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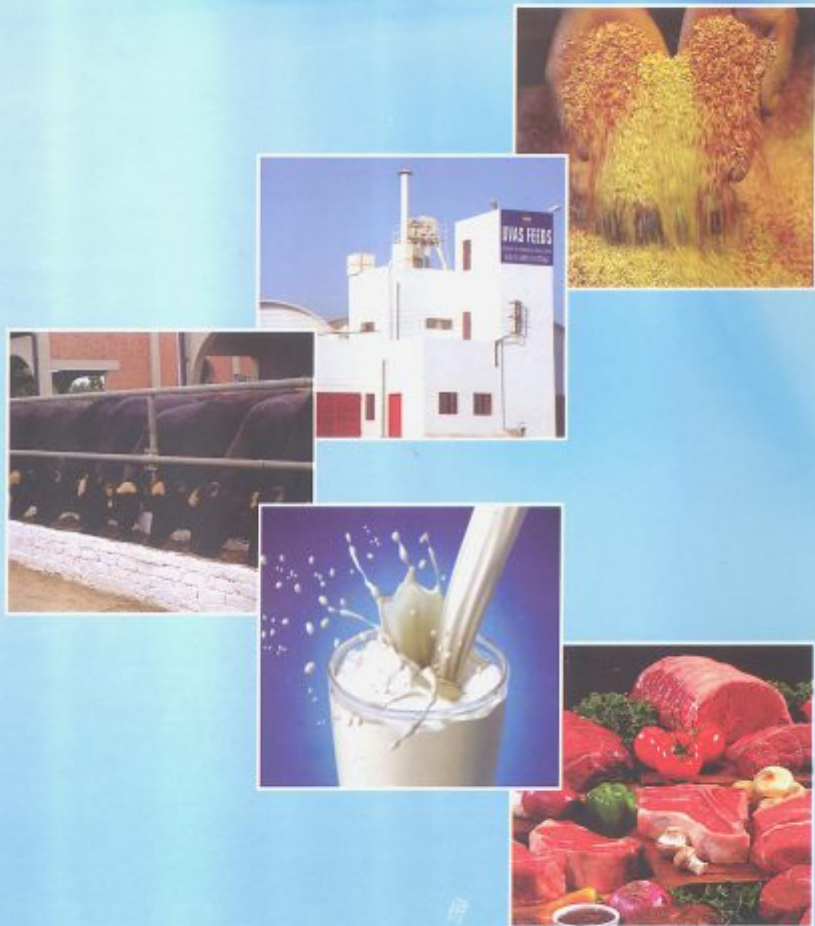


MENA BROTHERS (PVT) LTD.



International Livestock Nutrition Conference- 2013

October 23-24



Organized by:

Nutritionists Association of Pakistan
University of Veterinary & Animal Sciences
Lahore- 54000, Pakistan

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GUARANTEED ANALYSIS

• Crude Protein, not less than	15.0%
• Crude Fat, not less than	1.8%
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• Ash, (Max)	9.0%

Increase milk yield of your animal upto 2 litre/animal/day
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Very Economical

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USE:
Add the feed or added directly to drinking water.

INGREDIENTS:
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About NAP

The Nutritionists Association of Pakistan (NAP) is registered by Government of Pakistan under the societies registration act, XXI of 1860 vide no. PP/405 dated 27th March, 1990. The NAP is a national organization of educators, scientists, animal nutritionists, dietitians, technologists, producers, extensionists, **project leaders and development experts who lead food & feed sectors to improve human nutrition and sustainable livestock & poultry production.** Its secretariat is at Department of Animal Nutrition, Faculty of Animal Production and Technology, University of Veterinary & Animal Sciences, Lahore-54000, Pakistan.

The objectives of the NAP

- to work for the general advancement of the science of Nutrition in the country, and to contribute in the development of nutritional policies and planning.
- to promote research and teaching in different branches of Nutritional sciences and to help in the development of Nutrition science at the national level.
- to make the general public aware of the importance of Nutrition, and to provide direction and leadership to attain appropriate food and dietetic practices for optimal health, performance, productivity and quality of life.
- to promote regional and international relations in the field of Nutrition and maintain liaison with foreign scientific organizations with similar objectives.
- to promote and safeguard the interests of Fellows and Members in Pakistan and Nutritionists in general.

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Vice Chancellor
University of Veterinary & Animal Sciences, Lahore-54000, Pakistan

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**Glimpses of
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International Livestock Nutrition Conference-2013



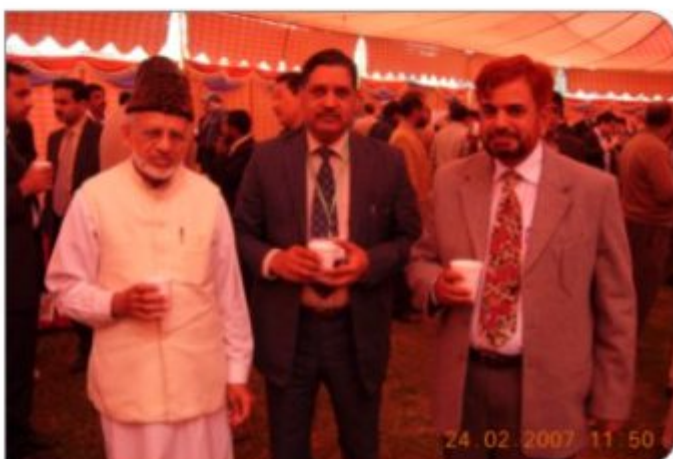
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Calf Nutrition

EFFECT OF SHORT TERM MONENSIN SODIUM SUPPLEMENTATION AT WEANING ON HASTENING PUBERTY IN DAIRY CALVES

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Abstract

Monensin sodium, was supplemented to dairy cattle calves at weaning @200mg/day/head and was continued for next 75 days at the same rate to study the effect on puberty. After discontinuation of supplementation these calves were shifted into the institute herd and fed as per the practices followed there. Monensin supplementation not only stimulated the growth, but also enhanced the feed conversion efficiency during experimental period. The growth rate varied between 470 to 602 g/day in control and 583 to 742 g/day in supplemented calves. The live weight gain was 42.75 and 53.07kg respectively in control and supplemented group. The average daily gain was significantly higher (24%) in supplemented group as compared to control calves ($P<0.05$) with values averaging 679 ± 49 and 547 ± 64 g/day respectively. The feed conversion efficiency was enhanced by 16.40 percent in supplemented group. Despite withdrawal of monensin from the feed, the supplemented calves continued to grow at higher rate which was evidenced through higher body weight and ADG ($P<0.05$). After 220 days of withdrawal of supplementation, the total body weight gain amounted to 83.10 kg in control calves as against 98.85 kg in supplemented calves. The puberty as evidenced by progesterone levels on an average was hastened by 44.08 days in supplemented dairy heifers. However, the decrease in age at puberty by monensin was independent of weight gain. These heifers were later declared pregnant and delivered the calves normally.

EFFECT OF REPLACING THE FODDER WITH MAIZE SILAGE ON FEED INTAKE, GROWTH RATE&FEED EFFICIENCY IN BUFFALO MALE CALVES

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Abstract

The study was performed to evaluate the performance of silage on feed intake and growth rate in male buffalo calves. 18 animals of body weight 250 ± 20 kg and age of about 2 years were randomly divided into three groups containing 6 in each group according to completely randomize design. A total mixed ration containing 14% Crude Protein and 2.1 Mcal/kg was formulated and 4 kg of TMR was fed to the animals of each group. Along with TMR, 16kg of green fodder was fed to each animal of group A, 08 kg of green fodder plus 08 kg of maize silage was fed to group B while 16kg of maize silage was fed to the individuals of group C. Individual stall feeding was practiced during the whole period. Project was lasted for 75 days after 10 days of adoption period. The dry matter intake of group A, Band C was 4.82, 4.83 and 4.27 kg respectively. There was significant difference ($P<0.05$) among the groups. Whereas there was non significant difference ($P>0.05$) in terms of of weight gain per day. The weight gain was 0.92,0.93 and 0.91 kg for groups A,B and C, respectively. The FCR of group C was lowest i.e.4.67 followed by group B of 5.21 and high FCR was noted in group A. There was significant difference ($P<0.05$) among the treatments.

RUMEN DEVELOPMENT, CHANGES IN BLOOD METABOLITES AND STARTER INTAKE OF EARLY WEANED HOLSTEIN BULL CALVES FED DDGS AND AMMONIA TREATED DDGS BASED STARTER FEED

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Abstract

Current experiment was conducted to evaluate the effects of replacing grains and soybean in starter feeds with DDGS and ammonia treated DDGS at 25% of DM and their impact on rumen development. The experiment was conducted in collaboration with Dairy Science Department, SDSU, USA. Twenty one neonatal male Holstein calves were assigned to one of the three of dietary treatments: **C** = 0% DDGS, **DDGS** = 25% DDGS, **CAFEX-DDGS** = 25% CAFEX treated DDGS. In a 10 week experiment: calves were fed 680 g milk replacer (**MR**) through 4 week, reduced to half during week 5, and weaned at the end of week 5. Starter intake was conducted daily; whereas, jugular blood samples were taken on a weekly basis using EDTA and NaFl coated evacuated tubes. At the end of experiment, n=4 calves from each treatment were slaughtered to determine rumen morphometric measurements papillae length (**PL**), papillae width (**PW**), rumen wall thickness (**RWT**) and papillae concentration (**PC**). Results revealed that pre-weaning and post-weaning average daily starter intake was lower ($P<0.05$) in the CAFEX-DDGS fed calves compared with the C and DDGS. Plasma glucose concentration was unaffected by dietary treatments. Whereas, concentration of BUN was higher ($P<0.05$) in the C and DDGS compared with the CAFEX-DDGS calves. Plasma BHBA was higher ($P<0.05$) in the C and DDGS compared with the CAFEX-DDGS. Further, Plasma NEFA was higher ($P<0.01$) during post-weaning period in the DDGS and CAFEX-DDGS compared with the C treatment. Concentration of all the plasma metabolites was affected by advancing age ($P<0.01$). In the light of these results it is concluded that inclusion of CAFEX-DDGS at 25% of DM in starter feed reduced the starter intake during pre-weaning period that resulted in lower blood BHBA concentration which limited the rumen papillae growth (PL and PW).

Key words: Rumen development, DDGS, CAFEX-DDGS, Starter, BHBA

EFFECT OF DIFFERENT ENERGY SOURCES ON THE FATTENING POTENTIAL OF BUFFALO CALVES

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Abstract

Molasses, a by-product of sugar industry, is an excellent and cheaper source of energy. Objective of the study was to compare efficiency of energy sources for meat production. For this purpose, a fattening trial was conducted on 15 Nili-Ravi buffalo calves of approximately the same age and weight to study the comparative efficacy of three different energy rations. Animals were divided into 3 groups of 5 calves each. Animals were offered three different rations. The experiment was carried out for 90 days. Group A was fed TMR having molasses as energy source, group B was fed TMR having com grain as energy source and group C was fed TMR with rumen protected fat as energy source. Daily feed consumption, body weight gain, feed conversion ratio, economics and blood parameters (blood glucose, total protein, urea and creatinin) were studied. The average weekly growth rate of group A, B and C was 6.23 ± 0.187 , 6.185 ± 0.187 and 6.08 ± 0.187 respectively. The average daily growth rate of group A, Band C was 0.89, 0.88 and 0.87 kg respectively. Total

Mixed Ration taken by group A, B and C was 2064.5 kg, 2546.01 and 1993.7 kg respectively. The average daily feed intake was 4.59 ± 0.106 , 5.66 ± 0.106 and 4.43 ± 0.106 kg per day of group A, B and C respectively. Group A, C had non significant difference ($P > 0.05$) from each other while group B was significantly different from group A and C. The feed conversion ratio of group A, B and C was 5.16 ± 0.25 , 6.40 ± 0.25 and 5.10 ± 0.25 respectively. The results showed that calves fed ration C has highest FCR than ration A and B. The results of the study revealed non significant difference in the concentration of serum urea, creatinine, glucose and serum total protein among the experimental animals. The study revealed that each energy sources is equally effective.

EFFECTS OF STAIR-STEP NUTRITION REGIMEN ON GROWTH RATE, NUTRIENT UTILIZATION AND PUBERTAL DEVELOPMENT IN NILI-RAVI BUFFALO HEIFERS

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Abstract

Under this study, effect of stair-step nutritional regimen compared to the standard NRC recommended energy levels on growth rate, nutrient utilization, some selected blood metabolites, pubertal age, conception rate and economic analysis in Nili- Ravi buffalo heifers were measured. Twenty-two heifers, 6-8 month old, 98.57 ± 5.07 kg average body weight were divided into two equal groups. The SSNR was designed in three-phase program each having 6 months duration i.e., post-weaning, pre-pubertal and pubertal. In each phase, the treatment group during step 1, was fed on low energy diet for 4 months followed by high energy diet for 2 months in step 2. Average dry matter intake was similar between the heifers of two groups. Feed conversion ratio was poor in heifers fed low energy diet compared to those fed control diet. But on high energy diet FCR was better in SSNR compared to control group. During pre-pubertal phase, there was no difference in weight gain between the heifers fed SSNR low energy diet (1.89 Meal/kg) and control diet (2.35 Meal/kg). But on high energy diet (2.80 Meal/kg) weight gain was higher in SSNR compared to control group. Average dry matter intake was similar between the heifers of two groups. On low energy diet, there was no difference in FCR between the two groups. But on high energy diet FCR was better in SSNR compared to control group. In all phases, apparent DM and OM digestibility did not differ between the heifers fed SSNR and control diets. The trial concluded that overall feed costs incurred on SSNR heifers was less than the control heifers fed according to NRC recommendations from weaning to breeding age.

EFFECT OF SODIUM BENTONITE ON GROWTH PERFORMANCE AND FEED EFFICIENCY

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Abstract

A trial was conducted to determine the effect of supplementing sodium bentonite on the growth performance of Sahiwal male calves. Twelve animals of almost same age and weight were selected from the available stock. These animals were divided into three groups and fed a standard ration "A" according to their nutrient requirements. Rations of group B and C were supplemented with sodium bentonite at the rate of 2.5 and 5.0 percent while group A served as control. The trial was run for a period of 90 days with normal husbandry practices. During the experimental period body weight gain and feed consumption of the individual animals was recorded. The result of the experiment suggested that addition of sodium bentonite had statistically no effect on the body weight gain, feed consumption, and feed conversion ratio and rate of passage of digesta through the gastro-intestinal tract. Based on the results of this trial it could be inferred that supplementation of sodium bentonite showed no effect on the performance of calves. However, use of this clay over extended period of time needs to be investigated for any adverse effect in future.

IMPACT OF VARIOUS FEEDING REGIMES ON GROWTH PERFORMANCE OF MALE BUFFALO CALVES

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Abstract

There has been a gradual decline in per capita availability of protein based food particularly of animal origin for human consumption in Pakistan. The feasible solution of the problem is to increase the production of buffalo meat. Fifteen Nili Ravi calves of same age were randomly divided into three equal groups, which were reared on three different feeding regimes. Group I was fed TMR ad-libitum (TMBR) and 2 kg green fodder. Group II was fed available green fodder ad-libitum and concentrate ration @ 1% of body weight. Group III was fed Lucerne hay ad-libitum and concentrate ration @ 1% of body weight. Weighed quantity of feed was offered to every animal on individual feeding basis in a group and refusal was also recorded individually. The results of study revealed that among three feeding groups, highest (124.60 ± 7.82 kg) weight gain was observed in TMBR group while, lowest (108.20 ± 5.80 kg) weight gain was found in hay fed group. The highest feed intake (777.42 ± 8.87 kg) was observed in fodder group whereas the lowest feed intake (755.10 ± 16.61 kg) was found in TMBR group. The calves fed on TMBR showed best feed conversion ratio (6.07 ± 0.47) whereas, the feed conversion ratio in calves fed on hay and fodder was 7.04 ± 0.39 and 7.01 ± 0.32 , respectively. Economic analysis per kg weight gain revealed that TMBR group had the lowest cost of production per kg weight gain. On the basis of results of this study it is concluded that TMBR can be utilized as an alternate for our conventional feeding practices as it can meet all nutritional requirements of the animal. It is easy to handle, transport and store besides having a longer shelf life.

EFFECT OF DIFFERENT GROWTH PROMOTERS ON FEED INTAKE AND GROWTH PERFORMANCE OF MALE BUFFALO CALVES

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Abstract

Growth promoters as feed supplements are gaining wide acceptance in livestock production. The main aim of experiment was to investigate the effect of different commercially available growth promoters (Ralgro, Boostin-250, M2 Hormone) on feed intake and rate of growth in male buffalo calves. Twenty Nili-Ravi calves of approximately uniform age and weight were randomly divided into four experimental groups (A, B, C and D), which were offered four different treatment, such as, Ralgro, Boostin-250, M2 Hormone and control (non implanted), respectively. The basal diet consisted of concentrate ration @ 1% of body weight along with chaffed green fodder *ad lib*. The results of study revealed that animals consuming M2 Hormone performed better in terms of growth rate (43.4 ± 12.00 kg) as compared to other treatment groups. While, lowest (35.4 ± 12.5 kg) weight gain was found in control group. As far as feed intake was concerned, highest (429.79 ± 28.22 kg) feed intake was observed in Ralgro based group while, lowest (412.83 ± 50.56 kg) feed intake was noted in group offered M2 Hormone. Out of four experimental groups, calves of M2 Hormone group showed significantly best feed conversion ratio (12.40 ± 3.01) while, the feed conversion ratio in calves of Ralgro, Boostin-250 and Control group was 12.79 ± 1.99 , 14.14 ± 5.87 and 14.43 ± 2.54 , respectively. Economic analysis per kg weight gain revealed that M2 Hormone group had the lowest cost of production in rupees (110.23 ± 3.79) per kg weight gain, where as highest cost of production (136.63 ± 4.72) was observed in control group. On the basis of the results of this study it is concluded that M2 Hormone can be utilized as an alternate for our conventional fattening practices as it can increase body weight gain. On the other hand, this compound can be mixed in feed and does not have to be injected or implanted in the body.

Key Words: Growth promoters, calves, performance, feed intake

EFFECT OF FEEDING CITRUS PULP SILAGE ON THE GROWTH PERFORMANCE OF SAHIWAL CALVES

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Abstract

A biological trial was conducted to determine the effect of feeding citrus pulp silage on the growth performance of Sahiwal calves. A total of 16 Sahiwal male calves were randomly divided into four dietary groups. Each group has four animals. Group A, B, C and D were fed 100% Sorghum fodder, 85:15, 75:25 and 65:35 Sorghum fodder and citrus pulp Wheat straw silage respectively. It was noticed that the optimum level of 20% citrus pulp in feed gave good results while intake and weight gain decreased for 30% citrus pulp in feed. Average gain were 27.5, 37.5, 28.75 and 23.75 for group A, B, C and D respectively while average daily gain for group A, B, C and D were 0.44, 0.60, 0.46 and 0.38 respectively which shows non significant difference between diet groups. When average daily feed intake for each calf was calculated it showed 15.53, 15.48, 11.62 and 10.63 kg respectively for group A, B, C and D which was significantly different between diets. By ascertaining the cost of the group trials it showed significance difference having Avg. cost of

Production per animal per kg Body weight 35.57, 23.73, 21.74 and 22.43 for group A, B, C and D respectively.

COMPENSATORY GROWTH EFFECTS ON PERFORMANCE, NUTRIENT DIGESTIBILITY AND BLOOD HAEMATOLOGY IN GROWING NILI-RAVI BUFFALO HEIFERS

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Abstract

Twenty buffalo heifers (7±1 months old and 98±12 kg BW) were divided into two equal groups and randomly assigned total mixed rations either as per 100% National Research Council (NRC, 2001) requirements of Holstein heifers [(2.55 Mcal of ME/kg and 16% crude protein (CP)] for 6 months while other group was fed stair-step rations consisting of 20% low Metabolizable energy (ME) of NRC [(2.03 Mcal of ME/kg & 16% CP)] for 4 months followed by 20% high ME of NRC [(3.01 Mcal of ME/kg & 16% CP)] for 2 months. Stair-step heifers on low ME ration gained (P<0.05) lower weights (0.51 vs. 0.60 kg/day) but when shifted on high ME ration, gained higher (P<0.01) weights (0.82 vs. 0.58 kg/day) respectively, compared to NRC. However, daily dry matter (DM) intake on low or high ME rations was almost similar with NRC, respectively. Feed conversion ratio on low ME ration was poorer but improved with high ME ration compared to NRC (P<0.01). Digestibility of DM, OM and CP was lower (P<0.05) by heifers fed low ME ration but it was higher (P<0.05) on high ME ration compared to NRC. Digestibility of NDF and ADF was lower with high ME but was higher with low ME rations than NRC but the differences except CP was non-significant (P>0.05). Nitrogen retention as well as blood serum haematological values were not affected by dietary treatments. Feed costs per kg gain of stair-step heifers were 13% less than those fed NRC group.

Key Words: Heifers, Stair-step nutrition, Growth, Digestibility, Blood haematology

GROWTH RATE, FEED INTAKE, ANTIOXIDANT AND IMMUNE STATUS OF SAHIWAL CALVES SUPPLEMENTED WITH CHROMIUM PROPIONATE DURING THERMAL STRESS

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Abstract

Ruminants are the homeotherms and can maintain their normal body temperature within the certain range of ambient temperature. Therefore, any deviation in ambient temperature above or below the normal range of ambient temperature (thermoneutral zone) causes the adverse effect on animal growth, feed intake and other physiological and biochemical parameters. Keeping in mind the above fact, the present study was undertaken on twelve Sahiwal calves based on their body weight and age. These animals were further divided equally (6 each) into two groups i.e. control (without chromium propionate) and treatment (with chromium propionate supplementation). Treatment group of animals were fed @0.5mg chromium propionate /kg dry matter intake/day during winter and summer seasons

for 45 days continuously. The blood samples were collected at fortnightly interval from both groups of animals during winter and summer seasons. Average daily weight gain in control and in treatment group of Sahiwal calves were 350g/ day and 440 g/day respectively during winter season. Body weight gain was significantly higher in treatment group compared to control group, whereas no significant difference was observed in dry matter intake among two groups. The overall mean values of antioxidant enzymes activity (SOD, CAT, GPx and GR) did not differed significantly among both groups during both the seasons. But numerically lower values of antioxidant enzymes were found in treatment group compared to control group of Sahiwal calves during summer and winter seasons. Immunological parameters (IL-1 , IL-2, IL-6 and TNF-) also did not differed significantly in both the groups and during both the seasons. Immunological parameters showed higher immunity status in treatment group compared to control group of Sahiwal calves. Supplementation of chromium propionate improved DMI, body weight gain and immune status of Sahiwal calves. Thus supplementation of chromium propionate could be used as one of the major thermal stress ameliorative measure for mitigating the negative impact on body growth and immune status.

CHEMICAL COMPOSITION AND DIGESTION KINETICS OF UREA-MOLASSES TREATED WHEAT STRAW ENSILED WITH FIBROLYTIC ENZYME IN RUMINALLY CANNULATED BUFFALO BULLS

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Abstract

Experiment was conducted to evaluate the effect of increasing fibrolytic enzyme level on nutrient composition and digestion kinetics of urea treated wheat straw (WS). Wheat straw was treated with 4% urea and 6% molasses and was ensiled with 0 (E0), 1 (E1), 2 (E2) and 3 (E3) g of enzyme /Kg of dry matter (DM). Enzyme mixture was dissolved in water and the solution was sprayed on WS. Then after an hour of enzyme treatment, molasses and urea were dissolved in water and sprayed on enzyme-treated WS. Wheat straw was ensiled in 36 laboratory silos under Completely Randomized Design for twenty one days. Application of enzymes at the time of ensilation of WS did not affect ($P>0.05$) the DM, crude protein, true protein, neutral detergent fiber (NDF) and acid detergent fiber (ADF) contents. Changes in nutrients during ensilation were also remained unaltered ($P>0.05$). Enzyme treatment did not affect ($P>0.05$) the pH of the ensiled WS. Lag time, digestion rate, *in-situ* digestibility and extent of digestion of DM, NDF and ADF also remained unaltered ($P>0.05$) across all the treatments. On the basis of results it is concluded that enzyme did not affect the nutrient profile of WS because of alkaline pH due to rapid production of ammonia in the silo.

Key words: fibrolytic enzyme, digestion kinetics, wheat straw

IMPACT OF WEANING AGE ON INTAKE, GROWTH AND PERFORMANCE OF NILI RAVI FEMALE BUFFALO CALVES FED AT DIFFERENT WHOLE MILK FEEDING REGIMES & STARTER DIET

Ehsaan Ullah Khan and Prof. Dr. Talat Naseer Pasha

Abstract

The objective of the study was to evaluate the effect of weaning age on intake, growth and performance of Nili Ravi female buffalo calves till 12 weeks of age. Twenty four (24) Nili Ravi female buffalo calves \pm 3 days of age were randomly divided into three groups, conventional milk feeding (CMF), limited milk feeding (LMF), short milk feeding (SMF) and calves in each group were weaned at 12, 10, 8 weeks of age respectively. After colostrum feeding for first three days the whole milk (WM) was fed @ 10% body weight twice daily in two equal proportions till weaning. The calf starter (CS) diet with 18% crude protein and ME of 3.2 Mega calories/Kg was provided ad libitum along with free choice fresh water through out the study. Calf starter intake was measured daily while calves weight and body measurements (withers height, heart girth and hip width) were conducted weekly till 12 weeks. The results suggested that calves weight and body measurements were not significantly different among the treatments ($p < 0.05$). The starter intake was significantly higher in SMF group and in contrast WM consumption was lowest in the group. Optimal growth performance, similar body measurements data and lesser milk consumption by SMF group indicate that weaning, as early as 8 weeks of age, can be successfully and economically achieved in Nili Ravi female buffalo calves.

Key words: Early weaning, whole milk, calf starter, Nili Ravi Female Buffalo Calves

COMPARISON OF THE DIFFERENT ENERGY SOURCES IN CONCENTRATE OF GROWING NILI RAVI BUFFALO HEIFER CALVES AND THEIR EFFECT ON GROWTH, INTAKE AND BODY MEASUREMENT

Ehsaan Ullah Khan and Prof. Dr. Talat Naseer Pasha

Abstract

Female buffalo calves are commonly seen as “cost center” but these represent the future investment for producers. Nutritional regime of post-weaned buffalo heifer calves should not only care for health and growth but also completing rumen development in early possible time. Focusing on sustainable nutrient supply from concentrates for rumen development and obtaining growth potential, the present study was conducted to determine the effect of different energy sources in concentrate part of ration. The response on weight gain and structural growth was determined on 18, 3 Mo. \pm 10 days old post-weaned Nili Ravi buffalo heifer calves of 74 ± 1.5 Kg BW randomly assigned to one of the three treatment groups. Ration consist on 40% good quality oats silage as forage source and 60% concentrate with three different energy sources as treatment, 1-Corn based (CB), 2-Molasses based (MB) and 3-Corn +Molasses based (CMB). The feeding period continued for 90 days and individual DM intake was calculated daily. Growth and body measurements were taken fortnightly. The results suggest that ADG ($551 \text{ g/d} \pm 21$) was not significantly different in treatment groups while structural measurements were same in all except that of withers height in CMB. The DM intake was comparatively lower in MB as compare to CB and CMB but was not significantly different. The data indicates that optimal growth rates can be achieved with the 60:40 ratio of concentrates to forages in ration and the energy source, in concentrate portion of ration, balanced with starch (corn) and sugars (molasses) is more beneficial for growth and health in Nili Ravi buffalo heifer calves.

PERFORMANCE OF CATTLE MALES TREATED VIA GROWTH PROMOTERS UNDER INTENSIVE PRODUCTION SYSTEM

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Abstract

Growth performance of cattle males treated via injectable, implant and oral growth hormones under intensive production system was evaluated for eighty four (84) days at Dairy Animals Training and Research Centre, Ravi Campus, Pattoki. Twenty (20) male cattle calves of same age (20 ± 1 months) and weight (220 kg) were equally allocated according to Completely Randomized Design to four treatments i.e. Injected bST @ 500 mg/animal at 15 days interval, implant (Zeranol @ 36mg/animal once), oral (Harmonic Media M2 @ 500 mg/animal/day mixed in concentrate diet) and only on concentrate (control) designated as bST, IMP, ORAL and CON, respectively. The calves had free access to clean drinking water and maize silage + concentrate with a ratio of 40:60 on dry matter basis. The data on daily DMI, weekly weight gain, FCR and production economics was collected. The mean daily DMI/kg^{BW} was 28.34 ± 1.40 , 29.52 ± 0.55 , 29.68 ± 0.51 and 31.22 ± 1.44 gm treated via bST, IMP, ORAL and CON, respectively. Significant ($P<0.05$) difference in daily DMI was recorded between treatments. Highest (6.99 ± 3.32 kg) weekly weight gain was recorded in calves on bST followed by ORAL, IMP and CON, respectively. FCR in calves was significantly ($P<0.05$) best on ORAL (9.71 ± 4.50) followed by bST (11.09 ± 7.71), IMP and poorest in calves on CON (15.41 ± 5.82) diet, respectively. Statistically non-significant ($P>0.05$) difference was recorded between calves on bST and IMP treatment. Economic analyses reported a significantly higher (Rs. 4413.75 ± 16.79) gross margin during the trial period in calves on IMP followed by bST, ORAL and CON (Rs. 404.15 ± 5.09), respectively. On the basis of the findings it is concluded that the growth promoters used via IMP and ORAL helpful for fattening of male calves as they improved the growth, feed conversion ratio and higher gross margin.

Keywords: Cattle males, growth hormone, bST, DMI, oral harmonic media, implants, weight gain, feed conversion ratio.

EFFECT OF MANNAN OLIGOSACCHARIDES (MOS) ON THE PERFORMANCE OF NEONATAL CROSS BRED CALVES

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Abstract

Calves are seeds of any farm and every new born calf is supposed to enhance/sustain the flock volume and improve genetic status resulting in improved economics of farming community. High calf mortality is one of the most crucial aspects that discourage animal production and reproduction, compelling the farmer/firm towards huge economic losses. Misuse of antibiotics against high calf mortality resulted in resistance development in pathogens therefore compromised efficacy of antibiotics, residues in milk and meat resulted in severe allergic reactions, fatal blood dyscrasia and altered intestinal micro-flora. Treatment expenses, discard of residues containing milk and meat and culling of potent animals disturbed the economy greatly. A recent advancement in this regard is made by the use of prebiotics which are being used as additive in milk replacer and act as best alternate to antibiotics with very less/no residual effects. In this regard, current study was conducted for a period of 70 days to check the efficacy of mannan oligosaccharide (MOS) (ActigenR-Altech) on the performance of neonatal cross bred calves. Five days old calves were divided into two groups; treated and controlled, each having 16 heads and given an adaptation period of 15 days till rumen development. Significant improvement in the performance was observed as there was high dry matter intake, improved weight gain, good health performance and low incidence of digestive problems in the treatment group compared to controlled. The current study highly suggests the use of MOS in the milk replacer and best alternates to antibiotics.

Key Words: Calves, Health performance, Antibiotics, Alternate, Mannan oligosaccharide.

EFFECT OF PALM KERNEL CAKE ON FEED INTAKE, GROWTH RATE, AND DIGESTIBILITY IN GROWING NILI-RAVI BUFFALO CALVES

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Abstract

The study was planned to see the effect of palm kernel cake on growth rate, feed intake and digestibility in buffalo calves. 25 buffalo male calves of 18 months of age having body weight of 160 ± 10 kg were divided into five groups according to Completely Randomized Design. Five iso-caloric and iso-nitrogenous concentrates viz A, B, C, D & E were formulated replacing 0, 25, 50, 75 and 100 % of cotton seed cake with 100, 75, 50, 25 and 0% palm kernel cake (PKC). The animals were fed individually at ad libitum intakes for 90 days. Feed offered and refusals were recorded daily and composited for analysis. During last week of the study, a digestibility trial was conducted; insoluble ash was used as digestibility marker. Five rations were randomly allotted to each group of animals and were fed adlib. The dry matter intake for group A (PKC 30%, CSC 0%) was 6.03kg, for

B (PKC22.5%, CSC7.5%) was 5.75kg, for C (PKC 15%, CSC15%) 5.92kg, for group D (PKC7.5% CSC 22.5%) was 6.25kg and for group E (PKC0%, CSC30%) was 6.24kg. Dry matter intake of groups A and C was not significant ($P>0.05$) to each other (6.03 and 5.92kg/day) similarly DM intake of groups D & E was also non significant ($P>0.05$) to each other (6.25 and 6.24kg/day). But the DMI of group B was significant lower ($P<0.05$) to all other groups. (5.75kg/day) The weight gain per day was higher in group A and D (0.85kg) followed by animals of groups C and E which was 0.82kg. The less weight gain was observed in animals consuming ration B. The growth performance was all groups was non significant to one another ($P>0.05$) except group B. The daily weight gain of group B was significantly lower ($P<0.05$) which was 0.75kg/day. The Feed efficiency (feed intake per unit gain) in animals fed ration A was (7.14) which was less followed by group C, D, E and B respectively. The feed conversion efficiency of group A was significant lower ($P<0.05$). Digestible DM and CP and NDF intakes were lower in buffalo calves fed diet A. It was concluded Palm Kernel Cake can replace cotton seed cake without any harmful effect on growth performance in male buffalo calves.

Keywords: Palm kernel cake, Buffalo calves, Feed efficiency

EFFECT OF REPLACING COTTON SEED CAKE WITH GUAR MEAL ON GROWTH PERFORMANCE AND ECONOMICS OF SAHIWAL CALVES

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Abstract

The study was conducted to examine the effect of replacing cotton seed cake (CSC) with guar meal (GM), partially or completely, on nutrient intake, digestibility, growth performance and economics using Sahiwal calves. Twelve female Sahiwal calves of 8-10 months of age were used in a randomized complete block design. These calves were divided into 3 groups, 4 calves in each group. Three iso-nitrogenous and iso-caloric rations containing CSC (15%), GM (15%) and CSC and GM (7.5% each) were formulated. The study continued for 90 days. The first 25 days were adaptation period, while last five days of each month was taken as collection period. Chemical composition indicated that CSC contained 23.04% CP, 31.23% NDF and 18.49% ADF contents while GM contained 39.67% CP, 31.22% NDF and 17.77% ADF contents. Non-significant effects were observed on nutrient intake and digestibility in calves fed rations containing CSC, GM, CSC+GM. Concentrations of blood glucose, blood protein and blood urea nitrogen were also remained unaltered. Total weight gain by calves was unaffected due to replacing CSC with GM. Guar meal containing diets were cheaper than CSC based diet. The study revealed that replacing CSC with GM helped in economical ration formulation without any adverse effects on growth performance of the calves.

Key words: cotton seed cake, guar meal, calves, growth performance, economics

EFFECT OF FEEDING VARIOUS ENERGY LEVELS ON NUTRIENT UTILIZATION AND GROWTH IN MALE BUFFALO CALVES

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Abstract

Eighteen male Murrah buffalo calves were randomly divided into three groups of six animals in each having average body weight 190.24 ± 10.39 kg and age between 7-12 months. First group (control) was fed as per NRC (2001). Second and third groups were fed ration containing 10% and 20% higher energy than control. Experiment was conducted for 135 days. The metabolic trial was conducted for seven days at the end of feeding trial to ascertain the nutrient balance. DM intake (kg/100kg body weight) was 2.64, 2.78 and 2.82 in group 1, 2 and 3, respectively. There was significant difference in DM intake between the control and 20% higher energy fed group throughout the experimental period. CP intake (g/100 kg BW) was significantly higher ($P < 0.05$) in group 3 (286.39) than group 1 (259.27) and 2 (267.15) calves. The mean TDN intake (kg/100 kg BW) was 1.57, 1.66, and 1.74 in group 1, 2 and 3, respectively. Group 3 has significantly higher CP intake and TDN intake than the group 1 and 2. Average daily gain was numerically higher in group 2 (777.40 g/d) and group 3 (771.64 g/d) than group 1 (759.67 g/d) but values differed non significantly. The FCR was 10.06, 11.36 and 10.98 kg in group 1, 2 and 3, respectively and these values were non significantly differed in all three groups. The scrotal circumference was 18.90, 19.51 and 19.71 cm in respective groups during different months. There was no significant difference in overall scrotal circumference among all the three groups. There was significantly higher digestibility of DM and EE in group 3 than the group 1. The digestibility of OM was significantly higher in group 3 than group 1 and 2. The CP digestibility was higher in group 1 than group 2 and same in case of group 3. The digestibility of NDF, ADF, cellulose and hemicellulose were not differed significantly in group 1, 2 and 3. There was no significant difference between N intake and outgo and balance. The present study revealed that there were no differences in average daily gain, feed conversion ratio and scrotal circumference in male Murrah buffalo calves fed 10% and 20% higher energy. It was concluded that the energy requirement of buffalo male calves is adequate that is described for cattle in NRC (2001).

EVALUATION AND UTILIZATION OF RUMEN CONTENT FOR FATTENING OF NILI-RAVI MALE CALVES

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Abstract

A metabolic trial was conducted at Buffalo Research Institute, Pattoki, in which 25 male buffalo calves were fed the diets having total mixed ration (100% TMR) (Tc), 70% TMR with 30% silage1 (T1), 70% TMR plus 30% silage2 (T2), 70% TMR with 30% silage3 (T3), and 70% TMR plus 30% silage4 (T4). The data thus obtained was statistically analyzed using one way analysis of variance (ANOVA) technique. Among the treatments containing ensiled rumen contents without molasses, feed efficiency was significantly ($P < 0.05$) more efficient than those silages which were ensiled along with molasses. However, the DM intake was significantly ($P < 0.05$) higher in control group and silage treated with molasses and urea. When means were compared there were significant differences among all treatments for DM intake and feed efficiency. Comparatively efficient TMR (1&3) are those which formulated with those silages (silage1&3) which do not contain molasses. TMR1 is the most economical and the best efficient TMR which is formulated with silage1 (containing just rumen content and wheat straw 50:50 without any treatment of urea and molasses). Even TMR formulated with silage1 is more efficient than control TMR and it also economical as compare to control TMR. It was concluded that rumen contents could replace 50% of conventional TMR without any adverse effects on health of buffalo calves.

Key words: Rumen contents, buffalo calves, Total mixed ration, Silage

EFFECT OF VARYING LEVELS OF CONCENTRATE RATION ON THE PERFORMANCE OF NILI-RAVI BUFFALO HEIFER CALVES

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Abstract

The current study was conducted to set the appropriate concentrate level for Nili-Ravi buffalo heifers. Twenty seven buffalo heifers were randomly divided into three different groups A, B and C having nine animals in each group. All the heifers were given free access to chopped green fodder and fresh water. In addition, heifers of group A, B and C were given concentrate at the rate of 0.5%, 1% and 1.5% of their body weight. The average daily dry matter intake was 2.69, 3.06 and 3.83 kg with average daily gain of 456.09, 398.56 and 515.87 gm in group A, B and C, respectively. The feed conversion ratio of heifers of these groups was 5.89, 7.74 and 7.52, respectively. There was non-significant ($P > 0.05$) difference in the body measurements (height at wither, body length and heart girth), final body condition & scoring and blood serum (glucose, total protein and cholesterol) of heifers of all the three groups. The results of current study shows that there is non-significant ($P > 0.05$) difference in the growth rate of Nili-Ravi heifers at varying levels of concentrate so, it is cost effective to raise 6-8 month calves by offering concentrate at the rate of 0.5% body weight along with free access of green fodder.

Key word: Concentrate level, buffalo heifer, body measurement, green fodder

ECONOMICS OF REARING NILI-RAVI BUFFALO HEIFERS ON VARYING LEVEL OF PROTEIN AND ENERGY

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Abstract

The current study was planned to examine the response of Nili-Ravi heifers on altered dietary protein and concentrations. Twenty seven female buffalo calves were selected and randomly distributed in three different groups A, B and C. These groups A, B and C were given three different levels of concentrate. A non-significant ($P>0.05$) difference was observed in the protein intake of group B & C while group A has taken significantly ($P<0.05$) lesser protein as compared to group B & C. There was significant ($P<0.05$) difference in the average daily gain of group B & C while non-significant ($P>0.05$) difference was observed in group A&B and A&C. A non-significant ($P>0.05$) difference was observed in average daily total energy intake in group A and B ($21.10^b \pm 3.70$ & $24.66^b \pm 2.39$) while significant ($P<0.05$) difference was observed in group A & C and B & C, respectively. There was a non-significant ($P>0.05$) difference in the blood profile of all the groups. The cost for production of one kg weight in group A was significantly ($P<0.05$) lowers as compared to other two groups B & C, respectively. The above study shows that group A has taken lower protein & energy and its average daily gain was same as that of other groups B & C. So, it is recommended that 0.5% concentrate level is economical without affecting the production performance of 6-8 month Nili-Ravi heifers.

Key word: Heifers, concentrate levels, cost, protein, energy

SAHIWAL CALVES: FEEDING WHOLE MILK AND MILK REPLACER

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Abstract

The objective of trial was to determine the effect of feeding whole milk or milk replacer during early age on average daily gain and growth of Sahiwal calves. The experiment was conducted at Livestock Experimental Station, Jahangirabad on forty eight new born calves. First 14 days of age calves were fed colostrum and whole milk (WM) @ 10 % of body weight. The calves were randomly allotted six treatment groups i.e. A, B, C, D, E and F were offered WM (Control), WM+calf starter (CS), WM+Milk replacer (MR), WM+MR+CS, MR and MR+CS, respectively. The experiment continued for 120 days. Daily milk intake was highest ($P<0.05$) in calves on treatment WM+CS (2.33 ± 0.21 kg) followed by WM, MR, WM+MR+CS and MR+CS, respectively. Highest daily gain ($P<0.05$) was observed in the calves on treatment WM+MR+CS (0.38 ± 0.02 kg). Increased in body height ($P<0.05$) was 0.70 ± 0.07 , 1.08 ± 0.10 , 0.75 ± 0.09 , 1.14 ± 0.09 , 0.74 ± 0.09 and 1.13 ± 0.10 cm, respectively on WM, WM+CS, WM+MR, WM+MR+CS, MR and MR+CS at fortnightly interval. Increase in body length was highest ($P<0.05$) on WM+CS diet. Significant differences ($P<0.05$) in heart girth were recorded among treatments. Cost to gain ratio was lowest (Rs 156.68) on treatment MR+CS.

Key word: Whole Milk, Milk Replacer, calf starter, Body measurements

EFFECT OF DIFFERENT MANAGEMENT SYSTEMS AND MINERAL FEEDING ON AGE AT PUBERTY IN NILI-RAVI BUFFALO HEIFERS

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Abstract

The objective of present study was to determine the effect of management system and mineral feeding on age at puberty, seasonality in breeding behavior and estrus response in Nili Ravi buffalo heifers. The age at puberty and seasonality in breeding behavior in buffalo heifers (n = 487) were assessed through a survey in stall and pasture feeding system. To determine the effect of mineral supplementation on estrus response, a group of thirty five buffalo heifers in stall feeding system that had passed the average age of puberty as assessed by survey were randomly divided into two groups; GI and GII. GI (n = 20) were fed with mineral mixture (100 grams/day/heifer) for a period of four weeks. Whereas, GII (n = 15) did not receive any mineral supplementation. Visually, estrus response (%) was observed in both the groups. The results of survey indicated that the age at puberty and seasonality in breeding behavior in buffalo heifers was lower (P<0.05) in pasture system compared to stall feeding system. Mineral supplementation enhanced estrus response significantly (P<0.05) in GI compared to GII heifers (65% vs. 33%). It is concluded that in pasture system buffalo heifers have lower age at puberty and minimal seasonality in breeding behavior. Furthermore, mineral feeding could be helpful to induce estrus in heifers that had achieved or passed average age of puberty.

Key Words: management systems, mineral feeding, puberty, estrus, buffalo heifers

EFFECTS OF DIFFERENT PROTEIN AND ENERGY LEVELS OF CALF STARTERS ON GROWTH PERFORMANCE IN RED SINDHI MALE CALVES

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Abstract

This study was conducted to determine the effects of different protein and energy levels of calf starters on weight gain and feed efficiency in *Red Sindhi* male calves. Thirty five newly born *Red-Sindhi* male calves were randomly divided into seven experimental groups i.e. A, B, C, D, E, F and G of five calves each. Each group was housed separately in the pens having common feeding and watering systems. Calves were fed adequate colostrum immediately after birth for three days. From day 4th, group A was fed whole milk at the rate of 1/10th of body weight (BW) per calf for first 4 weeks, 1/15th of BW for 5-8 weeks and 1/20th of BW for 9-13 weeks of age. The remaining six groups were given milk at the rate of 1/10th of BW per calf for first 4 weeks, 1/15th of BW for 5th week and 1/20th of BW for 6th week of age. From fourth week, these groups were randomly introduced one of the six experimental calf starters having three crude protein (CP) i.e. 16, 18 and 20% and two metabolizable energy (ME) 2.8 and 3.0Mcal/kg levels on *ad-libitum* basis. At the end of 6th week, milk supply to these six groups was stopped and the calves were shifted to calf starters that were fed for further 2 months. All the calves were also offered chopped green fodder along with fresh and clean water. Feed intakes, body weights and feed efficiency (FE) were determined weekly. Weight gain and FE of group B calves fed on 16% protein and 2.8 Mcal/kg energy calf starter were significantly (P>0.05%) poorer as compared to other groups. However, there was no significant difference in dry matter intake (DMI) among the groups. Feed efficiency of group A reared on milk

was significantly ($P>0.05\%$) better (2.55) as compared to other groups (2.87 to 3.30) but the cost of feeding of that group was also on the higher side. These results indicate that a calf starter having combination of 16% protein and 3.0Mcal/kg energy (Group C) is sufficient to introduce successful weaning in *Red Sindhi calves* as it produced similar results to that of other calf starters with 18 or 20% CP and 2.8 or 3.0Mcal/kg energy.

Key words: *Calf starter, Protein, Energy, Weight gain, Feed efficiency*

MILK AND MILK REPLACER PERFORMANCE IN DAIRY CALVES

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Abstract

As the future productive units of a dairy herd, calf feeding is important that represent to grow economically and at optimal rate to achieve puberty at lesser age. The first two month are important in rearing calves for replacement heifers that allows a smooth transition from milk to solid feed. In past, different scientist struggles to develop an appropriate feeding method that is more efficient, reduce disease risk and cost effective. To encourage early intake of milk, milk replacer, calf starter and conventional feeding program have a limitation to supply of milk @ 10% of body weight, have many pros and cons. However, calves fed free access of milk critically reviewed the literature and examining that feeding whole milk, milk replacer, and starter ration are needed to exploit more through research. The milk feeding calves should be fed in such a way to have greater body weight, improve feed efficiency, reduced incidence of disease, and have a natural behaviour, weaning methods influences feed efficiency, rumen development, improve growth and have a long term effect on heifer performance and improve lactation performance in dairy cattle.

Keywords: Milk, Milk Replacer, Starter Ration, Feeding Management, Nutrition

THE EFFECT OF COTTON SEED CAKE, LUCERNE HAY SUPPLEMENTATION ON INTAKE OF MAIZE STOVER AND WEIGHT GAIN BY MALE SAHIWAL BULL

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Abstract

The experiment was conducted at livestock research and development station surezai Peshawar during March 2012 to study the effect of cotton seed cake, Lucerne hay supplementation on intake of maize stover and weight gain by male sahiwal bull. Twelve (12) young Sahiwal bull breed, 280 kg average liveweight and 2 years of age were randomly put into 4 groups of 3 animals under intensive feeding system to determine the effect of different protein supplements on growth, and intake of chopped, dried maize stover. A control group was fed stover ad libitum only, and the other groups were fed daily 750 g cottonseed cake/head, 1 kg lucerne hay or 900 g of lucerne/cottonseed cake (66:34; w/w). Significant differences were observed on average daily liveweight gains. Animals on lucerne and its mixture registered higher daily gains (243 g) and (330 g) respectively, followed by cottonseed cake (156 g); the control group lost weight (-8.0 g/d). Contrary to the live weight gains, animals fed on lucerne and its mixture had lower maize stover intakes, 3.35 kg DM/animal/day and 3.70 kg DM respectively, while those on cottonseed cake and the control group ingested respectively 4.72 kg DM and 4.16 kg DM maize stover. It is concluded that during the critical period in the suburb of Peshawar, small-scale farmers can prevent loss in live weight by utilizing simple available rations.

Beef Nutrition

EFFECT OF BOVINE SOMATOTROPIN ON MEAT PRODUCTION POTENTIAL AND MEAT QUALITY IN GROWING BUFFALOES

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Abstract

The present study was conducted to see the effect of Bovine somatotropin on total weight gain, weight gain, feed efficiency and carcass composition of male buffalo calves (n= 16) for 3 months. They were divided into four groups A, B, C and D with 4 animals in each group. The group A was given offered with green fodder ad libitum and the group B was offered with ad-libitum green fodder along with bST hormone (125mg/animal) at an interval of 14 days, while the animals of group C were offered with fodder ad libitum + 1% b. wt. In group D animals were given fodder ad libitum + 1% b.wt. Experimental ration + bst injection s/c at the interval of 14 days. The feed efficiency of group A, B, C and D was 8.08, 4.89, 5.91 and 4.79 with an average daily weight gain of 0.31, 0.48, 0.62 and 0.71 kg, respectively. The dressing percentage for group A, B, C and D was 47.04, 48.35, 48.59 and 49.76 respectively. The percentage of liver, spleen and kidneys were 1.8, 1.17, 1.61, 1.53 percent and 0.32, 0.44, 0.33, 0.42 percent and 0.33, 0.34, 0.32, 0.35 percent for group A to D respectively. The value for other components like mesenteric fat, feet, head and skin were 1.8, 1.84, 1.87, 2.4 percent for mesenteric fat and 3.04, 3.38, 2.93 and 2.64 percent for feet and 5.03, 5.13, 4.67 and 4.57 percent for head and 10.5, 9.46, 10.32 and 10.0 percent for skin of group A to D, respectively. The percentage ratio of meat, bone, fat and other tissues were 49.5, 51.6, 50.5 and 49.5 percent, 34.15, 33.0, 34.5 and 35.15 percent, 7.5, 9.25, 8.0 and 9.5 percent 4.20, 3.85, 4.5 and 5.1 percent for group A to D, respectively. The chemical composition of meat revealed 74.37, 73.0, 74.87 and 76.30 percent moisture, 19.75, 20.75, 21.0 and 20.50 percent for crude protein, 8.15, 9.0, 9.15 and 9.07 percent for ether extract, 6.08, 6.6, 6.15 and 7.0 percent for ash in group A to D respectively. The overall data suggested that the use of bST has positive effect on meat production.

EFFECTS OF COMPENSATORY GROWTH ON ATTAINMENT OF PUBERTY IN SAHIWAL CATTLE HEIFERS FED LOW FOLLOWED BY HIGH ENERGY BASED TOTAL MIXED RATIONS"

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Abstract

Twelve heifers of Sahiwal cattle breed of 14±1 month's age were divided into two equal groups after one month adjustment period. First group was fed as per National Research Council (NRC) requirements of Jersey breed's heifers throughout the study period while second group was fed stair-step feeding (SSF) that consisting of two rations having 20% below (SSL) or 20% above (SSH) of NRC energy levels. The SSF group was started on SSL ration for 4 months followed by SSH for 2.5 months. The SSF heifers gained 16% higher (p<0.05) daily weight (0.80 vs. 0.70 kg/head) and better FCR (7.20 vs 8.02) than NRC group whereas no difference (p>0.05) was found in daily DM intake (5.50 vs 5.73 kg/head) between the groups. Heifers showed estrus was bred by natural mating. Upto the age of about 22 months, 100% of SSF and 83% of NRC heifers attained puberty. The difference was not significant (p>0.05) in age and BW at first estrus and number of services per conception

between the groups. Overall feed cost incurred on SSF was 12% lower ($p < 0.05$) and had no adverse effects on growth rate and reproductive parameters compared to NRC group.

DIETARY MANIPULATION TO COMBAT RUMINANT METHANE PRODUCTION

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Abstract

Mitigating methane (CH₄) losses from ruminants is generally required to minimize global greenhouse gas emissions and to enhance animal performance by improving feed conversion efficiency. The production of CH₄ has been reduced using various techniques which affect the metabolism, microbial population and/or animal digestive physiology. These technologies can be broadly classified into improved nutrition and fermentation modification strategies. The nutritional approaches include dietary manipulation and feed additive supplementation. This paper presents some promising methane mitigation options with special consideration to ruminant dietary modification.

Keywords: methane; forages; concentrate; lipid; mitigation

FEEDING STRATEGIES FOR BEEF PRODUCTION

S.K.Ranjhan

Abstract

India is world's largest exporter of buffalo meat known as Carabeef globally. In 2011-12, it exported 70% of its buffalo meat production accounting for 972,863 Million Tonnes of deboned buffalo meat equivalent to 1.25 Million Tonnes of dressed buffalo carcasses valued at Indian Rupees 13,6178 Millions (US \$ 2.5 billions). There are 32 modern meat processing plants which are fully integrated right from slaughter to the production of frozen buffalo meat with rendering and effluent treatment plants to ensure green safe meat production. The plants are world class with HACCP, ISO 9001:2000 and SGS certification.

Individual identification and traceability is now the hallmark of meat production in a '*farm to fork concept*'. The animal rearing farms are likely to come up as a backward integration to modern plants. The paper deals with rearing of male buffalo calves for meat production.

Key words – Meat Processing; Backward Integration; Identification; Traceability.

CHEMICAL CONSTITUENTS, MINERAL PROFILE AND *IN SITU* DIGESTIBILITY OF CERTAIN IRRIGATED GRASSES

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Abstract

The study determined the nutritive value of *Panicum antidotale*, *Sorghum halepense*, *Pennisetum purpureum*, *Vetiveria zizanioides* and *Cymbopogon citrates* grasses for ruminants. Five samples of each grass were taken and composite samples of each grass were oven dried at 55°C for ash for 48 hours. Chemical analysis revealed that dry matter (DM) content varied from 11.88% (*P. purpureum*) to 38.42% (*V. zizanioides*). Maximum crude protein (14.28%) was observed for *P. antidotale* while minimum (8.19%) was noted for *P. purpureum*. Higher ash content (14.99%) and lower neutral detergent fiber (NDF) contents (53.1%) were observed for *P. antidotale*. Higher hemicellulose (50.2%) and lignin (8.5%) contents and lower organic matter (86.40%) were noted for *V. zizanioides*. Gross energy value was optimum (3654.28 Kcal/kg) for *P. antidotale* but minimum (2799 kcal/kg) for *C. citrates*. The Ca, 2.4-3.2 g/kg; P, 0.29-0.59 g/kg; Mg, 0.48-0.72 g/kg; Na, 2.5-7.5 g/kg; K, 16.6-26.1 g/kg; and Ca:P ratio, 4.67-10.67 g/kg were observed among grasses. Maximum *in situ* digestibility (74.2%) and NDF digestibility (67.96%) were noted for *P. antidotale*, while minimum *in situ* digestibility, DM digestibility (29.5%) and *in situ* NDF digestibility were examined in *V. zizanioides*. Based on the findings of the present study, grasses as ruminant feed were ranked as *Panicum antidotale* > *Vetiveria zizanioides* > *Sorghum halepense* > *Cymbopogon citrates* > *Pennisetum purpureum*.

THE MEASUREMENT OF RUMEN DEGRADABILITY OF DIFFERENT SOURCES OF PROTEIN USING *IN SITU* TECHNIQUE

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Abstract

A study was conducted to determine nitrogen (N) and dry matter (DM) disappearance of linseed meal (LM), malt culms (MC), maize gluten meal (MGM), double zero rapeseed meal (00 RSM), high glucosinolate rapeseed meal (HG-RSM), sunflower seed meal (SFM) and field beans (FB) from the nylon bags suspended in the rumen of sheep. The bags were removed at 3, 6, 9, 12, 15, or 24 hour. Results for N and DM disappearance with incubation time were fitted to the exponential equation $a+b(1-e^{-ct})$ using non-linear regression. The effective degradability of each ingredient was estimated from non-linear parameters assuming a constant outflow of solid (0.05/h) from rumen. Maize gluten meal was observed to be least degradable ($P<0.01$). Linseed meal, MC, 00 RSM, HG-RSM and SFM intermediate and FB the most degradable vegetable protein ingredients ($P<0.01$). Washing losses formed a substantial proportion of the potential degradability. Both 00 RSM and HG-RSM exhibited similar rate and extent of degradation of N and DM after 24 h incubation. Maize gluten meal showed the lowest 'b' for N (32.4) and DM (42.2). Field beans gave a very high 'a' both for DM (49.3) and N (60.1) respectively.

Key Words: Nitrogen disappearance; dry matter disappearance; protein ingredients

LIVESTOCK FEED RESOURCES AND FEEDING PRACTICES IN BALOCHISTAN

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Abstract

Balochistan province is blessed with rich livestock wealth and vast rangelands for their feeding. Small ruminants are the major users of biomass in grazing lands; however the overall biomass productivity (ranges from <30 kg to 280 kg /hec) and nutritional significance of rangelands is low enough to maintain good health and livestock production. Fodder is mostly grown in plain areas of Balochistan especially in Naseeabad and Sibi zones which can fulfill the needs of native livestock of the area. Lucerne, berseem and sorghum fodders are mostly grown in the province. The estimated dry matter/crude protein availability from Kharif and Rabi fodders in Balochistan are 117000/ 9360 and 100540/18097 tons, respectively. The estimated yield of wheat straw and sorghum stovers are 1093715 and 59487 tons respectively. Among industrial by products, wheat bran, rice husk and rice polishing are obtained locally. The prevailing livestock feeding practices in the province revolves around grazing, fodder and mixed feeding systems which need more improvement for balanced feeding coupled with development of feed resources for better meat and milk production and economic returns.

Dairy Nutrition

RESPONSE OF STRAW BASED COMPLETE BLOCK FEEDING ON MILK PRODUCTION PERFORMANCE OF DAIRY ANIMALS IN THE HILLS OF NEPAL

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Abstract

Crops residues from various cereals and legumes are major source of feeds for ruminant animals in Asian countries. Rice and wheat are the main staple food crops, after grain harvest farmers remain straw in the field and burnt where other sources of feeds are available. Dairy farmers across Asian countries mainly use straw as basal diet with little supplemental bran (rice and wheat bran) and oilseed cakes. Straw content low nutrients, carbohydrate link with lignin and make less digestible and protein content in straw is very negligible (less than 4 percent) and not easily available to the animals due to bonding with lignin. In this regard one research trial was conducted to know the milk production performance of dairy animals by feeding straw based complete feed block. Nine newly calved dairy cows were randomly assigned to three treatments in summer months (May to July, 2012) in 2011 and 2012. The treatments composition were chaffed rice straw with sugarcane molasses and urea (0.5%) then compressed to form 5 kg block (T1), similarly from wheat straw (T2) and in the treatment three (T3) same as composition in T1 but non block. The ration was formulated as 3 percent of the body weight of the animals and 3:1 ratio of roughages and concentrate with 1/3 portion green grass of roughages fed twice daily. There was significant increase in milk production when straw based complete feed block was feeding to dairy cows. In the rice growing Asian countries this technology will be viable option to utilize crop residues (Crop residues, straw, maize stover and sugarcane byproducts) as source of feeds for ruminant animals and consequently minimize the green house gases (CH₄) emitting from animals and from crop fields.

INCREASING THE DIETARY PROTEIN EFFICIENCIES THROUGH ESSENTIAL AMINO ACID BALANCE IN CORN SILAGE –SOYBEAN MEAL BASED DIETS IN LACTATING DAIRY COWS

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Abstract

Balancing the essential amino acid (EAA) profile of diets is one of the effective tools to decrease the total protein intake in dairy cows. The protein digestible in the small intestine system (PDI, INRA, 2007) allows user evaluating methionine (Met) and lysine (Lys) contents in diets as well as estimating the animal requirements. Recently, we performed several experiments in lactating cows fed corn-silage and soybean meal based diets with or without balancing EAA profile under the EU project "Rednex". The EAA balance in these studies were created through 1) duodenal infusions and 2) dietary manipulation and using analog of methionine [an isopropylester 2-hydroxy-4-(methylthio)-butanoic acid (HMBi)]. Our objective in these studies were 1) to refine the ideal requirements for EAA beyond Met and Lys and to compare the increase in milk protein yield and PDI efficiencies when diets were balanced with 2, 4, or all 9EAA; and, 2) to see if the response of balancing the EAA profile at low vs. high levels of protein supply is similar for milk protein yield. The results of these studies validate following requirements for EAA in dairy cows: 2.5% of PDI for Histidine, 8.9% of PDI for Leucine, 5.2% of PDI for Isoleucine, 5.1%-5.9% of PDI for Valine, 3.1% of PDI for Arginine, and 5.4% of PDI for Phenylalanine. The dry matter intake was decreased when

diets were balanced with Met and Lys at high PDI levels without decreasing the milk protein yield. In conclusion our research clearly demonstrate that balancing EAA profile of diet is very effective mean of decreasing the protein intake of dairy cows with out costing the milk protein yield, first by, increasing the PDI efficiency of conversion to milk and secondly by decreasing the dry matter intake without modifying the milk protein yield.

OPTIMAL PROTEIN NUTRITION AND ROLE OF MICROBIAL PROTEIN SUPPLY IN DAIRY ANIMALS

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Abstract

Microbial protein synthesis in rumen is a major output of rumen fermentation. It is directly related to the amount of organic matter (OM) fermented in the rumen. Microbial protein (MP) is expressed as microbial N yield per unit of OM fermented in the rumen. The amount of OM fermented largely depends on the supply of fermentable metabolisable energy (FME). Therefore, it is more logical that MP synthesis in rumen is expressed as microbial crude protein (MCP) per unit of FME in the diet. Microbial growth efficiency has been increased successfully by manipulating different sources of FME. This has resulted in increased MP supply, increased fibre digestion and increased contribution to the total metabolisable protein requirements in dairy cows. A MP synthesis at the rate of 9 g MCP per MJ FME can meet 0.58-0.61 MP requirements of dairy cows at different level of milk production. However, 13 g MCP per MJ FME can meet 0.84-0.88 MP requirements of dairy cows at different levels of milk production. This indicates that by increasing the microbial growth efficiency, the cost of protein ingredients in dairy diets can be decreased substantially. Therefore, maximisation of microbial protein economically is desirable as it not only saves the cost but provides a protein of high digestibility (>0.8) with excellent amino acid profile.

Key words: Organic matter, Microbial protein, fermentable metabolisable energy, dairy cows

EFFECT OF INOCULATED CORN SILAGE ON MILK PRODUCTION PERFORMANCE OF LACTATING SAHIWAL COWS

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Abstract

Feeding management study was conducted at Livestock Production Research Institute, Bahadurnagar Okara to determine the effect of inoculated corn silage on milk production performance of lactating Sahiwal cows. Eighteen healthy lactating Sahiwal cows of same lactation stage were randomly allocated to two treatments designated as ICS (Inoculated Corn Silage) and UCS (Un-inoculated Corn Silage- Control) and were fed individually for 60 days. Corn silage was inoculated by using a commercial inoculant “**Sil-All**” by **ALL-TECH** and offered ad-libitum. Concentrate was provided to each cow @ 1 Kg for each 3 liter of milk produced. Data on feed intake, daily milk production and weekly weight gain was recorded and analyzed through Paired Sample T-test. Milk samples using

“Milk-O-Scan” were analyzed for Lactose, Fat, SNF and Protein in the Dairy Laboratory, LPRI Bahadurnagar. The feed samples were analyzed for Dry Matter, Crude Protein, Ether Extract, Crude Fiber, ADF, NDF and Ash contents. Daily silage intake in Sahiwal cows was 30.12±0.601 and 26.29±0.614 kg fed on ICS and UCS, respectively. Daily intake of ICS was higher (P<0.05) in lactating Sahiwal cows than on UCS. Mean milk production and fat contents in cows on ICS feeding were also significantly higher (P<0.05) than the cows under control. Significantly higher (P < 0.05) solids not fat contents were recorded in cows on ICS diet than the cows on UCS. Mean body weight in Sahiwal cows on ICS was higher but differences between treatments were non- significant (P>0.05). Mean crude protein and Ether Extract values recorded in cows on ICS were significantly (P<0.05) higher than on UCS diet, A significant difference (P<0.05) was observed in NDF and ADF values between treatments. It is evident from the findings that milk production significantly increased along with improvement in milk constituents in Sahiwal cows on ICS than UCS diet. It was also noted that inoculation of corn silage also improved the quality of the corn silage. On the basis of results it is concluded that the use of commercial corn silage inoculant like Sill-All needs to be further investigated to promote milk production efficiency in dairy cows.

Keywords: Inoculant, corn silage, daily intake, milk production, milk composition, weight gain.

EFFECT OF RUMEN PROTECTED METHIONINE AND LYSINE SUPPLEMENTATION ON PLASMA AMINO ACIDS PROFILE AND HORMONAL PROFILE IN PERIPARTURIENT DAIRY COWS

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Abstract

Objective of this study was to investigate the effect of supplementing rumen protected methionine (RPM) and lysine (RPL) on plasma amino acids and hormonal profile in transition crossbred cows (*Bos taurus X Bos indicus*). Eighteen crossbred cows were selected and divided into two groups (9 each) on the basis of most probable production ability (MPPA) and lactation number. Animals in control group (C group; most probable production ability 4119 kg) were fed chopped wheat straw, chaffed green maize fodder and concentrate mixture as per requirements (NRC, 2001). However, animals in supplemented group (S group; most probable production ability 4120 kg) were fed same ration as control group plus 5 gm RPM and 20 gm RPL, prepartum and 7 gm RPM and 60 gm RPL, postpartum. The experimental period was started from 40 days before expected date of parturition to 30 days post parturition. Average daily milk yield during supplementation period in group S was 17.36 kg/d, which was 14.21 per cent higher (P<0.05) in group S than that of group C (15.20 kg/d). Plasma methionine, cysteine, and lysine concentrations were increased (P<0.01) in transition cows fed ration supplemented with RPM plus RPL. However, RPM plus RPL supplementation lowered (P<0.05) plasma histidine and isoleucine concentration. No effect was observed on plasma prolactin and growth hormone concentration on rumen protected methionine and lysine supplementation. Thus, the supplementation of rumen protected methionine and lysine in the ration of dairy cows causes increased duodenal Met and Lys flow in transition period, which in turn manifests in increased plasma concentration of methionine, cysteine and lysine.

Keywords: Rumen protected methionine, rumen protected lysine, plasma amino acids, bovine prolactin, bovine growth hormone

EXISTING FEEDING STRATEGIES AND NUTRITIONAL STATUS OF LACTATING BUFFALO AND CATTLE MANAGED BY (PERI-) URBAN DAIRY FARMERS IN FAISALABAD, PAKISTAN

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Abstract

Peri-urban dairy production has been growing constantly during the past decades and continues to gain importance; about 5% of Pakistan's milk comes from urban and 15% from peri-urban producers. A study was conducted in Faisalabad, third-largest city of Pakistan (>2 million inhabitants). Using a structured and pretested questionnaire, interviews with 145 peri-urban (4 to 9.4 km from city centre) milk-producing households (HH) were carried out from August until October 2009 to explore this important production system.

Mostly, farmers were feeding their animals in the morning and in the evening at milking time, using green fodder crops (95.2%), wheat straw (91.7%) and concentrates (87.6%; industrial by-products); mineral mixtures were only fed by 8 HH. There was no difference in feeding of cattle and buffalo. Animals were fed a fixed amount of concentrates without taking into account the species (buffalo vs. cattle) and as well their current milk production. This leads to nutrient undersupply in highly productive animals and to nutrient oversupply in low producers especially during late lactation. Hence, the farmers are to be advised for group feeding of their dairy animals according to production level for getting optimum productivity and profitability.

Key Words: Buffalo; cattle; feeding management; milk production, peri-urban

RESPONSE OF DAIRY COWS TO DIETARY REPLACEMENT OF WHEAT BRAN WITH BLACK GRAM (*VIGNA MUNGO* L.) FOLIAGE

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Abstract

Sustainable livestock farming depends on strategic supplementation to manipulate the rumen environment for maximum utilization of fibrous feeds for increased production at low cost. The present study was conducted to examine the effect of dietary supplementation of dried and ground foliage of Black gram (*Vigna mungo* L.) by quantitatively replacing 50, and 100 per cent of dietary wheat bran in concentrate mixtures on feed intake and utilization, haemato-biochemical parameters and production performance of crossbred lactating cows. The daily feed intake was increased significantly ($p < 0.05$) with the supplementation of Black gram foliage. Although the digestibility of DM, OM, CP and EE did not vary significantly ($p > 0.05$), the fibre digestibility was increased, which ultimately improved the TDN content of composite diet. The supplementation of Black gram foliage did not affect the haemato-biochemical parameters of cow irrespective of level of inclusion. Although, the average milk yield (kg/animal/d) was increased by 10 percent with supplementation of Black gram foliage, the milk composition did not differ among the groups. The economics of milk production calculated as feed cost per kg milk yield (Rs. 10.61 vs. 7.98) was reduced by complete replacement of wheat bran with Black gram foliage. Therefore, it may be concluded that Black gram

foliage could be used as a supplement feed for sustainable livestock production and complete replacement of wheat bran with Black gram foliage in concentrate mixture may be economical and socially acceptable proposition.

Key words: Black gram, Intake, Digestibility, Haematology, Milk yield, Cows

MANAGING HEAT STRESS IN DAIRY CATTLE THROUGH DIETARY MANIPULATION IN SUBTROPICAL CLIMATE

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Abstract

Pakistan due to its geographical location lies in the sub-tropical climate and has severe hot and humid season in most of the months. An increasing trend of importing exotic high yielding dairy cows in Pakistan is observed in past few years. These temperate breeds due to higher metabolic rate and production potential experience more heat stress as compared to the sub-tropical breeds. Consequences of heat stress include decreased dry matter intake, increased percentage digestibility, reduced visceral blood circulation including fore-stomach, decreased energy metabolism, increased pH of the lungs and increased water and electrolyte metabolism. All these factors affect the performance of the animal in hot and humid region. Multiple options are available to decrease the heat stress that are only not limited to housing (providing the shade to the animals, using sprinklers and fans) but also related to the dietary and physiological manipulation (e.g. through feed additives or hormones). Cows can be protected from forecasted heat stress by reducing the heat of increment of feed through manipulation of diet. In the current review of literature, several commercial strategies currently in use in Pakistan are presented, so that the field nutritionist may take benefit and grade the best strategy according to their needs

INCIDENCE OF SUB CLINICAL KETOSIS AND TREATMENT WITH DIET SUPPLEMENTS IN COWS IN AND AROUND LAHORE

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Abstract

The study was designed to diagnose the Subclinical ketosis on the basis of Ross Rothra's method. After diagnosis the treatment trails was done on three different treatment methods comprises of Dextrose, Dexamethasone and by increasing the diet. Total 200 cows were studied for the diagnosis of subclinical Ketosis. Total positive samples of subclinical ketosis were 62 and the overall Incidence of Subclinical Ketosis in Lahore was 31 % and in sheikhupura and Raiwind areas it was 35% & 27 % respectively. The results indicates that the use of dexamethasone was very effective and it cured 84%,dextrose cured 64% ,and by the diet it was 25%.Although, dexamethasone was very effective but it also reduced the milk production in very next day after the administration of drug while, the dextrose shows no any reduction in milk production. The animals who received only green fodder as ration showed very positive results for subclinical ketosis while, the animals who received a concentrated diet with green fodder they showed very little presence of subclinical ketosis.

Prevention of subclinical ketosis can be done by providing extra ration to pregnant animals and during pregnancy give them pregnancy allowance and by effective managerial practices the effects of subclinical ketosis can be minimized.

France Missing

IN VITRO EVALUATION OF RICE BRAN LYSO-PHOSPHOLIPIDS FOR ITS INCORPORATION IN RUMINANT RATION

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Abstract

An *in-vitro* experiment was carried out to evaluate the level of incorporation of rice bran lyso-phospholipids (RBLPL) on rumen microbial fermentation. Different levels of RBLPL i.e. 0, 2, 4, 6, 8 and 10% were added to the substrate consisting of roughage and concentrate mixture (60:40). The parameters studied were total gas production, methane production, true digestibility (TD), IVTOMD, PF, microbial biomass, NH₃-N, individual VFA and acetate: propionate ratio. As the level of rice bran lyso-phospholipids increased in the substrate from 0 to 6%, total gas production, true digestibility and IVTOMD increased linearly and thereafter, there was decrease in these parameters. Methane production decreased with increasing level of rice bran lyso-phospholipids and lowest methane production was observed at 10 % level. There was no significant effect of different levels of RBLPL on NH₃-N, individual VFA, acetate: propionate ratio, PF and microbial biomass production. It was inferred that fiber digestion and microbial population were not affected and the digestibility of DM was maximum at 6 % level of RBLPL. Therefore, rice bran phospholipids can be incorporated at a level of 6% in the ruminant ration.

Key words: Rice bran lyso-phospholipids, *In-vitro* digestibility, methane

REPLACEMENT OF WHEAT BRAN WITH GRINDED PEA PEEL IN UREA MOLASSES BLOCK FEEDING FOR LACTATING DAIRY COWS

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Abstract

The research study was carried out in University Dairy Farm, Malakandher, The University of Agriculture, Peshawar to estimate the replacement of wheat bran with grind pea peel in urea molasses block (UMB) feeding for lactating dairy cows. The effectiveness of pea peel was assessed in dry matter intake, milk yield, milk composition and economics. Twelve (12) HF cows were selected and divided into four groups i.e. T0, T1, T2 and T3. Each group having three replicates (1 cow/replicate). Wheat bran was replaced with pea peels in urea molasses blocks @ 0, 25%, 50% and 100% in T0, T1, T2 and T3, respectively. The experimental trail was conducted for 20 days. The mean dry matter intake was not significantly different (P>0.05) among the treatments, highest dry

matter intake was found in treatment T3 followed by T2, T0 and T1. UMB intake was significantly different ($P<0.05$) in all treatments. Milk yield was significantly different ($P<0.05$), higher milk yield was obtained in treatment T3 (100%) whereas lowest milk yield was found in treatment T0 (control). Over all Milk composition was not significantly ($P>0.05$) effected except Lactose. Economically highly significant difference ($P<0.05$) was found. Highest net return was found in T3 while lowest net return was present in T0. Therefore it is recommended that wheat bran can be replaced with pea peel up to 100% in urea molasses blocks which have a beneficial effect on milk production and is highly economical.

Key words: Treatment, Urea Molasses Block, Total Mixed Ration, Dry matter intake, Di calcium phosphate.

RESPONSE OF STRAW BASED COMPLETE BLOCK FEEDING ON MILK PRODUCTION PERFORMANCE OF DAIRY ANIMALS IN THE HILLS OF NEPAL

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Abstract

Crops residues from various cereals and legumes are major source of feeds for ruminant animals in Asian countries. Rice and wheat are the main staple food crops, after grain harvest farmers remain straw in the field and burnt where other sources of feeds are available. Dairy farmers across Asian countries mainly use straw as basal diet with little supplemental bran (rice and wheat bran) and oilseed cakes. Straw content low nutrients, carbohydrate link with lignin and make less digestible and protein content in straw is very negligible (less than 4 percent) and not easily available to the animals due to bonding with lignin. In this regards one research trial was conducted to know the milk production performance of dairy animals by feeding straw based complete feed block. Nine newly calved dairy cows were randomly assigned to three treatments in summer months (May to July, 2012) in 2011 and 2012. The treatments composition were chaffed rice straw with sugarcane molasses and urea (0.5%) then compressed to form 5 kg block (T1), similarly from wheat straw (T2) and in the treatment three (T3) same as composition in T1 but non block. The ration was formulated as 3 percent of the body weight of the animals and 3:1 ratio of roughages and concentrate with 1/3 portion green grass of roughages fed twice daily. There was significantly increase in milk production when straw based complete feed block was feeding to dairy cows. In the rice growing Asian countries this technology will be viable option to utilize crop residues (Crop residues, straw, maize stover and sugarcane byproducts) as source of feeds for ruminant animals and consequently minimize the green house gases (CH₄) emitting from animals and from crop fields.

Key words: Rice and wheat straw, dairy animals, complete feed block, green house gasses.

EFFECT OF GRADED LEVEL OF MOLASSES IN CONCENTRATE SUPPLEMENT ON CROSS BRED CATTLE MILK YIELD, FEED INTAKE AND WEIGHT GAIN AT SUREZAI, PESHAWAR

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Abstract

The effect of feeding graded level of molasses in concentrate supplement diet on the performance of crossbred dairy cows was studied. Nine crossbred cows of second/ third lactation were randomly distributed into three equal groups and allocated to diets containing zero (control), 10 and 20% molasses, and were examined for the mid 7 weeks of lactation at Livestock Research & Development Station Surezai, Peshawar during March, 2012 to May 2012. Each cow was given a daily feed ration according to National Research Council (NRC) standards. Mean daily milk yield differed ($P < 0.05$) among all treatment groups However highest milk yield 8.7061kg/day was recorded for cows fed 20% Molasses, while the control group (0% molasses) produced the least yield 6.2258 kg/day. There was significant ($P < 0.05$) difference in daily feed intake, cows on 20% Molasses diet had the highest daily feed intake 80.4053 kg/day while the control group had the least intake 71.1053 kg/day. The Live weight gain was not effected significantly ($P > 0.05$) by rations, However highest mean change in weight gain 11.66 kg/49day was recorded for cows fed ration having 20% Molasses, while least 0.33kg/45day was recorded for cows fed 10% Molasses in the ration. Economically ration having 20% Molasses had the lowest cost of milk production (Rs: 15.78/kg) as compared to ration having 10% (Rs.19.01/kg) and Zero% Molasses (Rs.22.07/kg). it is, therefore, concluded that milk yield and feed intake was increased with supplementation of high level of Molasses in the dairy cattle ration. Higher proportion of Molasses (20%) has shown the best efficiency of production as compare to other rations and thereby reducing cost of production.

Key words: Molasses, Milk Yield, Feed intake, Peshawar, Live Weight and Crossbred Cattle

EFFECT OF DIFFERENT ADDED LEVELS OF SACCHAROMYCES CERVISIAE ON MILK PRODUCTION AND COMPOSITION IN LACTATING DAIRY COWS

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Abstract

The objective of the study was to expose the effect of live yeast culture (*Saccharomyces cerevisiae*) (S.c) at different levels (g/kg DM) (0, 1, 2, 4) on feed dry matter intake (DMI), milk yield and milk composition in early lactating ^{Holstein} Frisian (HF) cattle. The trial was carried out at the dairy farm of The University of Agriculture, Peshawar-Pakistan. In this experiment twelve early lactating HF cattle's of nearly the same age, weight and milking stage were randomly divided into four groups i.e. A, B, C and D, each having three replicates. Four rations containing 0g, 1g, 2g and 4g S.c/kg dry matter(DM) of ration were allotted to these groups, respectively. Experimental period lasted for sixteen days after allowing fourteen days adaptation period. The dry matter intake (DMI) (kg/animal/day) increased appreciably ($P<0.05$) in all groups of cows supplemented with S.c compared to control. The highest increased in the DMI was recorded in 1g S.c/kg DM. The milk yield (litter) was highly ($P<0.05$) increased in all levels than that of control. The maximum elevation in milk yield was recorded in cows fed 2g S.c/kg DM of the total mixed ration (TMR). The composition of milk i.e milk fat, milk protein, lactose and milk SNF were significantly changed in all levels. The percentage of milk fat was significantly ($P<0.05$) increased. The maximum improvement was recorded in 2g and 4g S.c. While the content of milk protein % highly ($P<0.01$) decreased in all level of S.c. but the overall protein content (per day) was increased in yeast supplemented groups. The contents' of milk lactose and SNF were highly ($P<0.01$) improved in all levels of S.c. The highest increased was recorded in lactose content of cow's milk supplemented with 1g S.c. Moreover, the maximum increased was recorded in the milk SNF of cows supplemented with 4g S.c. The ration to which the S.c was added proved significantly ($P<0.05$) economical for dairy cows. From the results of the present study it is concluded that the addition of S.c in the ration of lactating cows increased the DMI, milk yield and improved milk composition. Hence, the ration was highly economical.

Keywords: *Saccharomyces cerevisiae*. Milk yield, Dry matter intake

SELENIUM AS AN IMPORTANT MICRONUTRIENT FOR LACTATING COWS

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Abstract

This experiment was carried out in order to investigate the seasonal changes in selenium (Se) concentration in blood plasma and milk of cows in a semi-arid region in Pakistan. Twenty grazing Sahiwal Pakistani cows with standard body weight of 350 kg and average age of 36 months were used. Samples of blood plasma and milk were obtained four times from October 2009 to January, 2010 each at one month interval and analyzed to assess Se concentration. A significant effect of sampling periods on Se concentrations in plasma, and milk was found in this study. A consistent decrease in plasma Se was found at different sampling stages from first to fourth harvesting. The milk Se concentration was higher at first sampling, followed by abrupt decrease, and then a consistent decrease was found during the two last samplings. Based on this exploration, it may be concluded that it is indispensable to supervise Se in animals so as to sustain a sufficient amount of this micronutrient for achieving vigorous cows.

Key words: selenium, blood plasma, milk, cows, Pakistan

EFFECT OF PHYSIOLOGICAL STATUS ON MINERALS NUTRITION OF LACTATING AND DRY COWS

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Abstract

This study was conducted to evaluate the Calcium, Magnesium, Zinc, Copper and Iron concentrations in blood plasma of lactating and dry Desi cows. Twenty lactating and twenty dry Desi cows were used and their blood plasma was analyzed for Ca, Mg, Zn, Cu and Fe using atomic absorption spectrophotometer. In lactating animals, plasma Ca concentration was lower than dry cows (6.8 versus 7.6 mg/dl) while Mg concentration was higher in lactating than dry cows (1.60 versus 1.20 mg/dl). Plasma Zn concentration in lactating cows was higher than dry cows (0.78 versus 0.60±0.05 mg/l) and it was lower than the normal range in both groups. Plasma Cu concentration in lactating cows was lower than dry cows (0.56 versus 0.76 mg/l) and it was lower than the normal range only in lactating cows. Plasma Fe concentration was higher in lactating cows than dry cows (3.8 versus 2.6 mg/l). These levels are considered sufficient for the needs of ruminants. Plasma level of different minerals is affected by the physiological stages of ruminants.

Key words: Plasma, Mineral concentration, Lactating cow, Dry cow

**EVALUATION OF TRICHOHECENS CONTAMINATION OF DAIRY COW DIETS,
AND EFFECT OF A FEED SOLUTION ON MILK PRODUCTION**

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Abstract

Mycotoxins are known for their detrimental effects on monogastrics. Nowadays, scientific publications are highlighting their depressor effects on ruminant performance even at low dosage. Consequently, a field trial involving 8 dairy herds (715 cows) was conducted over a period of 4 months (2 month control period and 2 month test period) to evaluate the potential impact of a feed solution (T5X) on the milking performance of the cows. Herds were selected according to analysis showing trichothecens contaminations into their TMR (total mixed ration). These contaminations have been characterized by a global index expressed in « DON-equivalent » (Don-eq). It was calculated by each trichothecens contents measured in the TMRs, weighted by their relative toxicity intensity on ruminants given by literature*. The study proved that milk production has significantly increased (average of +2 kg/ cow / day, $p = 0.015$) during the trial period (period with T5X) in comparison with the control period, especially for herds exposed to high trichothecens contamination (+4.6 kg/cow/day, $p=0.013$). Furthermore, the DON-eq index used in these trials seems to highlight a toxicity threshold of 2000 ppb, in accordance with the literature which points out a systematic decrease in performance when DON contamination is above 2000 ppb.

Key words : ruminants, mycotoxins, trichothecens, milk production, toxinbinder.

Buffalo Nutrition

EFFECT OF FEEDING OF DIFFERENT NON PROTEIN NITROGEN (NPN)SOURCES ON PERFORMANCE OF LACTATING NILI- RAVI BUFFALOES

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Abstract

The feed resources in Pakistan are comprised of green fodder / pastures (mostly on canal banks and on road sides), dry roughages (mostly wheat and rice straw) and conventional concentrates. Furthermore, it has been reported that conventional feedstuffs are very low in non-protein nitrogen (NPN) sources. These circumstances attracts the attention of nutritionists and farmers towards the use of slow-releasing non-Protein Nitrogen sources in the livestock feed. The experimental study was conducted at LPRI Bahdurnagar Okara. Feed was reformulated by addition of urea and other slow releasing non-protein nitrogen. Samples in triplicates were analyzed at Nutrition laboratory, UVAS Lahore and LPRI, Bahadurnagar, Okara. The crude protein of the concentrates A, B and C were 17.03, 17.03 and 17.04 percent respectively. Eighteen lactating Nili-Ravi buffaloes were divided in three equal groups using completely randomized design. Each group was fed on iso-nitrogenous concentrate to find out its effects on performance of lactating buffaloes. The data thus obtained were statistically analyzed using one way analysis of variance (ANOVA) technique. The significant differences between means were tested by least significant difference test. Milk production was higher in group C feeding with reformulated with 1% slow releasing non-protein nitrogen source. The highest individual milk fat was higher for group C. The average protein percentages of all the buffaloes were non-significant. The milk urea nitrogen level was higher in group B. The blood urea nitrogen level was higher in group C. It was concluded that the use of slow releasing non-protein nitrogen in buffalo feed improved the milk production significantly without affecting the milk composition. It can replace the conventional NPN sources without any adverse effects on health of buffaloes.

Key Words: Blood urea nitrogen, Pastures, Roughages, Slow non-protein nitrogen releasing nitrogen,

NUTRITIONAL EVALUATION, PROCESSING AND UTILIZATION OF RUMEN CONTENTS IN THE DIET OF LACTATING NILI- RAVI BUFFALOES

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Abstract

For economical production of balanced feed for livestock, poultry, fish and pet animal, non-conventional feed resources need to be explored to find solution to the existing gaps. For this purpose, the present study was conducted to determine the nutritional profile, processing and utilization of rumen contents in buffalo feed. The study was conducted in three phases. In phase one, bovine rumen contents were collected from the local slaughter house and were analyzed in triplicates before ensiling. In phase two, rumen contents were ensiled with wheat straw, with and without addition of 6% molasses for a period of 60 days. Wheat straw was also treated alone with reducing its DM to 44% with water and by addition of 6% molasses. The pH of silages 1, 2, 3, and 4 was 4.78, 4.70, 4.92 and 5.11 respectively. The silage containing rumen contents and wheat straw showed a increase in C.P as compare to simple rumen content and silage which were urea treated have significant increase in C.P. In phase three, a production trial was conducted, in which 25 lactating

Nili-Ravi buffaloes were fed the diets having total mixed ration (100% TMR) (Tc), 70% TMR with 30% silage1 (T1), 70% TMR plus 30% silage2 (T2), 70% TMR with 30% silage3 (T3), and 70% TMR plus 30% silage4 (T4). The data thus obtained was statistically analyzed using one way analysis of variance (ANOVA) technique. The significant differences between means were tested by Duncan's Multiple Range test. The DM intake was higher in control group and silage without molasses and urea. Milk production was higher in group feeding with silage 4 which was treated with urea and molasses. There was also significant increase of milk production in group feeding with silage1. It was concluded that rumen contents could replace the conventional TMR without any adverse effects on health of buffaloes.

EFFECT OF DIFFERENT DOSES OF BOVINE SOMATOTROPIN HORMONE IN-RAVI BUFFALOES ON GROWTH, MILK PRODUCTION AND PHYSIOLOGICAL PARAMETERS

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Abstract

The present study was conducted to see the effect of different doses of bovine somatotropin hormone (bST) on milk production, milk composition, growth body weight, and physiological parameters. For this purpose 21 Nili-Ravi lactating buffaloes at similar lactating stage were used in this experiment. The group A was injected with full- recommended dose of bST hormone (250 mg/animal) at an interval of 14 days, while the animals of group B were given sub-cut injection on alternate days with divided doses (36 mg/animal), the group C was kept as control. Milk production was recorded daily and milk samples were collected on weekly basis or analysis. The blood samples were collected on fortnight basis to see the effect of bST on physiological parameters. The research trial continued for 6 month till the completion of lactation. The overall increase in milk production was found to be 11% in group A and B as compared to group C (control). The slight increase in weight gain was observed in group A and B. The use of bST showed no effect on milk composition and physiological parameters in Nili-Ravi buffaloes. It is also concluded that dose of bST of 250 mg injected at 14 days interval is beneficial for overall performance of Nili-Ravi buffalo.

EFFECT OF FORMALDEHYDE TREATED SUNFLOWER MEAL AS A SOURCE OF RUMEN UN-DEGRADABLE PROTEIN ON THE MILK PRODUCTION OF BUFFALOES

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Abstract

The rumen microorganism cannot synthesize enough protein to support high levels of growth and milk production by lactating animals. Among different methods, treatment with formaldehyde is an efficient and inexpensive method to protect proteins from rumen degradation. In this study, sunflower meal was selected for formaldehyde treatment and to study its affect on milk production in lactating buffaloes. Twelve lactating buffaloes were divided into 2 groups A and B based on the milk production (9 lit), lactation no (2) and days after calving (38). Individual feeding practice was adopted to fulfill the requirement of each animal. Group A was fed control ration with untreated sunflower meal and Group B was fed experimental ration containing the formaldehyde treated sunflower meal. Chopped green fodder (45 kg) was offered daily to each animal in both groups while concentrate mixture was given to satisfy production requirement. In-situ study showed that

formaldehyde treatment significantly reduced the degradation of protein in the rumen. Average values for undegradable protein from 0.5% formaldehyde treated sunflower meal was 75.52 percent as compared to 14.22 percent value of control after 24 hours of incubation. For group A and B average daily milk production was 8.66 and 8.94 lit; fat contents were 5.52% and 5.72% lit, respectively and were non-significant. It was concluded, that formaldehyde treatment of SFM could be over protected from rumen degradation leading to no change in the milk yield and fat contents when fed to lactating buffalo.

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

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Abstract

Study on the 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 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, respectively in a completely randomized design. Milk recording was done daily at the time of morning and evening milking while milk samples were collected on weekly basis and frozen till their analysis in the lab. 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 the same (P>0.05) for all diets.

Key words: Protein, degradability, milk production, FCM, milk composition, cost of production

EFFECT OF MINERAL VARIATION IN SOIL, WATER, FODDER AND SERUM ON REPRODUCTIVE EFFICIENCY OF BUFFALOES

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Abstract

This is the first study in which the mineral concentrations in different types of samples, e.g., canal water, drinking water, soil, fodder and serum of buffaloes were investigated in the same locality. The study was carried out at Buffalo research Institute, Bhunikey (Pattoki), Distt. Kasur. The effect of variation in these minerals on reproductive efficiency in buffaloes was also observed. For this purpose, concentrations of macro minerals, e.g., Calcium, Magnesium and Inorganic Phosphorus in above mentioned samples were investigated. Water samples used for drinking of buffaloes and for

irrigation of soil were collected. Soil samples were collected from same places at different depths from where fodder for the buffaloes was grown. Analyses of water and soil were performed at Agriculture Soil and Fertility Center (Thokar Niaz Baig) Lahore. Fodder samples were analyzed at Animal Nutrition Lab of UVAS. Buffaloes were divided into 4 different groups having 20 animals in each with the help of Honda ultrasound at 2.5 Mega Hertz. Group 1, 2 and 3 consist of non-cyclic, repeat breeder and cyclic buffaloes, respectively. All the animals were lactating except heifers (group 4). Calcium concentration was highly significant ($P < 0.001$) between canal (1.04 ± 0.02 mg/liter) and drinking water (1.00 ± 0.02 mg/liter). Similarly, the level of calcium in the soil was significantly high ($P < 0.05$) in upper surface (2.60 ± 1.95 mg/kg) as compared to lower surface (1.47 ± 0.11 mg/kg). But the difference between calcium concentration in fodder at the start of December (1.46 ± 0.05 %) and the end of March (1.35 ± 0.04 %) was non-significant ($P > 0.05$). Mean calcium values of serum was significantly higher ($P < 0.05$) in cyclic buffaloes (10.74 ± 0.38 mg/ dl) as compared to buffalo heifers (9.54 ± 0.25 mg/ dl). The level of inorganic phosphorus was non-significant ($P > 0.05$) between canal water (0.09 ± 0.01 mg/liter) and drinking water (0.10 ± 0.03 mg/liter). Inorganic phosphorus was not significantly ($P > 0.05$) different between upper (9.76 ± 2.08 mg/kg) and lower surface (9.76 ± 2.08 mg/kg) of soil. Inorganic phosphorus concentration in the fodder was non-significantly ($P > 0.05$) different at the start of December (0.20 ± 0.00 %) and end (0.46 ± 0.18 %) of March. Values of inorganic Phosphorus was significantly lower ($P < 0.05$) in non-cyclic buffaloes (5.12 ± 0.05 mg/dl) as compared to all other groups. Calcium to Phosphorus ratio in non-cyclic buffaloes and heifers was significantly ($P < 0.05$) lower as compared to repeat breeder and cyclic group. Magnesium concentration was significantly ($P < 0.05$) different in canal (0.72 ± 0.03 mg/liter) and drinking water (1.16 ± 0.21 mg/liter). Level of magnesium was higher in upper surface of soil (17.33 ± 8.4 mg/kg) as compared to lower surface (9.00 ± 6.24 mg/kg) but differed non-significantly. Similarly, differences between magnesium concentration in the fodder at the start of December (1.65 ± 0.02 %) and end (1.46 ± 0.10 %) of March was non-significant ($P > 0.05$). Level of magnesium was significantly ($P < 0.05$) higher in cyclic buffaloes (2.61 ± 0.10 mg/dl) as compared to other groups except non-cyclic buffaloes in the start of December. At the end of March, magnesium concentration was significantly ($P < 0.05$) higher in non-cyclic buffaloes (2.51 ± 0.09 mg/dl) and heifers (2.51 ± 0.05 mg/dl) as compared to repeat breeder (2.34 ± 0.03 mg/dl) and cyclic buffaloes (2.31 ± 03 mg/dl). It may be concluded from this study that deficiency of minerals in water and soil contribute its effect on fodder which is reflected in buffaloes.

Key Words: Macro minerals, Ca:P ratio, reproductive efficiency, buffaloes

MINERAL MANIPULATION FOR ENHANCED BUFFALO PRODUCTIVITY

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Abstract

Minerals play vital role in almost all biological functions of animal body. However, it has been noticed that certain minerals impart more significant effect on rumen dynamics and blood chemistry than their individual effects. This aspect of mineral nutrition has emerged as an effective nutritional tool to drive ruminant productivity. Studying certain minerals (like Na, K, Cl and S etc.) in their individual biological impact has revealed their pivotal role in different physiological mechanisms which are directly or indirectly associated with well being, health and productivity of the animals. However, alterations in magnitude of electric potential and acid base status created by the difference among certain negatively and positively charged minerals and their association with animal productivity has offered a practical tool to modulate rumen and blood profiles for enhanced buffalo

productivity, the concept has been referred as cation anion difference (CAD). Study on castrated buffalo bulls revealed that high CAD imparted favorable effects on rumen dynamics which not only increased feed intake, nutrient digestibilities but also improved nitrogen balance. Feeding high CAD in lactating buffaloes has been reported to increase feed consumption, nutrient utilization, nitrogen balance, milk production and conception rate than those fed on low CAD diets, both in summer and winter. Reduced occurrence of hypocalcaemia was noticed in buffaloes fed low CAD diets during pre-partum than those fed on high CAD diets. Fewer services per conception and higher pregnancy rate were noticed in buffaloes fed high CAD in lactating buffaloes. During hot summer, high CAD diet also revealed to reduce the effects of heat stress as evident by decreased blood cortisol concentration. Likewise, use of effective CAD of feed has also reduced the udder edema in buffaloes during winter. Use of high level of CAD also increased weight gain by improving feed consumption and nutrient digestibilities in growing buffalo calves during summer. This article recapitulates the effects of feeding different concentrations of CAD on rumen ecology, feed consumption, nutrient utilization, nitrogen balance and reproductive efficiency in lactating buffaloes and weight gain in growing buffalo calves.

EFFECT OF FEEDING MORINGA OLEIFERA ON DRY MATTER INTAKE, DIGESTIBILITY, MILK PRODUCTION AND MILK COMPOSITION IN NILI RAVI BUFFALOES

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Abstract

An experiment was conducted by using 8 early lactating multi-parous *Nili Ravi* buffaloes in complete randomized block design, four in each group to examine the effect of feeding *Moringa oleifera* hay (MOH) on intake, digestibility, milk production and its composition. An *isonitrogenous* and *isocaloric* diet was formulated and fed as a part of ration to all buffaloes with same quantity. However *Medicago sativa* hay (MSH) was offered to one group while other group received MOH *ad libitum*. Dry matter (DM) intake was higher ($p < 0.05$) in buffaloes fed MOH diet than in those fed MSH diet. Dry Matter, organic matter, crude protein, neutral detergent fiber, acid detergent fiber and ether extract digestibility were higher ($p < 0.05$) in buffaloes fed MOH diet as compared to MSH diet. All animals were in positive nitrogen balance however linearly increasing ($p < 0.05$) trend of nitrogen balance was noticed in those animals who fed MOH. Milk yield and 4% fat corrected milk, solid corrected milk, milk protein, and solid not fat was higher ($p < 0.05$) in buffaloes fed MOH diet than in those fed MSH diet, however milk fat percent, milk fat (kg/day), lactose, total solids, specific gravity and milk pH remained unaltered. The findings of research indicated that feeding MOH in early lactating buffaloes not only increased nutrients intake and digestibility but also improved milk yield in early lactating *Nili-Ravi* buffaloes.

Key Words: *Moringa oleifera*, Dry Matter Intake, Digestibility, Milk production, Buffaloes

EFFECT OF VARYING NDF LEVELS ON PRODUCTIVE PERFORMANCE FOR LACTATING NILI RAVI BUFFALOES

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Abstract

The aim of study was to evaluate the effect of varying levels of dietary NDF on voluntary feed intake, nutrient digestibility, milk production and composition in early lactating (n=25) Nili Ravi buffaloes. Five groups with five animals in each, under completely randomized design were fed containing isonitrogenous and isocaloric diets A, B, C, D and E based on different NDF levels 23, 28, 33, 38 and 43%. Nutrient intake and nutrient digestibility differ ($P < 0.001$) significantly among the dietary groups. Dry matter (DM), crude protein (CP) and neutral detergent fiber (NDF) intake were highest in animals fed diet C (14.31 ± 0.05), C (1.86 ± 0.006) and E (5.52 ± 0.018) respectively than those on the other four treatments. Whereas, DM, CP and NDF digestibility were observed highest in the group B (62.88 ± 1.04), B (51.00 ± 0.57) and C (64.4 ± 0.99) respectively, as compared to others. The 4% fat corrected milk production was significantly ($P < 0.001$) higher in the groups A (11.23 ± 0.15) as compared to others. In term of milk composition (TS 16.65 ± 0.07 , fat 7.01 ± 0.04 , milk protein 3.78 ± 0.02 and milk lactose 5.04 ± 0.02) were highest in group D (38% NDF). Hence it is concluded that 33% NDF level is better in terms of NDF digestibility and milk production for early lactating Nili Ravi buffaloes.

Key words: Nili Ravi buffaloes, NDF, ADF, voluntary intake, weight gain

MINERALS STATUS OF SOIL, FODDER AND IN LACTATING NILI-RAVI BUFFALOES IN IRRIGATED AGRO-ECOLOGICAL ZONE OF PUNJAB, PAKISTAN

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Abstract

The current study was designed to evaluate the macro and trace mineral profile in soil, fodder and in buffaloes of irrigated agro-ecological zone. 60 soil and 60 fodder samples were collected from Block-1 (Tehsil Dera Ghazi Khan) and Block-2 (Tehsil Taunsa Sharif), whereas, in each Block, 60 blood samples were collected randomly from lactating buffalo. The concentrations of calcium, magnesium, copper, iron and zinc were quantified with the help of atomic absorption spectrophotometer whereas sodium and potassium were measured by a flame photometer. There was non-significant ($P > 0.05$) difference in soil and fodder macro (calcium, magnesium, sodium, potassium) and trace mineral (copper, iron, zinc) concentrations between block-1 and 2. There was non-significant ($P > 0.05$) difference in calcium, magnesium and sodium concentrations whereas significant ($P < 0.05$) differences were observed for potassium concentrations in buffaloes of block-1 and block-2. There was non-significant ($P > 0.05$) difference in copper, iron and zinc concentrations in buffaloes of block-1 and block-2. In block-1 and block-2, all buffaloes were deficient for zinc. It was concluded that buffaloes raised in the study area were lacking in some minerals, and for optimal production these minerals must be supplemented.

PRE-PARTUM SUPPLEMENTATION EFFECTS OF SELENIUM AND VITAMIN E ON POSTPARTUM PERFORMANCE IN NILI-RAVI BUFFALO HEIFERS

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Abstract

The current study was accomplished to determine the effect of pre-calving administration of selenium and vitamin E on post-partum performance of Nili-Ravi buffalo heifers. 36 pregnant Nili-Ravi buffalo heifers at Buffalo Research Institute, Pattoki were divided in 3 groups (HSE-1, HSE-2 and HNSE). HSE-1 heifers were given single intra muscular injection of selenium (10 mg) and vitamin E (1400 mg) whereas, HSE-2 heifers were given single intramuscular injection of selenium (20 mg) and vitamin E (2800 mg) before 4 and 2 week of expected calving. HNSE heifers were given no treatment and served as control. There was non-significant difference in ($P > 0.05$) serum selenium concentrations in different groups of heifers at 4 week before parturition, whereas, at the day of parturition, selenium concentrations increased significantly ($P < 0.05$) in HSE-1 and HSE-2 heifers as compared to HNSE. The selenium concentrations were highest in HSE-2 heifers at the day of parturition. In all groups, the mean milk production varied non-significantly ($P > 0.05$) at 4 week after parturition. At 8 week after parturition, there was significant difference ($P < 0.05$) in milk production between treated (HSE-1 & HSE-2) and control group (HNSE) heifers whereas non-significant difference ($P > 0.05$) in milk production was recorded between HSE-1 and HSE-2. Similarly, 12 week after parturition, the milk production varied significantly ($P < 0.05$) between treated and control group heifers. The milk production was higher in HSE-1 and HSE-2 heifers as compared with group HNSE. In the present study, at 8 week lactation, milk somatic cell count decreased significantly ($P < 0.05$) in heifers of group HSE-2 as compared with HNSE group. At 12 week lactation, there was non-significant difference in milk somatic cell count among heifers of all groups. The gestation length in all three groups of heifers was almost similar. The incidence of sub-clinical mastitis was lower in HSE-1 and HSE-2 as compared to HNSE, but the difference among three groups was non-significant ($\chi^2_{cal} = 0.94$). There was no incidence of retention of fetal membranes in animals of HSE-1 and HSE-2, while 16 % incidence was observed in HNSE heifers. Non-significant differences ($P > 0.05$) were observed among heifers of HSE-1, HSE-2 and HNSE for incidence of retention of fetal membranes. The current study indicated that selenium and vitamin E supplementation during pre-partum is beneficial by increasing the serum selenium concentrations at parturition, increased milk production and decreased somatic cell count in milk during post-partum period.

Key words: buffalo heifer, selenium, vitamin E, milk production, somatic cell count

EFFECT OF DIFFERENT NON-PROTEIN NITROGEN (NPN) SOURCES ON PERFORMANCE OF LACTATING NILI-RAVI BUFFALOES

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Abstract

Eighteen lactating Nili-Ravi buffaloes of same lactation stage were divided into three groups with equal number of buffaloes in each group to study the effect of different non-protein nitrogen (NPN) sources. Iso-nitrogenous feed was prepared for all the groups. Feed A was control; feed B was reformulated by addition of 1% urea, while Feed C was reformulated by addition of 1% Optigen. Among three treatment groups, highest milk production was observed in group C reformulated with addition of 1% Optigen, lowest milk production was with group A. There was a non significant differences ($P>0.05$) between all three treatment groups for milk production. There was 1.6 L and 0.18 increase in milk yield in group B and C, respectively while there was decrease of 0.04 L in group A. Fat contents were higher for group B. There was non-significant difference ($P>0.05$) for milk composition between all the groups. Milk urea nitrogen level was non significant ($P>0.05$) between all treatment groups. There was gradual increase in milk urea nitrogen level in group B while decrease in milk urea nitrogen was observed in group A and C, respectively. Blood urea nitrogen level showed non significant difference ($P>0.05$) between all groups. On the basis of the results of this study it is concluded that the use of Optigen in buffalo feed improved the milk production significantly without affecting the milk composition. It can replace the conventional NPN sources without any adverse effects on health of buffaloes. Optigen can be used as economical and affective slow release NPN source.

Key Words: Nilli-Ravi, Urea, Optigen, slow release

QUANTIFICATION OF METHANE EMISSIONS FROM NUTRIENT INTAKE AND DIGESTIBILITY OF RIVER BUFFALOES FED ON GREEN FODDERS

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Abstract

Fifteen male Murrah buffalo calves (15-18 months, 227.98±4.44 kg body weight), distributed in to 3 equal groups were fed solely on berseem (G₁), oats (G₂) or chicory fodder (G₃). A digestibility trial was conducted followed by methane measurement using SF₆ tracer technique. No significant difference was observed in nutrient intake, other than crude protein, non-fibrous carbohydrates (NFC) and neutral detergent insoluble CP (NDICP). The digestible DM, OM, NDF and EE intake was similar in all the groups, whereas the digestible CP and NFC intake was lower in G₂ compared to G₁ and G₃. Chicory and berseem fed groups emitted 12.2% and 5.2% less methane than oats fed group. The following regression equations were developed to estimate methane production, methane

(g/kg BW) = 128.8553+ (167.7456 × dNDFI) + (216.32 × dCPI)- (40.3313 × dNFCI) and methane (g/d)= -1.7494+ (41.42 × NDFI)+ (39.8686 × CPI) + (0.5197 × NFCI).

KEY WORDS: Digestible nutrient intake, greens, methane, nutrient intake, river buffalo

EFFECT OF DIFFERENT LEVELS OF NDF ON VOLUNTARY FEED INTAKE, DRY MATTER DIGESTIBILITY, AND NUTRIENTS UTILIZATION IN DRY NILI RAVI BUFFALOES

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Abstract

Proper nutrient detergent fiber (NDF) ratio in the diet of dairy animals is important to get optimum milk yield from the animals. The study was conducted to determine voluntary intake, digestibility of feed and optimum requirements of fiber in dry Nili Ravi buffaloes at Buffalo Research Institute (BRI), Pattoki district Kasur for the period of 60 days. Dry Nili Ravi buffaloes (n=25) were selected and arbitrarily separated into five groups in a completely randomized design and fed containing isonitrogenous and isocaloric diets A, B, C, D and E based on different NDF levels 23, 28, 33, 38 and 43%. Nutrient intake and nutrient digestibility differ ($P < 0.001$) significantly among the dietary groups. Drymatter (DM), crude protein (CP) and neutral detergent fiber (NDF) intake were highest in animals fed diet C (14.42 ± 0.09), C (1.58 ± 0.01) and E (5.52 ± 0.010), respectively than those on the other four treatments. Whereas, DM, and NDF digestibility were observed highest in the group B (62.5 ± 1.04) and C (64.46 ± 0.99) respectively, as compared to others. The CP digestibility was non-significant different treatment groups. The average weight gain in dry Nili Ravi buffaloes was 0.48 ± 0.045 kg/d. The overall result showed that 33.0% dietary NDF level is better in terms of nutrients intake and digestibility in dry Nili Ravi buffaloes.

Keywords: NDF, Nili Ravi buffalo, dry matter, digestibility, weight gain

SERUM TESTOSTERONE LEVEL, SCROTAL CIRCUMFERENCE AND SEMEN CHARACTERISTICS IN NILI-RAVI BUFFALO BULLS FED TWO LEVELS OF FEED

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Abstract

The objective of this study was to determine the effect of two levels of feed on serum testosterone level, scrotal circumference and semen characteristics in Nili-Ravi buffalo bulls. Three Nili-Ravi buffalo bulls were maintained under similar feeding and management condition for this study. The study was conducted in two phases. In first phase low energy feed containing wheat straw (4.54 %), wheat bran (4.54 %) and mott grass (90.90 %) while in second phase improved feed containing cotton seed cake (4.34 %), wheat straw (4.34 %), wheat bran (4.34 %), mott grass (86.95 %) and 50 g dicalcium phosphate was fed to the bulls. Blood samples were collected from Jugular vein at 48 hours intervals. Scrotal circumferences of animals were measured at weekly intervals. Semen samples were collected with artificial vagina (at 42 °C) at weekly intervals and analyzed for semen volume, sperm motility, sperm concentration, pH and sperm abnormalities. There was a significant effect of improved feed on serum testosterone level, scrotal circumference and semen pH while no significant increase in ejaculate volume, sperm motility, sperm concentration and sperm abnormalities was observed in Nili-Ravi buffalo bulls.

Key words: Testosterone level, scrotal circumference, semen characteristics, Nili-Ravi buffalo bulls, feed

EFFECT OF SUPPLEMENTATION OF ARSENIC AND PENTASULPHATE MIXTURE IN THE DIETS OF MURRAH BUFFALOES GIVEN HIGH LEVEL OF SELENIUM ON BLOOD SELENIUM AND ERYTHROCYTE GLUTATHIONE PEROXIDASE ACTIVITY

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Abstract

In the present study, 16 Murrah buffalo male calves were divided in 4 groups of 4 animals in each group based on body weight and age. All the animals were fed a basal diet (0.41 ppm Se) comprising of paddy straw, concentrate mixture and green maize (Control, T₁). The animals in groups T₂, T₃ and T₄ were also supplemented with 10 ppm of Se in the form of sodium selenite until blood Se level approached 1.5 ppm which happened at 60d of feeding. Thereafter, animals were given supplementary arsenic (40 ppm of diet) in form of sodium arsenite and pentasulphate mixture (9g/100 kg BW) in groups T₃ and T₄, respectively in addition to Se (10 ppm) being already given up to 105 days of experiment. Blood Se levels were monitored at fortnightly intervals since the beginning of the experiment while erythrocyte glutathione peroxidase (GPx) was monitored after 60d of beginning of the experiment at fortnightly intervals up to 105d. Blood Se level and erythrocyte GPx activity increased significantly (P<0.01) due to 10 ppm Se supplementation. Both arsenic @ 40 ppm and Degcure mixture/pentasulphate mixture @ 9 g/100kg BW and of the diet given orally were able to reduce the concentration of blood Se and GPx activity bringing them to

normal levels within 30-45 days of supplementation and hence they were effective in checking chronic selenosis,

KEY WORDS: Arsenic, buffalo, blood Se, erythrocyte GPx activity, hair Se, pentasulphate

LACTATION RESPONSE TO THE SUPPLEMENTATION OF FATS AND NIACIN IN NILI-RAVI BUFFALO

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Abstract

The objective of the study was to compare the effect of supplying vegetable oil vs. rumen by pass fats with or without supplying niacin. Twenty lactating buffaloes were allocated with 5 different treatments: A) Ctrl: Basal diet containing 18% CP; B) Ctrl + Oil; C) Ctrl + Oil + Niacin; D) Ctrl + bypass fat; E) Ctrl+ bypass fat + Niacin in a continuous scheme. The cumulative forage intake was not effected by the treatments; whereas concentrate intake varied across the treatment. Milk yield remained unaffected by the treatments. Supplementation of oil and by pass fat increased milk fat and lactose contents with or without using niacin compared to Ctrl. Milk protein remained unaffected with the treatments. Plasma urea and glucose contents also varied with the treatments. It could be concluded that using by pass fat or oil increase milk fats and can be used as a substitute of each other.

INFLUENCE OF REPLACEMENT OF CONCENTRATES WITH ENZOSE (CORN DEXTROSE) AND CORN STEEP LIQUOR ON NUTRIENT DIGESTIBILITY IN NILI RAVI BUFFALO BULLS

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Abstract

The objective of the study was to examine the replacement of concentrates with enzose and corn steep liquor on nutrient digestibility in buffalo bulls fed corncobs based diets. The control (C) diet was contained 70% dry matter (DM) from corncobs and remaining 30 % DM from concentrates. The other two diets were formulated to replace 100 % concentrates with EZ and CSL in energy equivalent basis. In the fourth diet (EZCSL) 50% of concentrates was replace by EZ and remaining 50% by CSL. Four buffalo bulls of almost same age and weight were fed twice a day at restricted intake (1.5% of their body weight) and ad libitum intake in a replicate 4 × 4 Latin square. DM, organic matter (OM), crude protein (CP) and neutral detergent fiber (NDF) digestibilities were significantly higher in bulls fed EZ, CSL and EZCSL diets compared with those fed control diet at both restricted and ad libitum intakes. The acid detergent fiber (ADF) digestibility noticed similar in all bulls. EZ and CSL can safely replace the concentrate portion in corncobs based diets without affecting intake and their replacement can improve the total tract nutrients digestibility in buffalo bulls.

Key words: enzose, corn steep liquor, intake, digestion, buffalo

MINERAL STATUS AFFECT THE POSTPARTUM CYCLICITY IN MURRAH BUFFALOES

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Abstract

Minerals are the integral part of the animal metabolism, so they might have vital role in the reproductive processes in the domestic animals. The blood collected from two groups of Murrah buffaloes each consisting of twenty animals. Group I was of postpartum anestrus (PPA) and group II was of cyclic buffaloes. The analysis of minerals in the plasma revealed that the levels of Ca, P, Mn and Fe and Ca:P ratio were significantly higher in cyclic animals than PPA animals. The levels of Zn, Cu and Mg did not show any significant difference among the two groups studied. During production period there is higher demand of nutrients and animal is under production stress. This type of stress may affect the absorption and assimilation of nutrients thereby causing the deficiency of Ca, P, Mn and Fe in PPA animals because all the animals were maintained under similar feeding and managerial practices. The deficiency of these minerals in higher producing animals may be the cause of PPA.

Key words: Minerals; PPA; nutrients; stress

Small Ruminant Nutrition

EFFECT OF DIETARY ZINC ON SEMEN TRAITS AND SEMINAL PLASMA BIOCHEMICAL COMPOSITION IN BEETAL BUCKS

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Abstract

An experiment was conducted to fine the effect of different levels of Zn supplementation on semen quality of 12 Beetal bucks. One group was kept as controlled (non- supplemented), other groups were supplemented with different levels of Zn in the diet (50, 100 and 200 mg/day). The effect of supplemental Zn include semen quantitative (volume, sperm concentration and sperm per ejaculate) and qualitative characteristics (sperm motility, dead sperm percentage, seminal plasma micro-nutrients i.e. Zn, Mn, Fe and Cu, and the activity of seminal plasma enzymes i.e. SOD, GPx AST and ALT. Higher semen volume was observed in Zn-supplemented groups as compared to the control group of Beetal bucks. Similarly, sperm concentration ($10^6/ml$), dead sperm (%) and sperm motility (%) were significantly ($p<0.05$) high in Zn-supplemented groups as compared to the control group. The results of seminal plasma micro-nutrients were high ($p<0.05$) significant as compared to the un-supplemented group. The activity of SOD and GPx in seminal plasma were significantly ($p<0.05$) high in the Zn-supplemented groups, whereas AST and ALT activities in seminal plasma were significantly ($p<0.05$) lower in the Zn supplemented group as compared to the control group. Therefore, it may be concluded that Zn supplementation at the rate of 100 mg/day in the diet of Beetal bucks improved the qualitative and quantitative parameters of semen.

Key words: Zinc, Beetal bucks, Semen, Micro-nutrients, seminal plasma enzymes

NUTRITIONAL EVALUATION, PROCESSING AND UTILIZATION OF RUMEN CONTENTS FOR FATTENING OF MALE LOHI LAMBS

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Abstract

At present, 121.1 million heads of animals in Pakistan require about 10.9 million tons crude protein and 90.36 million tons of total digestible nutrients annually. However the availability of these two nutrients is 6.7 million tons of crude protein and 69.0 million tons of total digestible nutrients and thus, deficiency of crude protein and total digestible nutrients is 38.10 and 24.02% per annum, respectively. For economical production of balanced feed for livestock, present study was conducted to determine the best processing practice for wheat straw and urea with the utilization of rumen contents for fattening of male Lohi lambs. The study was conducted in three phase. In phase one, bovine rumen contents were collected from the local slaughter house. In phase two, ensiling of wheat straw (Urea treated @4% of DM of wheat straw and also another ensiling without urea treatment) along with rumen contents was done with or without 7% addition of molasses for minimum 60 days. In phase three, a metabolic trial was conducted, in which 25 male Lohi lambs were fed the diets having 100% total mixed ration (Tc), 70% TMR with 30% silage treated only with molasses (T1), 70% TMR plus 30% silage treated with urea and molasses (T2), 70% TMR with 30% silage treated only with urea (T3), and 70% TMR plus 30% silage treated without urea and molasses (T4). The data thus obtained was statistically analyzed using one way analysis of variance (ANOVA) technique. The significant difference between means was tested by Duncan's Multiple Range test.

Results showed that the pH of silage treated with urea and molasses was minimum (4.7) as compared to other silages. The silage containing rumen contents and wheat straw showed an increase in crude protein as compare to simple rumen contents and silages which were urea treated showed increase in crude protein content. In the trial, DMI was significantly higher in control group than other groups offered silages containing rumen contents. There was no effect in DMI between T1, T2, T3 & T4. Statistical results showed no difference in total weight gain among all the treatments however maximum weight gain was observed in control treatment. Feed efficiency of the animals was not affected by any treatment in the trial. It is concluded that processed rumen contents could be used as cheap protein source in small ruminant feed and can replace 30% of conventional TMR. There were no harmful effects on health of lambs during whole trial.

GOAT MEAT ASPECTS

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Abstract

Goat meat is widely eaten throughout the world. It is used more than other farmed animals meat in warmer climates. Dressed carcass of a goat commonly yields a 40-55 percent of the live weight. Factors contributing to the variation are discussed. Over the years the tendency towards eating smaller kid goat meat has developed in many counties but more so in the tropical regions of the Indian subcontinent. An average carcass weight of 10- 14 kg for goat is considered normal but the tender meat of goats of dressed carcass weight as low as 3 – 4 kg has emerged for certain tastes. It is achieved through early slaughtering of teddy breeds of goats in India and Pakistan. Interestingly these small goats may look like big cats.

Quality traits of any kind of red meat can be divided to indicate nutritive value, physical properties/ visual acceptance and processing ease which relates to the biochemical parameters. Goat meat has brick red colour and chalk white fat, both colours darken with age of the animal. The processing characteristics of *chevon* are known to be as good as of other meats, so it can be easily put in place of beef or beeflo. In emulsion products it is as good as lamb and better than beef.

Nutritionally goat meat is an important source of animal protein in most developing countries, however, not enough research seem to have been carried out on goat meat aspects. Average composition of goat meat is moisture 74-76 %, protein 20.6 – 22.3 %, fat 0.5 – 2.5 % and ash about 1.0 %. *Chevon* contains more essential amino acids like arginine, leucine and iso-leucine than sheep meat. Goat meat has a lesser fat content and appear to have more oleic acid in its fat depots than the sheep. Goat meat has higher content of thiamine and riboflavin in the liver but it is low in niacin. Management factors and practices affect goat meat yield and meat quality, like tenderness and juiciness. The paper reviews most of the related aspects of goat meat to conclude some important points.

**GROWTH PERFORMANCE, SURVIVABILITY, AND ECONOMICS OF PRODUCTION
OF KAJLI LAMBS GIVEN BUFFALO-MILK, COW-MILK, MILK REPLACER OR
SUCKLED DIRECTLY FROM THEIR DAMS**

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Abstract

The study aimed at generating basic information on feeding cost, survivability, disease occurrence and average daily and total weight gain of Kajli lambs were raised on milk replacer, milk from buffalo or cow and compare it with those lambs who suckle directly from their dams. For this purpose, 56 healthy Kajli lambs both male and females (with equal sex ratio) born at livestock experimental station, Khushab during lambing season from February to March were fed colostrum for one week and then divided into four groups of fourteen animals each. Lambs in treatment-were allowed to suckle their dams ad libitum, twice daily. Lambs suckled their dams twice daily till 8 weeks and then once daily from 9-12 weeks. Lambs were weighed before and after suckling to calculate milk consumption. Lambs in other three treatments were offered buffalo milk, cow milk or milk replacer at rate of 10% of body weight offered in equal two halves during morning and evening till 8th week and gradually reduced to zero by the end of 12th week. All lambs in four groups were offered starter ration from 5th week of age in individual pens. The data on milk and starter intake, weekly body weight, blood glucose and body measurements was analyzed through MIXED Procedures of SAS using repeated measure analysis. Data on average daily weight gain, total weight gain, weaning weight, feeding cost was analyzed using completely randomized design. Direct suckled lambs had higher ($P<.05$) average daily growth rates and weaning weights (175 g/day and 21.2 kg, respectively) because of their higher milk intake than other groups. Weaning weight and average daily growth of lambs offered milk replacer was the lowest (93 g/day and 14.4 kg, respectively). Lambs fed buffalo milk had better growth rate and weaning weight than lambs offered cow-milk or milk replacers. Survivability was not affected due to treatments. Cost of production (Rs/kg of live weight) was highest in those fed milk replacer and lowest in direct suckled lambs (Rs. 525 vs 378). Lambs raised on buffalo milk had low numeric figure for cost of production than those offered cow-milk or milk replacer. In the absence of ewe's milk, raising Kajli lambs on buffalo milk seems to be a viable option.

ESTIMATION OF CALCIUM AND PHOSPHORUS LEVEL IN SMALL RUMINANTS IN CENTRAL MIXED ZONE IN PUNJAB

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Abstract

Mineral nutrition of sheep and goat is an area of significant importance due to its contribution in economics and health. A study was conducted to determine calcium and phosphorus in blood of Sheep and Goats (adult and kids) of Lahore, Kasur, Okara, Sahiwal and Pakpattan in winter and summer by collecting the samples of blood, fodder and soil. The mean plasma calcium values for Goats in Kasur, Lahore, Okara, Pakpattan and Sahiwal districts in winter and summer season were (9.15±0.5, 8.73±0.45, 10.08±1.23, 10.12±1.3 and 8.99±0.76 and (9.18±1.1, 8.83±0.98, 9.96±1.22, 10.6±1.32 and 8.77±0.76) respectively. The mean plasma Phosphorus values for Goats in Kasur, Lahore, Okara, Pakpattan and Sahiwal districts in winter and summer season were (5.19±0.5, 6.10±0.45, 4.84±0.34, 6.33±0.34 and 6.02±0.65) and (5.31±0.45, 6.12±0.56, 4.81±0.34, 6.29±0.75 and 6.00±0.67) respectively. The mean plasma Phosphorus values for Sheep in Kasur, Lahore, Okara, Pakpattan and Sahiwal districts in winter and summer season were 4.95±0.45, 6.16±0.80, 5.07±0.56, 6.4±0.8 and 5.79±0.55 and 5.56±0.54, (6.19±0.65, 4.72±0.43, 6.38±0.74 and 6.17±0.81) respectively. It is concluded that Phosphorus and calcium are present in normal range in the plasma of goats in the districts of Kasur, Okara and Pakpattan in both seasons but the Lahore and Sahiwal districts are deficient. All the districts are in normal range for calcium concentration in soil. The Phosphorus is present in normal range in the plasma of goats and sheep in all the districts in both seasons.

COMPARATIVE STUDY ON WEIGHT GAIN OF LOHI FEMALE YOUNG STOCK FED ON GREEN FODDER, UREA MOLASSES BLOCK AND ANMOL WANDA

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Abstract

Twenty four Lohi Female young stock were selected to study the comparative weight gain of Lohi female young stock when fed on green fodder, urea molasses block and Anmol wanda being prepared at Livestock Production Research Institute (LPRI), Bahadurnagar, Okara. Selection of animals was made on the basis of same age and weight. Animals were divided into two groups i.e A and B. Group A was given urea molasses blocks being prepared at Nutrition section of LPRI and Berseem fodder while group B was kept on Anmol Wanda. Group A was given a mixture of green fodder and urea molasses block @ 10% body weight for 60 days while group B was given Anmol Wanda @ 1% body weight. After 60 days weight gain recorded was 148 gms/day and 215 gms/day in group A and B, respectively with significant difference.

Keywords: Urea molasses block, Lohi sheep, weight gain, growth, anmol wanda

EFFECT OF DIFFERENT LEVELS OF PROTIEN BASED RATION ON FATTENING POTENTIAL OF LOHI FEMALE YOUNG STOCK SHEPP

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Abstract

Forty Lohi female young stock were selected to study the effect of different levels of protein based ration on fattening potential of this breed. Selection of animals was made at Livestock Experiment Station Bahadurnagar, Okara on the basis of same age and weight with equal number of animals (N=10) in each group i.e A,B,C and D. Group A was given concentrate ration @ 1% body weight, group B was given concentrate @ 2% body weight. Group C was given concentrate @ 3% body weight and group-D was kept as control group. Average daily growth rate was recorded as 283, 146, 67 and 60 gms respectively. There was more weight gain in the group A taking feed @ 1% body weight and lowest weight gain in group C fed @ 3% body weight. The difference among the group was non-significant.

Keywords: Sheep, Growth Rate, Concentrate ration

EFFECT OF DIFFERENT FORMS OF ALFALFA ON THE PERFORMANCE OF LOHI LAMBS

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Abstract

Growth performance and production economics in male Lohi lambs under intensive feeding of alfalfa hay and pellets was determined using eighteen (18) male Lohi lambs of approximately same weight (20±3 kg). Lohi lambs were randomly allocated to three treatments six lambs each fed on alfalfa pellets (100%), alfalfa hay & pellets (50:50) and alfalfa hay alone (100%) for twelve weeks (12) designated as AP, APH and AH, respectively. Data on DMI, Weekly weight gain, feed efficiency and production economics were analyzed. Daily DMI was significantly (P<0.001) higher in lambs on AP and lowest (699.39± 23.74gms) on AH feeding. The Lohi lambs showed highest weekly weight gain on AP (0.8385±0.00117), followed by APH (0.6847±0.00398) and the lowest weekly weight gain were observed on AH feeding (0.6272±0.0014) respectively. Weight gain differences were significant (P< 0.001) among treatments. The highest (P<0.05) feed efficiency was observed in lambs on AH (0.1196±0.0003), followed by APH (0.1060±0.00069) and recorded lowest on AP (0.0945±0.00012), respectively. The calves showed an increasing trend in daily gross margin as the proportion of AH (Rs. 0.94- 9.01) was increased in the diets. It is therefore concluded that Lohi lambs can be maintained on alfalfa pellets along with 1% concentrate supplement to have increased DMI and higher weight gain and be fed on alfalfa hay only to achieve higher efficiency and gross margins.

Key words: Lohi lambs, Alfalfa, hay, pellets, DMI, weight gain, feed efficiency, gross margin.

PREVALENCE & COMPARATIVE EFFICACY OF DIFFERENT IODINE SUPPLEMENTS IN FEED IN DEFICIENT PREGNANT GOATS

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Abstract

Iodine is one of them which is important for the body for its two major function the first one is that it help the normal cell of the body to metabolize the food and energy is conserved the second one of the important function of the body is the production of the two hormone of body, secreted by the thyroid hormone which is thyroxin (T4) and tri-iodotyrosine (T3). The main function of the hormone is that it helps to maintain the body metabolism and the ultimately the growth of the body. The iodine deficiency during pregnancy would have low level of T3 and T4 hormones in mother and the fetus. The signs which appeared in decreased plasma T3 and T4 hormones that would have had higher level of abortions, still births, and congenital anomalies, which can be minimizes by iodine supplementation. In this study 300 pregnant goat plasma samples were collected aseptically from the outdoor of the University of Veterinary and Animal Sciences in Lahore. These plasma samples were processed through ELISA technique in the University's Diagnostic Lab for the determination of T3 and T4 hormones. After processing of the plasma samples, out of 300 samples there were 84 samples which had the low levels of T3 and T4 hormone than the standard value in pregnant goat. Thus, the overall prevalence of iodine deficiency (goiter) is 28% in and around the Lahore.

In the second part of the study a drug trial is performed on 24 pregnant goats, these 24 goats were divided into three groups A, B & C and 8 pregnant goats were put in each group. Group A was given thyroxin at dose rate of 0.2mg/20kg B.W, OD, PO for 15 days. Group B was given the mineral mixture at the dose rate 50g/animal OD, PO, for 15 days again Group C was used as the control group. After 15 days of treatment, the plasma samples were again processed in lab and their T3 and T4 hormone levels in the body were measured. In Group A pregnant goats showed significant increase in the both T3 and T4 hormones which is $P<0.05$ and birth of normal kids. Group B pregnant goats also showed significant increase in both T3 and T4 hormones which is $P<0.05$ and birth of normal birth of kids. Group C showed the non significant $P>0.05$ results of the T3 and T4 hormones and pregnant goats gave birth to five kids with goiter and 3 abortion were observed without term completion.

Thus, it can be concluded that, the mineral mixture is more effective than thyroxin in treating iodine deficiency of pregnant goats.

Key words: Goiter, Goats, Iodine deficiency, ELISA

PERFORMANCE OF LACTATING BEETAL GOATS ON VARYING LEVELS OF CONCENTRATE SUPPLEMENTATION UNDER INTENSIVE SYSTEM

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Abstract

Feeding management trial was conducted to study the effect of concentrate supplementation on milk production and blood metabolites of lactating Beetal goats under intensive production system. Sixteen (16) lactating Beetal goats kept under tie stall intensive management were allocated according to RCBD (4x4) arrangement to four treatments i.e. T1 (control), T2, T3 and T4 supplemented with concentrate @ 0.0, 0.5, 1.0 and 1.5 % of body weight on dry matter basis. All the goats were given *ad-libitum* green Lucerne (*Medicago sativa*). Mean daily DMI in goats on T1, T2, T3 and T4 was 1.144±0.005, 1.322±0.005, 1.467±0.005 and 1.604±0.005 kg, respectively. Mean DMI differences were significant between treatments. Mean daily milk production was significantly (P<0.01) higher (771.34±5.54 ml) in goats on T2, followed by T4, T3 and T1. Mean milk fat and SNF contents showed non significant (P>0.05) difference among treatments. Blood albumin (2.56±0.20 - 3.01±0.20 g/dl), Triglycerides (12.23±0.49 - 16.03±0.49 mg/dl), Urea (1.35±0.04 - 1.45±0.04 mg/dl) and Glucose (23.42±1.82 - 61.52±1.82 mg/dl) showed an increasing trend with the increase in the concentrate level. It is therefore concluded that the milk production of Beetal goats can be improved by supplementing the diet with concentrate @ 0.5 % of body weight on dry matter basis along with *ad libitum* Lucerne feeding.

Keywords: Beetal goats, lucerne, milk production, milk composition, blood protein, triglycerides, glucose.

NUTRITIVE EVALUATION OF ACACIA NILOTIEA INDICA FORAGE FOR GROWING KIDS

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Abstract

Sixteen weaned male goat kids were initially weighed and randomly divided into A, B, C and D groups, offered basal diet contained wheat straw with wheat bran for maintenance requirements to all groups and a supplement of dry *Acacia nilotica indica* leaves, dry *Acacia nilotica indica* pods and fresh *Sesbania aculeata* and basal diet to each group, respectively. Kids after two weeks adaptation period were fed experimental diets for a period of seven-weeks. Dry matter intake of group D was 0.26 g and group B consumed significantly smaller quantity of basal diet (0.04 g) than group A (0.19 g) and C (0.14 g). The intake of supplements was significantly higher in group B (0.50g) than C (0.24g) and A (0.21g) also, total dry matter intake was significantly higher in group B (0.54g) than A (0.40g), C (0.38g) and D (0.26g) per kid. Average daily weight gain was significantly higher in group B (20.78±2.27g) than A (12.35g±1.55g) and C (12.35±1.35g) whereas, group D maintained their initial weight up to the termination of experimental period. The apparent digestibility of kids fed basal diet with or without supplements determined was higher in B (73.94%) than A (65.44%), C (58.15%) and D (56.38%) groups. The *Acacia nilotica indica* leaves contained DM, CP, CF, EE, NFE and ash, 14.20, 9.20, 3.90, 66.40, and 6.30 percent; the pods, 11.90, 17.00, 1.90, 62.50, and 6.70 percent; *Sesbania aculeata*, 21.00, 14.00, 3.50, 50.40, and 10.10; wheat straw, 2.00, 37.60, 0.50,

47.60, and 12.20 and wheat bran 15.41, 10.76, 3.45, 64.79, and 5.59 percent, respectively. The degradability parameters for wheat straw were 57.4 % degradability of water insoluble fractions, with 66.1% measured degradability at 96 hours and 68.8 % calculated potential degradability. The values for fitted degradability curve were calculated as: 'a' 3.0, 'b' 65.7 and 'c' 0.030. The degradability parameters of wheat bran were: 73.7 % degradability of water insoluble fractions, with 72.2% measured degradability at 96 hours and 86.8 % calculated potential degradability. The values for fitted degradability curve were calculated as: 'a' 14.6, 'b' 72.2 and 'c' 0.050. The degradability parameters of *Acacia nilotica indica* leaves recorded were: 75.8 % degradability of water insoluble fractions, with 80.1% measured degradability at 96 hours and 95.8 % calculated potential degradability. The values for fitted degradability curve were calculated as: 'a' 15.7, 'b' 80.1 and 'c' 0.050. The degradability parameters of *Acacia nilotica indica* pods observed were: 61.1 % degradability of water insoluble fractions, with 76.4 % measured degradability at 96 hours. The values for fitted degradability curve were calculated as: 'a' 6.3, 'b' 76.4 and 'c' 0.050.

EFFECT OF HEAT TREATED SOYBEAN CAKE FEEDING ON GROWTH PERFORMNCE OF GROWING FEMALE GOATS IN FODDER BASED BASAL DIET IN WESTERN HILLS OF NEPAL

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Abstract

Growth comparison of goats fed with treated and none treated soybean cake is not evaluated so far in Nepal. Therefore, an experiment was carried out on eighteen growing female goats (50% Jamunapari - 6, 50% Barberi – 6 and Kiko goats - 6) at Agriculture Research Station (Goat), Bandipur for 90 days after an adaptation period of 7 days. Female goats of average five months old with average body weight of 11.86 kg were allocated into three groups having six animals in each group by using Complete Randomized Design (CRD). For T1 and T2 concentrate mixture were composed by using procured feed ingredients with 16% crude protein level while T3 was fed with commercial feed. Experimental animals of T1 group was provided forest mixed fodder (adlib) + treated soybean cake included concentrate mixture @ 1.5% of body weight, T2 group was provided forest mixed fodder (adlib) + untreated soybean cake included concentrate mixture @ 1.5% of body weight whereas T3 was provided forest mixed fodder (adlib) + commercial concentrate mixture @ 1.5% of body weight. Experiment revealed that higher intake of concentrate feed was recorded for T1 (207.6 g) followed by T3 (199.58 g) and T2 (193.87 g) which was highly significant (P<0.001) among diet groups. Similarly, fodder intake was also noted significantly higher (P<0.001) among diet groups (1969.5 g, 1967.6 g and 1942 g for T2, T3 and T1, respectively). Feed and fodder intake of different genotypes of goats was found to be non-significant among goat breeds. In addition, feed conversion ratio per kg body weight gain was observed higher for T3 (22.49:1) followed by T2 (17.57:1) and T1 (16.24:1). Similarly, initial body weight of T1, T2 and T3 was 12.15 kg, 11.25 kg and 12.18 kg respectively that reached 17.66 kg, 16.33 kg and 16.40 kg during 90 days of experiment for T1, T2 and T3, respectively. Both initial and final body weight was non-significant among diet groups. Similarly, there was also non-significant effect of goat breed on body weight gain. Total body weight gain was recorded higher for T1 (5.50 kg) followed by T2 (5.08 kg) and T3 (3.98 kg) which was significant (P<0.05) among diet groups. Similarly, average daily gain was also noted higher in T1 (61.2g) with variation of 29-122.6g g followed by T2 (56.48 g) with variation of 21-102.6 g and T3 (44.22 g) with variation of 14-101.3 g.

Key words: Goats, bypass protein feeding, Nepal

UTILIZATION OF LENTIL (*LENS CULINARIS*) STRAW IN THE RATION OF GROWING BARBERI KID

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Abstract

Lentil (*Lens culinaris*) straw as such and its total mixed ration (TMR) were evaluated in the diet of growing Barberi male kids. Experiment was conducted in two groups of five Barberi male kids in each group. They were fed either *ad libitum* lentil straw (LS) or LS based TMR (LSTMR). Lentil straw alone was a superior (CP, 9.21%) feed ingredient for kids but having quite high crude fibre (39.59%) and Ca: P ratio (10:1). Negative growth rate and N balance (-33.78 and -1.38g/day, respectively) on LS became positive (40 and 1.50g/day, respectively) using LSTMR in the diet of kids. Use of LS in TMR increased the digestibility of dry matter (DM), organic matter (OM) and nitrogen free extract (NFE) ($P<0.01$) with crude protein and neutral detergent fibre (NDF) ($P<0.05$). Improvement in intake of DM, energy (total digestible nutrients, TDN) and protein (digestible crude protein, DCP) as well as total volatile fatty acids (TVFA) concentration ($P<0.01$) in the strained rumen liquor was observed. It has also been suggested that feeding of lentil straw in total mixed ration is a cost effective method of kids rearing.

Keywords Growth, Kids, Lentil straw, Nutrient utilization, Rumen fermentation, Total mixed ration

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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Abstract

Calcium and Phosphorus 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.

Key Words: Soil, Water, feedstuffs, blood plasma, Atomic absorption spectrophotometer

ESTIMATION OF CALCIUM AND PHOSPHORUS IN WATER, SOIL AND FEEDSTUFFS AND THEIR IMPACT ON BLOOD PLASMA OF SMALL RUMINANTS IN DISTRICT SHEIKHUPURA OF PUNJAB, PAKISTAN

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Abstract

A comprehensive study was planned to estimate the variation in the status of calcium and phosphorus 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 soil (6 samples × 5 sites × 2 season = 60 samples), water (6 samples × 5 sites × 2 season = 60 samples), available feedstuffs (3 representatives × 10 feedstuff × 5 sites = 150 samples) and blood samples (10 samples × 5 sites × 2 seasons = 100 samples), were taken and analyzed for calcium and phosphorus using Atomic Absorption Spectrometer and Spectrophotometer. The calcium was found statistically deficit in sorghum fodder (0.245%), grasses (0.33%) and wheat grain (0.35%), whereas that of toria fodder (2.06%) was found in normal ranges. Normal phosphorus values for cotton seed cake (0.91%) and barseem (0.37%) fodder were estimated however, wheat straw (0.13%) value was found deficient in phosphorus. Significant ($p < 0.05$) difference was observed for phosphorus in blood plasma of sheep during winter and summer season and non-significant difference ($p > 0.05$) was observed for calcium during the winter season. The calcium and phosphorus of soil showed significance ($p < 0.05$) among sites and between the seasons while there was no change ($p > 0.05$) in calcium and phosphorus profile in water between summer and winter season.

Key word: Calcium, Phosphorus, Sheikhpura, Spectrophotometer, Atomic Absorption Spectrometer

EFFECT OF FEEDING DIFFERENT LEVELS OF TREATED BROILER LITTER ON PALATABILITY AND GROWTH PERFORMANCE OF SHEEP

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Abstract

This study was planned to assess the effect of different treatments on broiler litter palatability and growth performance. Twenty five Lohi sheep female young stock were individually tagged, tied and boxed in a performance trial. Four experimental and one control, iso-caloric and iso-nitrogenous rations were studied. Sun dried and formalin treated broiler litter was used to replace 15 and 30 percent nitrogen of a standard sheep ration. Four rations (B, C, D, E) thus formulated were compared with a control standard farm ration (A). Rations B and C contained 10 and 20 parts of formalin treated broiler litter; whereas, rations D and E contained 11 and 22 parts of sun dried broiler litter. Results showed that after control ration palatability was higher ($P < 0.01$) in ration B containing 10 parts of formalin treated broiler litter. Daily weight gain and feed conversion ratio were better at this ration (B) but statistically non-significant. Results further revealed that the cost of production was also less ($P < 0.01$) at this ration (B) which determined that sheep performed better at rations containing lower level of formalin treated broiler litter than control and sundried containing broiler litter rations.

HITROTROPHIC NUTRITION AND EARLY EMBYONIC GOWTH IN EWES

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Abstract

This study examined the concentrations of amino acids in oviduct fluid during the peri-ovular period as a reference for the establishment of optimal in vitro culture conditions for sheep embryos. Six mature ewes (4-5 years, 58-67 kg) of comparable body condition were superovulated using conventional treatment involving a progestagen, FSH and GnRH treatment. Oviducts were catheterised four days before collection which started one day before the time of ovulation and continued until five days later. Amino acid analyses were performed by HPLC (Waters Alliance 2690XE Separation module). The number of CL did not significantly influence the concentrations of the seventeen amino acids measured. From the repeated measures ANOVA it can be concluded that the concentrations of alanine, arginine, aspartic acid, cystine, glutamic acid, lysine, methionine, serine, proline, threonine and tyrosine did not change significantly over time. However, for glycine, histidine, isoleucine, leucine, phenylalanine and valine, the effect of day was significant ($P < 0.05$). The concentration of all these amino acids increased after ovulation. Certain amino acids, particularly glycine (1528-6868 μ M), alanine (575-1059 μ M), lysine (162-273 μ M), leucine (157-272 μ M), histidine (118-261 μ M), valine (125-257 μ M) and glutamic acid (91-142 μ M) were present in high concentrations compare with normal plasma levels, indicating that they might play important roles in early embryo development.

Key words: Amino acids, sheep, oviductal fluid, nutrition, superovulation

ASSESSMENT OF FEEDING TYPES, PRACTICES, AND COST FOR RAISING GOATS IN PUNJAB, PAKISTAN

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Abstract

House hold survey was conducted to assess feeding types, practices and cost for rearing goats at two sites (Bahawalpur and Faisalabad) in Punjab, Pakistan. Farmers (n=300) were interviewed regarding various types of feeding and watering management, and cost incurred on feeding goats. Common feed stuffs, management practices and involvement of gender in rearing goats was found similar at both sites. It is suggested that provision of pasture lands, soft loans, and other necessities would enhance goat productivity and lead towards efficient utilization of available resources.

Keywords: Household surveys, feeding types, feeding and watering practices, feeding cost

NUTRIENTS INTAKE AND DIGESTIBILITY OF LOHI LAMBS AND BEETAL KIDS FED UNDER INTENSIVE MANAGEMENT SYSTEM

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Abstract

Study was conducted to compare the performance of sheep and goats under confined situation. Sixty animals (lambs n=30, 10 month of age weighing 19.5 kg and kids n=30 of 10 month of age weighing 11.5 kg) were selected and divided equally in four groups, 2 each for lambs and kids. Both species were offered fodder *ad libitum* with concentrate supplement 240 grams/animal/day and total mixed ration *ad libitum*. Results showed that DM, CP, NDF, ADF intakes were significantly (P 0.05) better in lambs than kids. Dry matter and crude protein digestibility was significantly (P 0.05) higher in kids than lambs fed on total mixed ration and it was not different among both species fed on fodder plus concentrate supplementation. NDF, ADF digestibility was maximum (P 0.05) in lambs than kids fed on total mixed ration. It was concluded that nutrients digestibility was better in kids than lambs fed on total mixed ration. Similar pattern of digestibility was observed in both species fed on fodder plus concentrate supplementation.

Key words: Lohi Lambs, Beetal kids, Nutrient intake, Digestibility

ESTIMATION OF BODY WEIGHT FROM DIFFERENT BODY MEASUREMENTS IN KAJLI SHEEP RAISED UNDER SEMI-INTENSIVE FEEDING MANAGEMENT SYSTEM

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Abstract

Live body measurements for height at wither, body length, heart girth, rump length, rump width, head length and head width were performed on 152 Kajli sheep stratified into three different age categories of 10-12, 13-15 and 16-18 months of age. These animals were purebred Kajli sheep kept at Livestock Experiment Station Khizerabad district Sargodha. The coefficient of correlation between body weight and measurements in age group 10-12 and 13-15 months were found positive and significant (P < 0.005). The mean body weight of Kajli sheep of three age groups (10-12, 13-15 and 16-18) were observed as 16.35 ± 1.85, 31.84 ± 3.12 and 37.18 ± 3.10 Kg, respectively. The coefficient of determination (R²) at age 10-12 and 13-15 months was higher (84.5%) & (34.1%) for height at wither and heart girth while at age 16-18 months it was found higher (42.2%) for body length and heart girth, respectively. The recorded morphometric characteristics had strong positive correlation with body weight so, it was considered as an accurate and precise predictors of body weight in Kajli sheep under field conditions.

Key words: Kajli sheep, body measurements, body weigh

TO STUDY THE FATTENING POTENTIAL OF DIFFERENT SHEEP AND GOAT BREEDS UNDER DIFFERENT PLAN OF NUTRITION IN PAKISTAN

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Abstract

Mutton is an important commodity and its sources i.e., sheep and goats mainly feed on grasses and roughages. Supplementation of their diet with concentrate increases their fattening ability. The present study was conducted on Beetal goat and Thali sheep for two years. The animals were divided in three groups with different feedings regimes assigned randomly. Average daily weight gain was 132-156 gm/d in Beetal goat. The goats kept on supplement only had the lowest FCR i.e.5.6. The cost benefit ration (Rs./kg gain) was 117 and it was highest (181) in 2nd treatment group. There was a non-significant difference in carcass traits between treatments. When similar treatments were given to Thali sheep, the mean daily weight gain was 104-107 gm/day. Their FCR was higher than goats. The cost benefit ratio was also higher i.e. 161 to 221. Dressing% of sheep was similar to goats. In both species, animals aged 6-9 months did not attain good weight gain. Their weight gain started after 9 months and onwards. The feedlot activities are more profitable in winter than summer. In summer, the animals did not gain weight due to extreme heat. The most appropriate season for the feedlot is winter.

Key words: Beetal goat, Thalli sheep, Supplementation, Fattening, Carcass traits

EFFECT OF FEEDING FREQUENCY ON THE GROWTH PERFORMANCE OF BEETAL GOAT KIDS DURING WINTER SEASON

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Abstract

Eighteen Beetal goat kids of about same age and weight were selected from the prevailing flock and were divided randomly into three groups with 6 replicates in each group. These kids were kept separately to study the effect of feeding frequency on the growth performance during winter season. Green fodder was offered *ad-libitum* and concentrate was given @ 1% of the body weight to each kid. Group A (control), B and C were fed two, three and four times daily, respectively. The parameters studied were feed intake, weight gain, body measurements like height, girth and length, environmental temperature and relative humidity. There was a significant difference in the DMI ($P<0.01$), weight gain ($P<0.05$), body height ($P<0.01$) between treatments (feeding frequency). Body girth and body length also had a significant difference ($P<0.05$) for group A with B and C where as non significant results were found between kids of group B and C on fortnightly basis. The kids of group C performed well in terms of weekly body weight gain, daily dry matter intake, and body measurement as compared to group A and B.

Keywords: Feeding frequency, Growth Performance, Beetal goat kids, Winter Season.

INTAKE AND GROWTH PERFORMANCE OF GOATS AND SHEEP UNDER STALL FEEDING MANAGEMENT SYSTEM

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Abstract

Study was conducted to compare the performance of sheep and goats under confine situation. Sixty animals (lambs n=30, 10 month of age 19.5 kg body weight and kids n= 30 10month of age 11.5 kg body weight) were selected and divided equally in four groups, 2 each for lambs and kids. The both species were allotted two treatments *i.e.* fodder *adlibitum* with concentrate supplement 240 grams/animal and total mixed ration *adlibitum*. Results demonstrated that dry matter intakes were significantly (p 0.05) higher in lambs than kids on TMR and fodder with concentrate supplement respectively. CP, intake was significantly (P 0.05) better in lambs than kids. Average daily weight gain was significantly (p 0.05) supplementary in lambs than kids on total mixed ration. Feed efficiency was similar among lambs and kids on total mixed ration, but significantly (p 0.05) higher on fodder plus supplement. The cost of production was similar among both species. It is concluded that lambs and kids both perform better under stall condition.

Key Words: Lambs, Kids, Dry Matter intake, Weight gain, feed efficiency, cost of production

Feed Manufacturing Technology

SIMPLIFICATION OF UREA TREATMENT METHOD TO IMPROVE THE NUTRITIVE VALUE OF CEREAL STRAW

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Abstract

In Pakistan rice and wheat straw constitutes an important part of livestock feeding. These straws have low protein contents and low digestibility. In spite of large volume they contribute little towards meeting the nutritional requirement of livestock. The urea has been used for increasing the digestibility and protein contents of straws. However, inspite of significant improvement in the nutritive value by this method the adoption of technology by the farmers always remained low due to relatively tedious technology and involvement of labour. To overcome this problem a new simple and easier method has been developed. This method involves weighing of urea @ 4% of straw to be treated, mixing it with the double the amount of manure or Acacia leaves, giving some moisture by adding water, putting this mixture in bag, keeping the bag on ground where straw is to be treated, piling the straw on bag, again moistening the straw with water (60% of straw) and incubating this material for one month under the cover of plastic sheet or mud plaster. It was concluded that suggested method is slightly less efficient than the conventional one but very simple and involves very little labour as compared with conventional one.

AFLATOXIN M1 IN BULK TANK, UHT, PASTEURIZED, POWDER AND CONDENSE MILK SAMPLES COLLECTED FROM PUNJAB PROVINCE, PAKISTAN

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Abstract

Aflatoxin M1 (AFM₁) is a hydroxylated metabolite of Aflatoxin B₁ (AFB₁) as a result of hepatic cellular activity. It appears in milk, when lactating animals consume AFB₁ contaminated feed. Due to its carcinogenic nature, International agency of research on Cancer (IARC) has classified AFM₁ as class 2B (possible carcinogen). European Union and Food and Drug administration Agency (FDA) has defined permissible levels in milk and milk products i.e. 0.05µg/ml and 0.5 µg/ml respectively. Present study was planned to determine the incidence of AFM₁ levels in unprocessed (n=90) and processed (n=60) milk samples. The source of unprocessed milk was milk bulk tanks at dairy farms. However, processed milk i.e. UHT (n=36), pasteurized milk (n=12), powder milk (n=09) and condensed milk (n=03) were collected from the local market during a period from October 2012 to March 2013. Collected samples were purified by using AflaStar™ M₁ (IAC) column coupled with chromatographic determination. Limit of detection of method was 0.01ng/ml for liquid milk whereas 0.005ng/ml for powder milk. Highest incidence (100%) of AFM₁ was observed in UHT milk and pasteurized milk followed by bulk tank (86.66%) and powder milk (22.22%). However, none of the condense milk samples was found positive for AFM₁. The positive data was further computed with respect to EU and FDA legislations. Results of present study depicted, AFM₁ levels in bulk tanks milk was (mean 0.43ng/ml; range 0.17-1.63ng/ml) followed by UHT (mean 0.22; range 0.01-0.95ng/ml), pasteurized milk (mean 0.11; range 0.07-0.15ng/ml) and powder milk (mean, 0.03; range 0.01-0.1ng/ml). All detected mean levels of AFM₁ were lower than the FDA regulatory limits but beyond the EC legislation except powder milk i.e. 0.03ng/ml. Briefly, the presence of AFM₁ in milk is an alarming situation as milk is an important constituent of human and particularly infants diet. The need of the time is to manage the mycotoxin free feed through good agricultural practices to get quality milk.

Key Words: AFM₁, Milk, IAC, Feed, Legislation

FATTY ACID CONTENT AND COMPOSITION OF TROPICAL FORAGES: EFFECT OF SPECIES AND HARVEST MATURITY

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Abstract

The aim of this study was to quantify the variation in fatty acid (FA) content and composition of tropical forages, commonly fed to ruminant livestock in Pakistan. Twelve forage species, comprising of seven range grasses: *Pennisetum purpureum*, *Setaria anceps*, *Sorghum alnum*, *Panicum maximum*, *Rumex nepalensis*, *Panicum coloratum* and *Panicum antidotale*, and five fodder species: *Trifolium alexandrinum*, *Cichorium intybus*, *Hordeum vulgare L.*, *Medicago sativa* and *Avena sativa*, were evaluated. These forages were sampled at 3 stages of maturity at two week intervals, and analysed for chemical composition and *in vitro* digestibility. Contents of individual FA were quantified by gas chromatography. Forage species and harvest maturity significantly ($P < 0.001$) affected the content of all nutrients and dry matter digestibility. Linolenic acid (C18:3n-3), palmitic acid (C16:0) and linoleic acid (C18:2n-6) were the predominant FAs with an average content of 8.65, 3.61 and 2.38 g/kg DM, contributing on average of 53, 22 and 14% of the total measured FAs, respectively. The content of all individual and total FA had a large variation ($P < 0.001$) among the forage species. Among the individual FAs, C18:3n-3 had the largest variation ranging from 4.26 (*H. vulgare L.*) to 17.43 (*A. sativa*) g/kg DM at first harvest. The content of C16:0, C18:2n-6, C18:3n-3, and total FAs decreased ($P < 0.001$) with maturity in all forages. Among the individual FAs, C18:3n-3 had the largest decrease with maturity, ranging from 10% in *R. nepalensis* to 71% in *S. alnum*. Due to the larger decrease in the content of C18:3n-3, compared to other FAs, the average proportion of C18:3 in total FAs decreased from 54% in the first harvest to 43% in the third harvest. The large variation in FA content among forage species presents an opportunity to further improve the FA content through breeding. This study also highlights that harvest management can manipulate the FA content and composition of forages, thereby presenting an opportunity to improve the FA profile of ruminant products in a cheaper and environmentally sustainable way.

IMPROVING THE FEEDING VALUE OF LOW QUALITY ROUGHAGES WITH THE HELP OF WHITE ROT FUNGI (*PLEUROTUS OSTREATUS*)

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Abstract

The aim of this study was to evaluate the effectiveness of white rot fungi, *Pleurotus ostreatus* (*P. ostreatus*) to breakdown lignin and enhance the rumen degradability of various low quality roughages i.e. maize stover, wheat straw, rice straw and mixed straws (in equal proportion on dry matter (DM) basis). Each substrate was incubated in quadruplicate with *P. ostreatus* for 0 (control), 21, 28 and 35 days under solid state conditions (humidity, 70±5%; temperature, 22±5°C). The changes in chemical composition, *in vitro* DM digestibility (IVDMD) and *in vitro* gas production (IVGP) with the different fungal incubation periods were measured. Incubation with *P. ostreatus* increased ($P < 0.001$) the content of crude protein (CP) and decreased ($P < 0.001$) the content of neutral detergent fiber (NDF), acid detergent fiber (ADF) and lignin in all substrates. There was a consistent

increase in the content of CP with the increasing incubation length. At the end of 35 days incubation period, the content (g/kg DM) of CP increased from 29.07 to 86.23 in maize stover; 29.36 to 76.38 in rice straw; 33.62 to 80.36 in wheat straw; and 37.23 to 54.31 in the mixed straws. The NDF content (g/kg DM) reduced from 808.79 to 637.28 in wheat straw; 738.89 to 577.37 in rice straw; 702.89 to 574.33 in maize stover; and 775.01 to 711.91 in the mixed straws. Incubation with *P. ostreatus* resulted in a large decline in the content of lignin in all straws. Overall, the content (g/kg DM) of lignin decreased from 134.80 to 63.22 in rice straw; 149.55 to 83.23 in maize stover, 104.84 to 79.87 in wheat straw and from 140.01 to 113.11 in the mixed straw at the end of incubation period. Incubation with *P. ostreatus* increased ($P<0.001$) IVDMD in all substrates. The IVDMD (g/kg DM) increased from 395.15 to 557.50 in maize stover; 440.22 to 564.40 in wheat straw; 428.61 to 536.14 in rice straw; and 332.99 to 399.13 in the mixed straw. There was a gradual increase in the IVGP in all straws with the increase in incubation period. Maximum gas production was recorded in each straw after 35 days incubation with *P. ostreatus*. The highest ($P<0.05$) total IVGP were recorded in maize stover and wheat straw, followed by mixed straws and rice straw, respectively. Result of the present study demonstrated that incubation of maize stover, wheat straw, rice straw and mixed straws with *P. ostreatus* under solid state condition upgrade their nutritional value by reducing the content of lignin and increasing the content of CP, IVDMD and IVGP.

QUALITY IMPROVEMENT IN CORN SILAGE

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Dr Shakeel, and Dr Kaleem Ullah*

Abstract

Silage-making is a relatively new concept in Pakistan's dairy and rural sector; Silage made from Maize and sorghum was introduced in 1994 but corn silage making has come up only recently. In Pakistan, the import of pure bred Holstein-Friesian dairy cows has triggered its increased usage. Local made corn silage today represents, along with concentrated feed, the most important input of energy and protein in the feeding of high yielding dairy herds.

Corn silage is fed throughout the year, and is made in bunkers at farms with capacity of 500 to 1000 tons per bunk. It is also made by contractors using the round baling compacting machines, and round bales of approximately one ton are commercially available in Pakistan now. Two corn crops are grown during the same year, and thus corn silage represents enormous potential in dairy animal nutrition, and will contribute immensely towards increased local milk production in Pakistan.

In Pakistan, medium and small dairy producers are keen on corn silage-making. Small bunkers of 25 to 50 tons are being filled with chopped maize. This paper focuses on the improvement procedures in corn silage-making, packing and storage, and associated costs. It also builds discussion on chop quality, moisture levels, dry matter content and proper packing, and airtight compacting of the silo stocks. It also evaluates silage production costs and silage quality of stocks, ready for feeding at farm level.

Well-preserved silage is palatable and digested easily by dairy animals. Corn silage can be utilized to cater to the existing seasonal fodder shortages in Pakistan. This will ensure increased milk production leading to economic development of rural communities.

OPTIMIZATION OF SOLID STATE FERMENTATION CONDITIONS USING ARACHNIOTUS SPECIES FOR THE PRODUCTION OF FUNGAL TREATED WHEAT STRAW FOR NILI RAVI BUFFALO CALVES

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Abstract

This study was carried out to determine the optimum cultural [substrate to water ratio (1:1, 1:1.5, 1:2), days of incubation (0,2,4,6,8), and ionic parameters e.g. $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ (0.000, 0.025, 0.050, 0.075 and 0.100 %), CaCl_2 (0.000, 0.025, 0.050, 0.075 and 0.100 %), KH_2PO_4 (0.000, 0.050, 0.100, 0.150, 0.200 and 0.250 %) & urea (0.00, 0.10, 0.15, 0.20, 0.25 and 0.30%)] conditions on the nutritive value of wheat straw (WS) under solidstate fermentation (SSF) system. The performance of SSF product was assessed in terms of favorable changes in protein content (CP) of wheat straw. Wheat straw based inoculum (seed culture) of *Arachniotus* species was prepared. The 5 g of WS taken in 250 ml autoclavable conical flask was mixed with a pre-calculated amount of water and the particular nutrient in the straw to attain the desired levels of water and nutrient concentration in the substrate. The collected data was analyzed by using analysis of variance techniques under Randomized complete block design through SAS 9.1.3 portable software for the optimization of each condition. A significant progressive increase in CP contents ($p < 0.01$) was observed with increasing levels of moisture at 4th day of incubation periods and thereafter declined at 8th day. Among the ionic concentration, optimum level for maximum fungal protein for $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ (0.050%), CaCl_2 (0.075%), KH_2PO_4 (0.150 %), urea (0.15%) was observed. From the results, it was concluded that the incubation of WS with 1:2 percent substrate to water ratio for 4 days at 28°C with 0.05% $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, 0.075% CaCl_2 , 0.15 % KH_2PO_4 and 0.15% urea was most suitable for WS treatment with *Arachniotus* species and maximum enrichment in the protein content was achieved by adopting this protocol of bioprocessing of WS.

Key Words: Wheat straw; Ionic concentration; Fungi; Fermentation; *Arachniotus*.

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

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Abstract

Study conducted to know the effect of sulphuric acid and urea treatment on voluntary intake and digestibility. The data obtained were analyzed under the 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 compared with untreated rice husk (T1). 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 in situ dry matter digestibility 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 while for 48 hours incubation there was no significant difference among treatments. Feeding trial 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 in vivo 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.

Key word: Rice husk, sulphuric acid, urea, in situ dry matter digestibility, TMR, feed intake, In vivo digestibility, buffaloes.

REDUCING FEEDING COST OF SAHIWAL CALVES UP TO WEANING WITHOUT COMPROMISING THEIR PERFORMANCE

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Abstract

Our objective was to find the most cost effective weaning package for Sahiwal calves by weaning either at 8 or 12 weeks and offering milk at 10 or 15% of body weight (BW) to weaning. Forty-eight Sahiwal day-old calves born within 45 days were randomly allocated to 4 groups of 12 equalized for sex. Calves in two groups were offered milk either at 10 (M10) or 15% (M15) of BW up to day 28 adjusted weekly. The calculated milk intake at d35 was reduced to zero by day 56 (WK8). Calves in the other two groups were offered milk as for groups 1 and 2 but were weaned at day 84 (WK12) by reducing the milk for BW at day 70 to zero. Calves were offered a concentrate ration (21% CP and 80% TDN) from days 28 to 112 (16 weeks of age; WK16). Fed and fasted (12h) blood was taken fortnightly from week 3. Data were analyzed using mixed procedures (SAS) in a 2 x 2 factorial design with weaning age and milk feeding level as the two factors. The weaning combination of WK8/M10 produced a significantly smaller calf at the least cost per kg live weight. By contrast the WK12/M15 calves were heavier, but more costly. The significant differences in fed and fasted blood

glucose at WK9 showed that the calves weaned at WK12 remained in the pre-ruminant state longer than those weaned at WK8. By WK13 both groups showed a similar glucoregulatory response. Thus early-weaning or restricted milk feeding are likely to accelerate rumen development. Offering milk at 15% of BW and weaning at 8 weeks provided the best compromise to minimize feeding cost, but maintain a growth performance commensurate with early puberty.

Key words: Sahiwal calves, weaning package

ECONOMIC OF FEEDING GREEN FODDER & PROBIOTIC SUPPLEMENTED WITH UREA TRATEED STRAW & ANMOL WANDA ON THE FATTENING OF WEANED CATTLE/BUFFALOES & BEEF CROSSBRED MALE CALVES

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Abstract

A Comparison was made in order to observe the fattening potential of various breeds of livestock under same feeding and management conditions. For this purpose for a period of 75 days, calves of different breeds such as beef cross bred calves, Agnus cross calves, Hereford cross calves, Charlias cross calves, Simental cross calves, Sahiwal calves and buffalo male calves were divided into six groups i.e A,B,C,D,E, & F, respectively. Anmol Wanda and available green fodder were fed in all groups under same feeding and management conditions. The average daily weight gain in groups A,B,C,D,E, & F were observed as 0.506, 0.640, 0.334, 0.467, 0.560, & 0.563 respectively. The feed efficiency on concentrate mixture intake basis were obtained as 5.45, 5.18, 7.6, 6.12, 5.41, & 4.14 respectively. The feed efficiency on green fodder basis was calculated as 59.28, 45.93, 88.22, 64.53, 53.57, & 45.94, respectively in groups A, B, C, D, E & F male calves. The cost of production per kg live weight gain were calculated Rs. 126, 113, 180, 129, 118 & 95 respectively in groups A, B, C, D, E, & F. It was found that buffalo calves, Hereford cross bred calves & Sahiwal male calves produced 1 Kg live weight gain comparatively cheaper as compared to other groups. Significant difference was observed in weight gain, feed efficiency and cost of production ($P>.05$).

Keywords : Calves, growth rate, Anmol Wanda, green fodder

NUTRITIONAL EVALUATION OF THREE MAIZE (*ZEA MAYS*) VARIETIES HARVESTED AT EARLY AND LATE STAGE OF MATURITY

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Abstract

Nutritional evaluation of three maize varieties (Sa2000, G12000 and Sa2001) harvested at early (40 d) and late (60 d) stages of maturity was done in rumen cannulated *Nili Ravi* buffalo bulls in a completely randomized design with 3 × 2 factorial arrangements of treatments. Samples of maize varieties harvested at different stages of maturity were chopped and ground to 2mm size for chemical analyses, after drying. Maize, regardless variety, harvested at early stage had higher crude protein (CP) contents compared to those harvested at late stage. *In situ* dry matter (DM) and neutral detergent fiber (NDF) digestion kinetics of the varieties were determined in ruminally cannulated buffalo bulls. The DM and NDF degradability, rate and extent of DM and NDF disappearance decreased in maize variety harvested at late stage than those harvested at early stage. However, effect of varieties did not show any effect on *in situ* DM and NDF disappearance, but it declined with maturity of the plant. Lag time for DM and NDF was shorter (p<0.05) in early harvest varieties than late ones. Study revealed that maize varieties harvested at 40 days of maturity had higher CP contents and better *in situ* DM and NDF digestion kinetics in buffalo bulls.

Key words: Maize Fodder, Harvest stage, Digestion kinetics, Buffalo bulls

PREVALENCE OF AFLATOXINS IN DAIRY FEED AND MILK UNDER FIELD CONDITIONS IN PAKISTAN

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Abstract

Livestock sector has been playing a great role in the agriculture economy of Pakistan. However, this sector is facing many problems among which, mycotoxins is one. Among mycotoxins, the aflatoxins (AF) are the most prevalent and harmful mycotoxins for dairy animals. They are contaminating the dairy feedstuffs like cottonseed cake, corn, silage, wheat straw, rice straw and compound feed. In this way, they not only affect the animal health and productivity but are also secreted in milk of these animals. The AF in milk and its products have been considered a major risk for the consumer's health. However, field surveys have revealed that the feed is not the only factor responsible for AF contamination of milk. The varying season and time of milk collection are also among other factors. Many strategies have been designed and implemented to prevent the AF contamination of feedstuffs and their subsequent secretion in milk. However, AF contamination is still the major problem that is affecting the dairy productivity and consumers' health in Pakistan. In this regard, further work is needed to minimize the amount of AF entering the food chain.

Key words: Aflatoxin, dairy animals, feedstuffs, milk contamination

MAPPING SUPPLY AND DEMAND OF LIVESTOCK FEED RESOURCES IN PAKISTAN

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Abstract

This paper reports data and computation-based analysis to assess feed supply and demand in the country for the year 2010-11. The availability of feed was calculated using national agricultural statistics and local feed composition tables. Standard extraction ratios were used to quantify various crop by-products as feed and grouped these into different categories based on quality. For calculating feed demand, the growth rate of inter-census data of livestock 1996-2006 was used to estimate population of different livestock species for the year 2010-11. The requirements of dry matter (DM), crude protein (CP) and total digestible nutrients (TDN) were based on established standards published from time to time. Feed balance sheets were generated at both national and provincial levels comparing the feed demand and supply situations.

EFFECT OF DIFFERENT TREATMENTS ON TANNIN CONTENTS OF TWO CULTIVARS OF SORGHUM GRAIN

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Abstract

Sorghum is a major source of energy and protein in animal feed industry and also a staple food which provide essential nutrients. Red (high tannin) and White (low tannin) sorghum cultivars were used to study the effect of soaking in distilled water, 0.05%, 0.10%, 0.20% NaOH & Formaldehyde for 8 and 16 hrs on total tannin contents and proximate composition. Results showed that soaking the sorghum grains in distilled water and formaldehyde slightly reduced the tannin contents of red and white sorghum variety. The highest drop in tannin contents was observed after soaking sorghum in 0.20% NaOH for 16 hrs at ambient temperature. It was observed that there was no much difference of tannin contents between two sorghum varieties. Results also indicate that the alkali treatment also affect on the proximate composition of grain and crude protein slightly increased with the increase in time and concentration of alkali.

EFFECT OF CUTTING REGIME ON THE FODDER AND SEED YIELDS AND THEIR QUALITY OF THREE DIFFERENT SEED SOURCES OF EGYPTIAN CLOVER

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Abstract

A field study was conducted during winter season 2012-13 at University of Veterinary and Animal Sciences, Pattoki to investigate the optimum time of last fodder cut for the fodder and seed production and quality of Egyptian clover (*Trifolium alexandrinum* L.). The experiment was carried out by using Randomised Complete Block Design (RCBD) with split-plot arrangement; the seed sources were randomized in the main plot while sub-plot had the treatments of cutting regime. Three different seed sources of Egyptian clover were used; comprises of farmer own-saved seed, market seed and research station seed, while the treatments were; T₁: 2 fodder cuts and 3rd cut for seed production, T₂: 3 fodder cuts and 4th cut for seed production, T₃: 4 fodder cuts and 5th cut for seed production, and T₄: 5 fodder cuts and 6th cut for seed production. Cutting regime significantly produced higher fodder and seed yields and effected forage quality as the fodder cut delayed. Total green and dry fodder yields of all cuttings of research station seed significantly produced higher seed yield than the other seed sources, except the last cutting (5th fodder cut) where farmer own-saved seed have higher fodder yield. Delay in the time of last cut of fodder increased green and dry fodder yield, however significantly reduced the seed yield and fodder quality. The treatment (T₃) with four fodder cuts produced excellent fodder and seed yields of all the three seed sources.

FORAGE YIELD POTENTIAL AND NUTRITIONAL QUALITY OF ALFALFA FOR LIVESTOCK FEEDING UNDER VARIOUS AGRONOMIC PRACTICES

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Abstract

Alfalfa yield and quality depends mainly on plant maturity at the time of harvesting. The cutting schedule strongly impacts the overall alfalfa profitability due to its direct effect on forage yield and quality. More days of cutting frequency generally results in higher yield but at the expense of low forage quality. Investigations pertaining to study the effect of cutting schedules, sowing methods and seeding rates were undertaken at Agronomic Research Area, University of Agriculture, Faisalabad during the year 2011-12. Different cutting frequency of 28, 35 and 42 days were placed in the main plot in split plot design while four sowing methods (broadcast, 30cm, 45cm and 60 cm spaced row) and three seeding rates viz. 10 kg, 15 kg and 20 kg ha⁻¹ were placed in sub plot. Forage and dry matter yield increased with more days cutting frequency, however from quality point of view, the protein content decline and fibre and lignin increased as alfalfa plant matures and as cutting interval lengthened. The 35 days cutting frequency is optimum for forage yield and quality and stand persistence. Different seeding rates did not effect significant on forage yield and quality while among different sowing methods 30 cm spaced row have significantly higher forage yield and non significantly effected on forage quality.

STUDIES ON IMBALANCES OF MACRO-MINERALS IN LIVESTOCK OF OKARA AND HAFIZABAD DISTRICTS

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Abstract

A study was conducted to determine the levels of macro minerals (N a, K, Ca, and P) in the blood plasma of buffaloes and cattle, feed, fodder, soil and water samples of district Okara and Hafizabad during both seasons i.e. summer and winter. All the samples thus collected were analyzed on atomic absorption spectrophotometer for estimation of Ca and Mg. Potassium and sodium were observed by flame photometer whereas phosphorus estimation was done by using spectrophotometer. The mean plasma phosphorus values being observed for large were found to 4.65 ± 0.32 mg / dl for Okara district whereas in district Hafizabad the mean plasma phosphorus values as observed were 3.043 ± 0.122 mg / dl. The mean plasma potassium values district Okara were found 4.458 ± 0.155 mEq/L for Okara district whereas in district Hafizabad the mean plasma potassium values as observed was 5.626 ± 0.236 mEq/L for large ruminants. The mean plasma sodium values for different groups of animals in district Okara as observed were 107.04 ± 3.89 mEq/L in large ruminants whereas in district Hafizabad the mean plasma sodium values as observed were 88.95 ± 2.96 mEq/L in large ruminants. Both the districts showed sodium deficiency. The results of the present study indicate that there are higher values of plasma calcium in livestock of Okara and Hafizabad district. The mean plasma calcium values for different groups of animals in district Okara as observed were 14.05 ± 1.26 mg / dl in large ruminants whereas in district Hafizabad the mean plasma calcium values as observed were 28.14 ± 1.42 mg / dl in large ruminants. Plasma magnesium values were found slightly higher (3.845 ± 0.346 mg / dl) in livestock of Okara district whereas livestock of district Hafizabad showed higher (7.16 ± 1.29 mg / dl) level of plasma magnesium than normal ones. Feedstuff, soil and water analysis has shown nearly similar pattern in macro mineral levels. **Key words** Livestock, macro-minerals, feedstuff

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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Abstract

Calcium and Phosphorus 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.

Key Words: Soil, Water, feedstuffs, blood plasma, Atomic absorption spectrophotometer

NUTRITIONAL MANIPULATIONS TO REDUCE AFLATOXICOSIS IN ANIMALS: A REVIEW

Yasir Allah Ditta, Saima, Anjum Khalique, Athar Mehmud¹ and Muhammad Zafar Ullah Khan

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Abstract

The contamination of aflatoxins in the grains has been a serious problem since hundreds of years but serious focus on its hazardous effects on animals and humans health started after the mortalities of thousands of turkeys due to unknown toxins in 1960s. Aflatoxins as one of the most important mycotoxins, potent carcinogenic, mutagenic and teratogenic in nature, are difuranocoumarin derivatives being produced as the secondary metabolites by many strains of *Aspergillus flavus* (AFB₁, AFB₂) and *Aspergillus parasiticus* (AFB₁, AFB₂, AFG₁, AFG₂). These toxins occur most abundantly in sub-tropical regions but due to the transportation, aflatoxins occur throughout the world. The ambient growth occurs at high temperature and humidity. These are potent carcinogenic, mutagenic, immunosuppressant and teratogenic in nature. These are responsible for poor growth and poor minerals and protein absorption. Rapid and controlled drying may be helpful in the avoiding the aflatoxins exposure. Hydrated sodium calcium alumino- silicate, garlic extracts, certain strains of yeast and bacteria are found to have good results against different types of mycotoxins especially aflatoxins but Recent use of modified glucomannan from the yeast has been shown good results against aflatoxins and other mycotoxins including Ochratoxin, T-2 toxin, ZON in poultry.

Key Words: Aflatoxins, Carcinogenic, Garlic, Hydrated Sodium Calcium Alumio-Silicate, Mutagenic and Teratogenic.

ESTIMATION OF CALCIUM AND PHOSPHORUS IN WATER, SOIL AND FEEDSTUFFS AND THEIR IMPACT ON BLOOD PLASMA OF SMALL RUMINANTS IN DISTRICT SHEIKHUPURA OF PUNJAB, PAKISTAN

Yasir Allah Ditta, Anjum Khalique, Talat Naseer Pasha, Saima and Mohammad Zafar Ullah Khan

Department of Animal Nutrition, University of Veterinary and Animal Sciences, Lahore, 54000, Pakistan

Abstract

A comprehensive study was planned to estimate the variation in the status of calcium and phosphorus of feedstuffs, water, soil and plasma of sheep in district Sheikhupura 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 soil (6 samples × 5 sites × 2 season = 60 samples), water (6 samples × 5 sites × 2 season = 60 samples), available feedstuffs (3 representatives × 10 feedstuff × 5 sites = 150 samples) and blood samples (10 samples × 5 sites × 2 seasons = 100 samples), were taken and analyzed for calcium and phosphorus using Atomic Absorption Spectrometer and Spectrophotometer. The calcium was found statistically deficit in sorghum fodder (0.245%), grasses (0.33%) and wheat grain (0.35%), whereas that of toria fodder

(2.06%) was found in normal ranges. Normal phosphorus values for cotton seed cake (0.91%) and barseem (0.37%) fodder were estimated however, wheat straw (0.13%) value was found deficient in phosphorus. Significant ($p < 0.05$) difference was observed for phosphorus in blood plasma of sheep during winter and summer season and non-significant difference ($p > 0.05$) was observed for calcium during the winter season. The calcium and phosphorus of soil showed significance ($p < 0.05$) among sites and between the seasons while there was no change ($p > 0.05$) in calcium and phosphorus profile in water between summer and winter season.

Key word: Calcium, Phosphorus, Sheikhpura, Spectrophotometer, Atomic Absorption Spectrometer

CONTROLLING AFLATOXIN M₁ IN FRESH MILK BY REDUCING AFLATOXIN B₁ IN FEED

Mehboob Elahi, Japie Conradie, Ifzal Akhtar, Imran Salim, Faisal Nawaz, Azeem Shahzad

Abstract

Aflatoxins are a major contaminant risk in the cattle feed production industry in Pakistan. Aflatoxins are carcinogenic and cause injurious effects on both the livestock the milk consumer's health. Aflatoxin B₁ in cattle feed is metabolized and released in the form of aflatoxin M₁ in milk. A study was conducted with the aim to feed groups of dairy animals with a level of aflatoxin B₁ (< 20 ppb) which is thought to be the level at which metabolites in to aflatoxin M₁ will be within the acceptable level (< 0.50 ppb). Two different cattle farms were selected to assess the relationship between aflatoxin B₁ and aflatoxin M₁ in feed and fresh milk respectively. At both farms, 92% aflatoxin B₁ contribution was recorded from concentrate (Vanda) feed. When aflatoxin B₁ level was more than 20 ppb in concentrate, aflatoxin M₁ level in milk was 1.42 and 1.37 ppb at both the farms. After the replacement of contaminated concentrate (Aflatoxin B₁ > 20 ppb) with the same product having low contamination (aflatoxin B₁ < 20 ppb), it was found that aflatoxin M₁ in fresh milk dropped to 0.12 ppb. This is a significant decrease in the aflatoxin M₁ level in milk and compliant with international standards. Conclusively, aflatoxin M₁ in fresh milk was significantly correlated with aflatoxin B₁ in feed. The prescribed study suggested that maintaining the level of aflatoxin B₁ in cattle feed below 20 ppb is a reliable tool to reduce aflatoxin M₁ in fresh milk to target level of 0.50 ppb.

Key Words: Aflatoxin M₁, Aflatoxin B₁ in cattle feed, cattle feed contamination

FORMULATING DIETS FOR OPTIMAL RUMINAL DIGESTION OF LACTATING DAIRY COWS IN HOT AND HUMID CLIMATES

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Abstract

During periods of heat stress on dairy cows, feed intake is reduced, requiring the need to reformulate diets. During heat stress, reduced intake can be associated with reduced rumination and nutrient absorption and can adversely affect rumen health. Nutritional strategies can alleviate alterations in nutrient requirements to help maintain a healthy rumen. Always provide cool water for lactating cows because water accounts for over 85% of milk. Next, energy density of the diet needs to be improved to compensate for decreased intake. This could be accomplished by reducing the forage to concentrate ratio of the diet, however increasing concentrates to greater than 55% of the diet (on a DM basis) is risky for the cow, often resulting in altered rumen function, acidosis, cows going on feed, milk fat depression, and reduced efficiency of nutrient use. Adding fat to the diet can increase energy density of the diet, however if dietary fat exceeds 6% of the diet, this dietary fat can also result in altered rumen function which may reduce milk fat percentage. Other nutrients to consider when formulating diets for cows in hot weather include protein, buffers, minerals and vitamins. Feeding management such as providing adequate bunk space, frequent cleaning of the feed bunk and waterer, use of high quality ingredients, and frequent feeding will also help improve milk production during times of heat stress.

Keywords: lactating dairy cattle, diet formulation, heat stress, ruminal digestion.

IMPROVING FODDER NUTRITION THROUGH INTERCROPPING AND INOCULATION FOR LARGE RUMINANTS

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Abstract

A protocol was conducted under rain fed conditions for two years (June, 2005 to September, 2007) at National Agricultural Research Center (NARC) Islamabad, Pakistan comprising intercropping (33, 50 and 67%) of grass and legumes alone as well as coupled with seed inoculation to investigate the fodder quality with the intercropping as well as inoculation. Thus, combination of intercropping by 67% with inoculation proved as the best treatment. The 6-7 % higher crude protein (CP) of mixed fodder was recorded from intercropping in comparison to grass alone while inoculation increased it by further 1-2 %. Total digestible nutrients (TDN) increased by 2-4%.

KEY WORDS; Fodder Quality, *Panicum* grass, Forage legumes, Intercropping and Inoculation

NUTRITIONAL MANIPULATIONS TO REDUCE AFLATOXICOSIS IN ANIMALS: A REVIEW

Short Title: *Effect of Aflatoxins on the production and body functions of Livestock*

Authors Names: *Yasir Allah Ditta¹, Saima¹, Anjum Khaliq¹, Athar Mehmud² and Muhammad Zafar Ullah Khan¹*

Abstract

The contamination of aflatoxins in the grains has been a serious problem since hundreds of years but serious focus on its hazardous effects on animals and humans health started after the mortalities of thousands of turkeys due to unknown toxins in 1960s. Aflatoxins as one of the most important mycotoxins, potent carcinogenic, mutagenic and teratogenic in nature, are difuranocoumarin derivatives being produced as the secondary metabolites by many strains of *Aspergillus flavus* (AFB₁, AFB₂) and *Aspergillus parasiticus* (AFB₁, AFB₂, AFG₁, AFG₂). These toxins occur most abundantly in sub-tropical regions but due to the transportation, aflatoxins occur throughout the world. The ambient growth occurs at high temperature and humidity. These are potent carcinogenic, mutagenic, immunosuppressant and teratogenic in nature. These are responsible for poor growth and poor minerals and protein absorption. Rapid and controlled drying may be helpful in the avoiding the aflatoxins exposure. Hydrated sodium calcium alumino- silicate, garlic extracts, certain strains of yeast and bacteria are found to have good results against different types of mycotoxins especially aflatoxins but Recent use of modified glucomannan from the yeast has been shown good results against aflatoxins and other mycotoxins including Ochratoxin, T-2 toxin, ZON in poultry.

Key Words: Aflatoxins, Carcinogenic, Garlic, Hydrated Sodium Calcium Alumio-Silicate, Mutagenic and Teratogenic.

EVALUATING DIFFERENT MILKING PRACTICES FOR OPTIMUM PRODUCTION PERFORMANCE IN SAHIWAL COWS

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Abstract

Multiparous lactating Sahiwal cows (n = 24) were selected and divided randomly into four groups A, B, C & D with six animals in each under a completely randomized design for evaluating their productive performance on different milking frequency and methods. The cows in A & B groups were milked through hand milking twice and thrice a day, respectively. Similarly, cows in C & D groups were milked through machine milking twice and thrice a day, respectively. The dry matter intake was higher in animal groups milked thrice a day, whereas it was not changed with hand or machine milking. Milk yield was higher (P<0.05) in cows milked thrice than of those cows milked twice a day. Milk yield did not differ between groups of machine and hand milking methods. Milk fat percentage was higher (P<0.05) in cows milked twice either through machine or hand milking method than that of those milked thrice a day. Similarly, percentage of total solids was lower in cows milked thrice either through machine or hand milking method than of cows milked twice a day. It was concluded from findings that thrice a day milking can enhance daily milk yield in Sahiwal cows.

Key words: Sahiwal cows, machine milking, milking frequency, milk yield, composition

EFFECT OF SUPPLEMENTATION OF YEAST (*SACCHAROMYCES CEREVISIAE*) ON MILK PRODUCTION AND MILK QUALITY IN NILI-RAVI BUFFALOES

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Abstract

This research was carried out to study the effect of two different levels of *Saccharomyces cerevisiae* 1026 (Alltech's product-Yea Sacc) on the milk production and milk quality in twelve lactating Nili-Ravi buffaloes. These animals were randomly divided in three equal groups (A, B and C) having four animals in each group. All the groups were given 10 Kg green fodder and TMR ad-libitum. In addition to this group A was given 5gm and group B 10gm Yea Sacc/Animal/Day while group C (control) was given zero level of Yea Sacc. The average milk production of group A, B and C was 7.60^b±0.06, 7.86^a±0.05 and 7.51^b±0.09 liter, respectively. This shows that there was non-significant (P>0.05) difference in the average milk production of group A and C while average milk production of group B was significantly (P<0.05) higher than group A and C. A non-significant (P>0.05) difference was observed in the mean body weight and milk quality (milk fat, solid not fat, protein and lactose) of all the three groups. So, it can be concluded from this study that the use of Yea Sacc in buffalo feed significantly (P<0.05) improves the milk production without affecting milk composition and body weight of Nili-Ravi buffaloes.

Key words: *Saccharomyces cerevisiae*, Yeast, Milk production, Milk composition, Buffalo

PROMISING FUTURE STRATEGIES FOR ENTERIC METHANE MITIGATION AT ANIMAL AND MICROBE LEVEL

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Abstract

Mitigating methane losses from ruminants has economic as well as environmental benefits. Improved nutrition strategies and direct modification of rumen fermentation are being currently adopted to combat enteric methane emissions. However, data suggest that developing long term strategies in suppressing methane production is necessary because of constraints of currently used approaches. At the animal level, genetic selection is the area of research which would offer a long term solution of methane production. At the microbe level, vaccination and biological control are the most promising options of all the future approaches.

Keywords: methane; genetic selection; immunization; biological control

FATTY ACID PROFILE OF CHEDDAR CHEESE FROM COW MILK WITH ELEVATED CONJUGATED LINOLEIC ACID LEVELS ATTRIBUTED TO FEED MANAGEMENT

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Abstract

The aim of the study was to evaluate the effect of feed management on conjugated linoleic acid (CLA) level in milk and its subsequent influence on fatty acid profile of cheese. Twenty cows were divided into 2 groups, one was fed on grass silage and other on pasture feed with sunflower supplementation for 14 days. Milk samples were collected and analyzed for composition and fatty acid profile. Cheddar cheese was manufactured from both milk types and ripened for 120 days. During ripening, it was analyzed for composition and fatty acid quantification. The supplemented diet significantly increased the CLA content in milk. Similarly the *cis*-9, *trans*-11 CLA content in Cheddar cheese were more than twofold in case of supplemented diet as compared to grass silage. During ripening, the CLA concentration remained stable. The sunflower supplementation showed no effect on cheese composition. Hence, supplemented pasture feed affluent in linoleic acid resulted in elevated CLA content in milk compared to grass silage.

Key words: Fatty acids, milk, Cheddar cheese, conjugated linoleic acid

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

Kausarzeb[©], *M.A. Jabbar*, *A. Khalique*, *I.B. Marghazani*, *N. Ali*, *M. Abdullah*¹, *I. Ali*², *A. Gohar** and *S. Din**

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**Livestock and dairy development extension Khyber Pakhtunkhwa Peshawar*

Abstract

Study conducted to know the effect of sulphuric acid and urea treatment on voluntary intake and digestibility. The data obtained were analyzed under the 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 compared with untreated rice husk (T1). 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 in situ dry matter digestibility 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 while for 48 hours incubation there was no significant difference among treatments. Feeding trial 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 in vivo 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.

Key word: Rice husk, sulphuric acid, urea, in situ dry matter digestibility, TMR, feed intake, In vivo digestibility, buffaloes.

OPTIMIZATION OF SOLID STATE FERMENTATION CONDITIONS USING *ARACHNIOTUS* SPECIES FOR PRODUCTION OF FUNGAL TREATED WHEAT STRAW FOR NILI RAVI BUFFALO CALVES

M. Abdullah, F. Shahzad, I. Hussain^{}, J. A. Bhatti, M. A. Jabbar^{**}, K. Javed, A. S. Chaudhry^{***} and Z. Kamran^{****}*

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Abstract

This study was carried out to determine the optimum cultural [substrate to water ratio (1:1, 1:1.5, 1:2), days of incubation (0,2,4,6,8) and ionic parameters e.g. $MgSO_4 \cdot 7H_2O$ (0.000, 0.025, 0.050, 0.075 and 0.100 %), $CaCl_2$ (0.000, 0.025, 0.050, 0.075 and 0.100 %), KH_2PO_4 (0.000, 0.050, 0.100, 0.150, 0.200 and 0.250 %) & urea (0.00, 0.10, 0.15, 0.20, 0.25 and 0.30%)] conditions on the nutritive value of wheat straw (WS) under solid state fermentation (SSF) system. The performance of SSF product was assessed in terms of favorable changes in protein content (CP) of wheat straw. Wheat straw based inoculums (seed culture) of *Arachniotus sp.* was prepared. The 5 g of WS taken in 250 ml autoclavable conical flask was mixed with a pre-calculated amount of water and the particular nutrient in the straw to attain the desired levels of water and nutrient concentration in the substrate. The collected data was analyzed using analysis of variance with GLM procedure from the Minitab program for the optimization of each condition. A significant progressive increase in CP contents ($p<0.01$) was observed with increasing level of moisture at 4th day of incubation periods and thereafter declined at 8th day. Among the ionic concentration, optimum level for maximum fungal protein for $MgSO_4 \cdot 7H_2O$ (0.050%), $CaCl_2$ (0.075%), KH_2PO_4 (0.150 %), urea (0.15%)] was observed. From the results, it was concluded that the incubation of WS with 1:2 percent substrate to water ratio for 4 days at 28°C with 0.05% $MgSO_4 \cdot 7H_2O$, 0.075% $CaCl_2$, 0.15 % KH_2PO_4 and 0.15% urea was most suitable for WS treatment with *Arachniotus sp.* and maximum enrichment in the protein content was achieved by adopting this protocol for bioprocessing of WS.

Key Words: Wheat straw, ionic concentration, fungi, fermentation, *Arachniotus*

EFFECT OF DIFFERENT TREATMENTS ON TANNIN CONTENTS OF TWO CULTIVARS OF SORGHUM GRAIN

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Abstract

Sorghum is a good source of energy and protein in animal feed industry which provides essential nutrients. Red (high tannin) and white (low tannin) sorghum cultivars were used to study the effect of soaking in distilled water, 0.05%, 0.10%, 0.20% sodium hydroxide and formaldehyde for 8 and 16 hours on total tannin contents and proximate composition. Results showed that soaking the sorghum grains in distilled water and formaldehyde slightly reduced the tannin contents of red and white sorghum varieties. The highest drop in tannin contents was observed after soaking sorghum in 0.20% NaOH for 16 hrs at ambient temperature. It was observed that there was no much difference of tannin contents between two sorghum varieties. Results also indicate that the alkali treatment also affects the proximate composition of grain and crude protein slightly increased with the increase in time and concentration of alkali.

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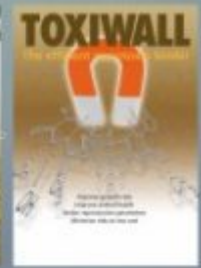
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The Dairy Project is a joint effort of United States Agency for International Development (USAID) and Dairy and Rural Development Foundation (DRDF) to foster sustainable increase in dairy and livestock productivity through adoption of best farming practices, breed improvement, availability of timely extension services and promotion of livestock businesses.

Due to the vital importance of the livestock sector in the rural economy of Pakistan, the Dairy Project's extensive training programs for dairy farmers, women livestock extension workers and artificial insemination technicians will play an important role in transforming livelihoods of rural communities.

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The American Soybean Association (ASA) was founded in 1920 by soybean farmers and extension workers looking to promote the crop for high protein applications in developmental settings. Overseas activities began in the mid-1950s and to date, ASA has served in more than eighty countries globally. In 2000, ASA expanded and focused its international role and founded the World Initiative for Soy in Human Health (WISHH) whose mission is to create sustainable solutions for the protein demands of people in developing countries through the introduction and use of soy products. Since its creation, WISHH has been enhancing the protein intake of many nations through market development, humanitarian assistance, education and research. Today, ASA/WISHH works in both the feed and food sectors, providing a multitude of services to support its international development activities.

Last year, in September 2011, WISHH began implementation of the FEEDing Pakistan Program funded by the U.S. Department of Agriculture (USDA). The program is aimed at improving capacity, productivity and quality in the Pakistani aquaculture sector, and will assist interested parties in Pakistan in using U.S. soybean meal to make high-protein fish feeds. Other elements of the program include: an assessment of the Pakistani fish farming industry, feeding demonstrations to show the results of fish feed formulations, training courses on fish feed manufacturing and best management practices, as well as technical assistance to industry stakeholders, such as feed manufacturers and farmers.

Growth in the aquaculture industry can play a large role in decreasing the “protein gap” in Pakistan which is the amount of protein produced in Pakistan compared to the amount needed to meet the nutritional needs of the population. Aquaculture in Pakistan has great possibility for growth with the potential to earn more than one billion dollars per annum in exports; current export earnings from fish and fishery products are \$197.3 million.

ASA/WISHH is working together with industry, individual fish farmers, Provincial Fishery Departments, and the Pakistani Fisheries Development Board to show improvements in fish growth and survival through the use of floating fish feed produced with U.S. soybean meal. Feed produced with high quality soy protein not only supports growth and healthy development of the fish but also reduces costs and supports healthy environment initiatives.

ASA/WISHH's objective is capacity building through transfer of technology for improved farming resulting into increasing rural incomes, economic competitiveness and addressing the Food Security in Pakistan.

Message

On this exciting occasion, the ASA extends our warmest greetings to Nutritionists Association of Pakistan and we look forward to continuing to collaborate in mutually beneficial ways for many, many years to come !



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