the medial border of patella and medial trochlear ridge in second horse and early degenerative joint disease of femoropatellar joint in the third horse. A comprehensive approach to diagnose the stifle lameness was effective for immediate treatment, pain free ambulation and assessment of prognosis. Clinical examination confirmed the seat of location in horses with stifle lameness reported in this study. Survey radiography was of no diagnostic value as there was no bony lesions whereas arthroscopy was proved to be a valuable diagnostic modality to diagnose the involvement of soft tissue or articular cartilage.

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### **RECOMBINANT ANTIGEN BASED ELISA FOR DIAGNOSIS OF BOVINE TUBERCULOSIS IN ORGANIZED AND UNORGANIZED DAIRY UNITS OF TAMIL NADU**

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Accurate means for identification of bovine tuberculosis (bTB) cases is a major diagnostic priority of zoonotic TB control programs. Recombinant antigen based serodiagnostic tests make ELISA a valuable tool for the screening of bTB especially in anergic animals. *M. bovis* recombinant antigen based IDEXX ELISA test kit was used to detect humoral immune response to *M. bovis* in 455 randomly collected samples which includes 357 serum and 98 milk samples. The results revealed total of 16 (4.48%) to be seropositive including 3 of 72 (4.2%) from organized farm and 13 of 285 (4.6 %) from unorganized dairy units. Higher percentage of seropositive animals was in the age group above 5 years (5.5 %) with 1.2%, 9.6% and 2.8% being positives in the category of indigenous cattle, Jersey crosses and buffaloes, respectively.