Abs. No.1

Mineral Profile of Soil, Feeds, Fodders and Blood Plasma in Southern Transition Zone of Karnataka

J.V. Ramana, C.S. Prasad and S.K. Gowda

S: Indian J. Anim. Nutri., 17 (3), 179 – 183, 2000

Minerals (Calcium, Phosphorus, Magnesium, Copper, Zinc and Iron) content of soil, feeds/fodders and blood samples of dairy animals from Southern Transition zone of Karnataka was studied. Calcium content of soil (0.15%) was just above the critical level (0.1%) and phosphorus content (31 ppm) was below the critical level of 45-130 ppm. The straws contained low levels of calcium (0.31-0.72%) and phosphorus (0.08-0.25%). Top feeds were found to be very good sources of calcium zinc and iron. Oil cakes and brans contained low levels of calcium (0.36-0.41%) and high levels of phosphorus (1.15-2.25%). Some of the unconventional feeds like groundnut haulms, horsegram pods used for livestock feeding in this zone contained good quantity of Ca (1.1%) but low level of other minerals. Copper, zinc and iron were present in appreciable quantities in cultivated fodders, leguminous fodders, local grasses and top feeds. Levels of phosphorus (3.6mg%), copper (0.31 ppm) and zinc (0.66 ppm) were low in the blood plasma of animal in this zone. More than 50% of the animal screened showed low copper and zinc in blood plasma.

Abs. No.2

Mineral Status of Soils, Feeds, Fodders and Animals in Coastal Agri-Eco Zone of Karnataka

N.K.S. Gowda*, C.S. Prasad, J.V. Ramana and M.T. Shivaramaiah

S: Animal Nutrition and Feed Technology (2001) 1: 97-104

Mineral (calcium, phosphorus, magnesium, copper, zinc and iron) status of soil, feeds/fodders and blood samples of animals from coastal zone of Karnataka was studied. Extractable ca (0.15%) and Mg (0.02%) level in soil was slightly higher than the critical level but the levels of P, Cu, Zn and Fe in soil was much higher than the critical levels. Paddy straw which is the major roughage source in this zone contained high silica (10.92-11.15%) and was low in most of the minerals estimated. Cultivated green fodders and local grasses were moderate to good sources of Ca, Mg, Cu, Zn and Fe. Tree leaves and top feeds contained higher amount of Ca (0.8-1.70%), Zn (82-110 ppm) and Fe (1480-2710 ppm). Wheat bran and rice polish contained high P (1.5-2.05%) and Fe (457-668 ppm). Copper (0.57 ppm) and zinc (0.91 ppm) were low in the blood plasma of the animals in this zone. About 40% of the animals screened showed lower plasma Cu and Zn values. However, the blood levels of Ca, P, Mg and Fe were within the normal limits. Supplementing green fodders, top feeds which are good sources of Cu and Zn could be a practical approach to overcome the deficiency and /or providing region specific mineral mixture could be an alternative approach.

Abs. No.3

In situ protein degradability of certain feedstuffs in the rumen of cattle

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S: Indian journal of Animal Sciences 71 (3) 261-264. March 2001

In situ crude protein (CP) disappearance of soybean extraction, sunflower extraction, rapeseed extraction, maize gluten meal-60 (60%CP), maize gluten meal-40 (40%CP), copra-cake extraction, safflower-cake, broken rice, jowar grain, ragi grain, rice polish and maize bran in the rumen at different incubation periods were determined by nylon bag technique using 3 adult fistulated steers. The residual CP values were transformed to natural logarithms and then subjected to linear regression to arrive at degradation constants. The effective degradability was calculated for an assumed out flow rate of 5%hr. The effective CP degradability of soybean extraction, sunflower extraction, rapeseed extraction, maize gluten meal-60, maize gluten meal-40, copra-cake extraction safflower-cake, broken rice, jowar grain, ragi grain, rice polish and maize bran was 54,54,69,21,37,33,63,32,15,32,47 and 37% respectively. Maize gluten meal-60, maize gluten meal-40, soybean extraction and copra-cake extractions provided high amounts of UDP (490,252,210 and 150g) per kg dry matter as compared to other protein supplements. The energy supplements (rage grain, jowar grain, broken rice, maize bran and rice polish), although in small quantities, contribute more undegradable protein than rumen degradable protein at an outflow rate of 5%hr.

Abs. No.4

Mineral Status of Soil, Feed Fodder and Blood Plasma of Animals in Northern dry and Northern Transition Zones of Karnataka

J.V. RAMANA* C.S. PRASAD, N.K.S. GOWDA, K.S. RAMACHANDRA

S : Indian Journal of Dairy Sciences 54(1) : 40-46

A study was conducted to estimate the micronutrient content, viz. Calcium (Ca), Phosphorus (P), Magnesium (Mg), Copper (Cu), Zinc (Zn) and Iron (Fe) content in soil, water, feed, fodder and blood plasma of animals in northern dry and northern transition zones of Karnataka. The phosphorus content in soil in Northern dry zone (30.30 ppm) and Northern transition zone (34.33 ppm) were found to be well below the critical level (45 to 130 ppm). The calcium (0.47%), copper (4.17 ppm) and zinc (11.27ppm) content in soil in northern transition zone were found to be higher than in the northern dry zone and were well above the critical levels in both the zones. Paddy straw (12.59%) in northern dry zone and local grasses (8 to 9%) in both the zones showed high silica content. Top feed like subabul leaves in northern transition zone was found to be good source of calcium (1.54%), copper (79.32mg/kg), zinc (361 mg/kg) and iron (1373 mg/kg). Concentrate supplements like brans and cakes had high content of phosphorus (0.77 to1.10%), zinc (54 to 66 mg/kg) and iron (1362 to 2267mg/kg) in both the zones. The average blood plasma levels of calcium (5.67 mg%), phosphorus (3.86 mg%), copper (0.59 ppm) and zinc (0.54 ppm) were found to be lower than the normal values in northern dry zone. In the northern transition zone calcium (6.26 mg%) and zinc (0.56 ppm) were found to be deficient in blood plasma. Supplementing the deficient micronutrients with locally available feed resources like green fodders, tree leaves, cakes and brans which are good sources of these minerals or providing region specific mineral supplements would alleviate the deficiency in these zones.

Abs. No.5

Micronutrient Profile in soil, feed, fodders and blood samples of animals in eastern and southern dry zones of Karnataka

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S: Indian Journal of Animal Sciences 71 (2): 150-154. February 2001

The micronutrient (calcium, phosphorus, magnesium, copper, zinc and iron) status of soil. Water, feeds, fodder and blood samples of animals was studied in eastern and southern dry zones of Karnataka. Micronutrient content of soil in both the zones was above the critical level except for phosphorus (15.7 ppm), which was well below the critical level of 45-130 ppm in southern dry zone. Ca and Mg were present in higher amounts (19-23 ppm) in water in both the zones, as compared to other micronutrients, which were present in trace amounts. Straw the major source of roughage in these zones was low in most of the micronutrients screened but contained high levels of silica. Legumes contained higher levels of Ca (1.44-2.73%). Zn (25-165 ppm), cu (8-25 ppm) and Fe (334-5664 ppm) compared to cultivated green fodders. Local grasses and weeds showed higher values of zinc and iron. Tree leaves/top feeds were good sources of Ca (1.38-2.02%).Zn (35-226 ppm) and Fe (792-981 ppm). Amongst the concentrate supplements oil-cakes, brans and rice polish were rich in phosphorus (0.84-3.95%). Most of the feed ingredients were good sources of magnesium. Majority of animals screened in eastern dry zone showed lower blood plasma Ca values as compared to other micronutrients. In southern dry zone about 65-70% of the animals screened showed low phosphorus and zinc content in blood plasma. It was evident that calcium in eastern dry zone and phosphorus and zinc in southern dry zone were the most limiting micronutrients. Strategies supplementation through legumes, tree leaves, oil cakes and brans would alleviate the deficiency of micronutrients in these zones.

Abs. No.6

Levels of Micro-Nutrients in Soil, Feed, Fodder and Animals of North East Transition and Dry Zones of Karnataka

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S: Indian Journal of Animal Nutrition 18(3), 235 – 242, 2001

The calcium (Ca), Phosphorus (P), Magnesiun (Mg), copper (Cu), Zinc (Zn) and Iron (Fe) content in soil (n = 10) were above the critical levels in north east transition zone and north east dry zone. Ca (63.44 ppm), P (0.35 ppm) and Mg (40.77 ppm) content in water in north east dry zone were higher than in north east transition zone. Paddy straw and jowar kadbi, the main dry roughage sources in these zones, were low in most of the minerals screened. Cultivated green fodders (maize, jowar and green gram) and grasses were good sources of Ca, Cu, Zn and Fe. Green gram fodder showed high content of Ca (2-2.6%) and Mg (0.85%). Tree leaves like glyricidia, neem and subabul (n=12) were good sources of Ca (0.8-3.1%). Amongst the concentrate feeds, grains were low in most of the micro-nutrients except iron. Groundnut cake and rice bran contained high levels of P(>1.0%). Some of the unconventional feeds like groundnut haulms, gram husks had high levels of Ca(1.75%) and iron (1600 -3000 ppm). About 49% of the crossbred cattle (n=40) showed low blood plasma Ca (7.07 mg%) and P (3.51 mg%)values in north east transition zone and 75% of the animals in north east dry zone showed low Zn values (0.72 ppm). Most of the animals were found to have reproductive problems which could be attributed to micro-nutrient deficiency. Providing region specific mineral salts or supplementing top feeds, green fodder, oil cakes and brans which are good sources of these minerals would help in overcoming the mineral deficiency.

Abs. No.7

Assessment of mineral status in hilly and central dry zones of Karnataka and ways to supplement them

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S: Indian Journal of Animal Sciences 72 (2): 165-170, February 2002

A study was undertaken to assess the mineral status of calcium (Ca), Phosphorus(p), Magnesium (Mg), copper (Cu), Zinc (Zn) and iron (Fe) of soil, feeds/fodders and blood samples of animals in hilly and central dry zone of Karnataka. The extractable minerals from soil were within the critical range in central dry zone, whereas, in hilly zone soil Ca (0.03%) and P (9 ppm) levels were below the critical levels. Paddy and ragi straw contained higher silica and were also lower in Ca, P, Cu, and Zn than the critical levels. Cultivated green fodders and mixed local grasses in both the zones were moderate to good sources of Ca, Mg, and Cu and were rich in Fe (206-2090 ppm). Legume fodders available in these zones contained good amount of Ca (1.8-2.4%), Cu(35-63 ppm), Zn(44-284 ppm) and Fe (652-2752 ppm). Fodder tree leaves like Erythrina, glyricidia, mulberry, and subabul contained higher levels of Ca (0.8-2.5%) followed by Cu Zn and Fe. Cereal grains had lower ash content and were low in Mg (0.18%). Oilcakes and brans were good surces of P (1-2.96%). Certain unconventional feeds like gram husk, horse gram and groundnut haulms being fed to animalism in these zones contained moderate to high levels of Zn(31-213 ppm), fe (702-2901ppm) and Ca(1.1-1.9%)but their boiavailability to the animals is yet to be seen. There existed some variation in the mineral content of feeds / fodders between the zones. Animals in hilly zone had significantly ($p<0.01$) lower P, cu and Zn values in blood plasma and animals in central dry zone showed significantly ($p<0.01$) low Ca, Cu and Zn. Iron levels in animals of both the zones were within the normal range. Supplementation of green fodders, legumes, tree leaves along with concentrate ingredients like cakes and brans or alternatively providing region specific mineral supplements could overcome the deficiency of minerals and could be a cost effective approach.

Abs. No.8

Scope for Utilization of Sunflower Heads as Animal Feed in Karnataka State

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S: Indian Journal of Animal Sciences 72(3): 469-471, June 2002

A survey was carried out to assess the utilization pattern of sunflower heads (SFH) in the districts of Bellary, Raichur and Chitradurga, which are the major sunflower growing areas of the Karnataka state. The survey revealed that currently sunflower heads are not being fed to any class of livestock, and are mainly used for composting or burnt or dumped on way side. Even though sunflower heads are not being fed, the survey revealed that animals consumed SFH in a limited way. Small ruminants have greater liking for SFH than the large ruminants. The major reason ascribed for not feeding SFH is lack of tradition and availability of other feeds in sufficient quantities. The chemical composition and in vitro studies revealed that SFH is nutritionally better than many of the commonly used roughages. Proper extension and demonstration of utilization of SFH is required for popularizing the use of SFH as livestock feed.

Abs. No.9

Assessment of animal feed resource availability in Southern Karnataka Region

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S: Indian Journal of Animal Sciences 72 (12): 1137-1140, December 2002

Animal feed resource availability was assessed bases on secondary data in Southern Karnataka region comprising 7 districts. Distribution and composition of livestock revealed that the region accounted for 49 and 48% of total state sheep and poultry population, respectively. High percentage of crossbred cattle(26.10%) among adult females with high crossbred population in the districts of Bangalore urban (64.69%) Kolar (45.71%) and Bangalore rural (30.30%) indicated that the animal husbandry activities are practiced more on commercial lines in the region. The region had a total DM availability of 10.31 m tones from different feed resources. Crop residues contributed for more than 70% of total DM available in the region. Major portion (58%) of the green DM forage availability is contributed from the gross cropped area in all the districts of the region. The contribution from the forest area was minimal within the region as a whole. The DM availability/ RLU/ day for the region is 8.05 kg with the values ranging from 3.92 kg in Bangalore urgan district to 12.33 kg in Chitradurga district. The study indicated that the existing situation ranges from low feed resources availability-high productivity to high feed resource availability-low productivity. Developing suitable strategies of r efficient utilization of existing feed resources would help in further increasing the animal productivity in the region.

Abs. No.10

Rumen Protein Degradability of Certain feedstuffs in Cattle Determined by Nylon Bag Technique

M. Chandrasekhraiah, K.T. Sampath and A. Thulasi

S: Indian Journal of Dairy & Biosciences 13 (2): 18-21

In situ dry matter(DM) and crude protein (CP) disappearance of silk worm pupae,silk worm pupae (deoiled), chilliseed cake (expeller), chilliseed cake (deoiled,) bajra and navane (fox millet or Setaria italica) grains in the rumen at different incubation periods were determined by nylon bag technique using 3 adult fistulated steers. The residual CP values were transformed to natural logarithms and then subjected to linear regression to arrive at degradation constants. The effective degradability was calculated for an assumed out flow rate of 5%h. the effective CP degradability of silk worm pupae, silk worm pupae (deoliled), chilliseed cake (expellr), chilliseed cake (deoiled) bajra and navane grains was 29.42, 19.97, 39.88, 24.63, 49.79 and 44.71% respectively. The feedstuffs such as silk worm pupae and silk worm pupae (deoiled) provide high amounts of UDP (388.82 and 560 g) per kg dry matter. However the other feedstuffs such as chilliseed cake (expeller), chilliseed cake (deoiled), bajra and navane grains although in small quantities, contribute more undegradable protein than rumen degradable protein at an outflow rate of 5%/h.

Abs. No.11

Evaluation of Chemical Composition and in Vitro Digestibility of Certain Commonly Used Concentrate Ingredients and Fodder / top Feeds in Ruminant Rations

M. Chandrasekharaiah, K.T. Sampath, U.S. Praveen and Umalatha

S: Indian Journal of Dairy & Biosciences 13 (2): 28-35

Studies were conducted to determine the chemical composition, in vitro dry matter, organic matter and neutral detergent fiber digestibility (IVDMD, IVOMD and IVNDFD) of commonly used concentrate ingredients such as soybean exteraction, sunflower extraction, safflower extraction, copra cake, maize gluten meal (40% CP) (MGM-40). Sesame cake, full fat soya, rice polish broken rice, bajra grain, tur chuni and moong chuni and tree leaves/fodder such as Sesbania grandiflora, Erythrina indica, ingadulcis, Peepal leaves, para grass, napier grass, luceme fodder, maize fodder, jowar fodder, subabul fodder, anjana tree leaves and sugar cane tops. Higher IVDMD (> 70%) IVOMD (>75%) and IVNDFD (>50%) values were observed in broken rice, MGM-40, sesame cake, bajra grain, tur chuni, full fat soya and moong chuni. Lowest amount of in vitro digestibility values were observed in safflower and sunflower extraction. Highest IVDMD and IVOMD were observed in Sesbania grandiflora leaves followed by Erythrina indica leaves Ingadulcis leaves and Peepal leaves. Lower IVDMD and IVOMD values were observed in the case of sugar cane tops. IVNDFD of para grass, napier grass and maize fodderwas higher ($P<0.01$) while the same is lower in the case of anjana tree leaves, subabul fodder, sugar cane tops and ingadulcis leaves.

Abs. No.12

Influence of Storage Condition, Bag Material and Duration of Feed Storage on Aflatoxin Production

N.K.S. GOWDA*, V. MALATHI AND R.U. SUGANTHI

S: Indian Journal of Animal Nutrition 19(14) 340-345, 2002

Studies on influence of different storage conditions and type of bag material on aflatoxin production in animal feeds were conducted. Storage of groundnut cake (GNC) and maize with 12 per cent moisture level in open plastic containers under godown conditions for 28days period showed a significant ($P<0.01$) increase in aflatoxin (B_1) content from 10±0.50 to 70±3.5 ppb in GNC and 8±0.76 to 34±3.3 ppb in maize. Storage studies with jute/gunny and HDPE bags showed higher fungal spore count (31-58 x 10^4 CFU/g) and significantly ($P<0.05$) higher aflatoxin production (385±15 to 393±2ppb) in feeds stored in gunny (jute) bags as compared to HDPE bags (27-43 x 10^4 CFU/gm & 343±4 to 360±21 ppb) at 12.5-15 per cent moisture level. The spore count and the aflatoxin production (6-9 x 10^4 CFU/g & 20-25 ppb) were minimum in both the type of bags at 7.5 per cent moisture level and was uniformly increased in both the bags at 10 percent moisture level (33-76 ppb & 35-68 ppb). It is suggested that below 10 per centmoisture level is safe for feed storage provided further entry of moisture is not there. At above 12.5 percent moisture level, storing feeds in HDPE bags could considerably reduce fungal growth and aflatoxin production, but drying and storing would be more appropriate and safe.

Abs. No.13

Availability of Limiting Amino Acids in the Rumen Undegradable Protein (udp) Fraction of Commonly used Protein Sources

K.T. Sampath,* M. Chandrasekharaiah and A. Thulasi

S: Indian Journal of Dairy Science 55 (2): 93-96

Studies were conducted to determine the availability of limiting amino acids (lysine and methionine) in the UDP fraction of commonly used protein sources. The feedstuffs, Soyabean extraction (SBE), Rapeseed extraction (RSE), Sunflower extraction (SNFE), Maize gluten meal (MGM), Safflower cake (SFC) and Copra cake (CC) contained 2.59 and 1.00; 0.80 and 0.35; 1.11 and 0.19; 1.01 and 1.25; 1.17 and 0.44 and 0.21 and 0.21 per cent lysine and methionine, respectively, which were determined by HPLC. The above feedstuffs were incubated in nylon bags in the rumen of three fistulated crossbred steers for a period of 24 hours. The lysine and methionine disappearance from these feedstuffs during 24 hour incubation in the rumen were 94.21 and 92.07; 69.97 and 76.60; 41.99 and 89.81; 62.89 and 67.64; 30.25 and 13.16 and 58.57 and 68.05 per cent in SBE, RSE, SNFE, MGM, SFC and CC respectively. It was observed that the bypass protein fractions of stafflower cake and maize gluten meal are good sources of lysine and mehtionine and the bypass protein fractions of sunflower cake and copra cake are good sources of lysine. The lysine and methionine availability in the UDP fraction of soyabean extraction was very low as these amino acids are extensively degraded in the rumen.

Abs. No.14

Effect of Supplementation of Different Concentrate Ingredients on in vitro NDF Digestibility of Finger Millet Straw

M. Chandrasekharaiah, * K.T. Sampath, C. Prakash and U.s. Praveen

S: Animal Nutrition and Feed Technology (2002) 2: 169-176

In vitro studies were conducted to determine the effect of supplementation of finger millet straw (FMS) with different concentrate ingredients on NDF digestibility. The in vitro NDF digestibility of FMS which initially was 41.39 was enhanced ($P<0.05$) to 48.77±0.36, 47.79±0.19 and 48.91±0.16 with deoiled rice bran; 44.27±0.13, 48.90±0.01 and 47.22±0.20 with maize gluten meal –60; 46.44±0.16,46.14±0.39 and 46.62±0.14 with groundnut cake; 45.24±0.33, 45.61±0.01 and 46.24±0.11 with cotton seed extraction and 42.68±0.16 43.24±0.01 and 43.17±0.12 with copra cake depending on the level of dietary rumen degradable nitrogen (RDN). There was no significant difference in NDF digestibility due to different levels of RDN for these ingredients except in case of maize gluten meal-60 and maize gluten meal-40 where the NDF digestibility was significantly ($P<0.05$) higher at 22 and 30 g RDN/kg DOM for maize gluten meal-60. and 30g RDN/kg DOM for maize gluten meal –40. The mean NDF digestibility values were significantly ($P<0.05$) higher when supplemented with deoiled rice bran followed by maize gluten meal-60, groundnut cake, cotton seed extractions and copra cake. However, the mean digestibility values were not significantly ($P<0.05$) different between groundnut cake and cotton seed extractions.

Abs. No.15

Imapct of Three categories of Supplements on In Sacco Ruminal Degradation of Urea-Treated and Untreated Straw Substrates

Bandla srinivas* , U. Krishnamoorthy' and Soumitra Jash

S: Asian-Aust. J. Anim. Sci. 2002. Vol. 15, No. 2 : 195-204

The objective of this study was To examine the impact of three categories of supplements on intake and diet induced difference on degradation of straw substrates. Sixteen crossbred cattle fitted with rumen cannual were randomly divided into 4 equal groups. Animals were fed on wheat straw ad libitum without any supplement except mineral mixture(control; T_1) or supplemented with concentrate mixture(CS;T_2) or green Luceme (GLS;T_3) or urea-molasses block lick (ULS;T_4) Total dry matter intake in T_2,T_3 and T_4 was increased by 70, 54 and 49%, respectively compared to T_1 which was only 1.55 kg /100 kg B.W_t. Other than control animals, straw intake was less on T_3 than T_2 or T_4. In Sacco degradation of untreated and urea treated wheat or paddy straw in different treatments indicated that the supplements had a significant ($p<0.01$) impact on rapidly soluble (A) and insoluble but potentially degradable (B) fractions of straw. Urea treatment increased fraction-A but, provision of supplement improved fraction-B also. Effective degradation (ED) of OM was better on T_2 Rate of degradation (C) of OM and CWC was dependent on diet and type of straw but hemicellulose and cellulose were related to latter factor only. ED of cell wall carbohydrates (CWC) was similar in T_2 and T_4 but higher than T_3. CS was more effective in improving the degradation of both untreated and urea treated straw while ULS was effective on the former only. CS had more impact on superior quality straw while contrary was true with ULS. Although GLS improved intake and degradability of untreated and urea treated straws, its bulkiness affected the straw intake compared to other supplements.

Abs. No.16

In vitro NDF Digestibility of ragistraw as affected by supplementation of locally available fodders/Top feeds

M. Chandrasekharaiah, K.T. Sampath*, U.S. Praveen and C.Prakash

S : Indian Journal of Dairy Science 56(1): 38-41.

In vitro studies were conducted to determine the effect of supplementation of finger millet straw (FMS) with different fodders/top feeds on NDF digestibility. The finger millet straw was supplemented with lucerne, maize, sorghum, para grass and subabul at 15.22 and 30g of rumen degradable nitrogen (RDN) per Kg digestible orgtanic matter (DOM). The in vitro NDF digestibility (%) of finger millet straw which was 41.29 was enhanced ($p<0.05$) to 47.04, 49.91,49.62 with lucerne fodder, 49.98, 54.21 and 54.79 with maize fodder, 43.88,44.15 and 43.96 with sorghum fodder and 48.27, 49.14 and 46.31 with subabul fodder at 15, 22 and 30g RDN/Kg DOM respectively. The NDF digestibility was significantly ($p<0.05$) lower at 15 g RDN level of supplementation than at 22 and 30g RDN level supplementation, however, the values were similar at 22 and 30g RDN supplementation in case of lucerne and maize fodders. The NDF digestibility was significantly ($p<0.05$) lower at 30g RDN level of supplementation, where as the values were similar at 15 and 22g RDN supplementation than at 22 and 30g RDN level supplementation in case of subabul fodder. No significant difference was observed among 15,22 and 30g RDN level of supplementation for sorghum fodder. The over all NDF digestivility values were significantly ($p<0.05$) higher for maize fodder followed by lucerne, subabul and sorghum fodder. The overall NDF digestibility was not significantly different between lucerne and subabul fodders. Supplementation with para grass had no significant ($p<0.05$) effect on the in vitro NDF digestibility of finger millet straw.

Abs. No.17

Status of Livestock and feed Resources in Northern Karnataka Region

S. Anandan, S.S. Raju and K.S. Ramachandra

S : Indian Journal of Dairy Science 56(4): 230-234

The status of animal feed resource availability in the Northern Karnataka region comprising of Bellary, Belgaum, Bidar, Bijapur, Raichur, Dharwad and Gulbarga districts has been assessed based on the secondary data. The data on the distribution and composition of the livestock revealed that the region had 3.96 million cattle, 2.11 million buffalo, 3.51 million sheep, 2.6 million goats and 2.12 million improved poultry accounting for 38,52, 48,59 and 23% of the total state population. The buffalo population, which constituted 47% of the total state buffalo population in 1990 increased to 52% in 1997 registering a 5% increase while the cattle population remained stagnant at 38% during the same period. The region had potential dry matter availability from different sources to the tune of 17.7 milion tons, out of which contribution from cron residues was to an extent of 74 percent. The available dry matter in the region was more than the requirement, indicative of High feed availability – Low productivity situation, The potential dry matter availability per Ruminant Livestock Unit per day ranged from 7.73 kg in Gulbarga to 14.59 kg in Bijapur with the regional average of 10.32 kg, which clearly showed that the feed availability – at last the dry matter availability is not the primary constraint for the low productivity of the animals in the region. There is a considerable scope for further improvement in the overall livestock production and productivity in the region through suitable interventions.

Abs. No.18

Screening for Aflatoxin and Effect of Moisture, Duration of Storage and Form of Feed on Fungal Growth and Toxin Production in Livestock Feeds

N.K.S. Gowda,* V. Malathi and R.U. Suganthi

S: Animal Nutrition and Feed Technology (2003) 3: 45-51

Estimation of aflatoxin content of several livestock feeds and feed ingredients indicated the presence of aflatoxin (10-56 ppb AF B_1) in compounded feeds. Samples of groundnut cake had aflatoxin content of 279 ppb (AF B_1) and 39 ppb(AF B_2) and samples of wheat bran. rice bran and rice polish showed negligible aflatoxin content. Fodder samples of maize, sorghum, gram husk and coffee husk contained no detectable aflatoxin. Storage studies with different moisture levels and duration of storage showed a trend of increased mold growth at moisture level above 15% and was highest during 7-21 days of storage (3.66-3.83 logCFU/g). Feeds stored in air-tight containers at 0% moisture level showed no fungal growth and at below 7.5% moisture level there was minimum fungal growth (3.18-4.18 logCFU/g). The aflatoxin (B_1) production was maximum ($P<0.05$) between 12.5-17.5% moisture level upto 14 days of storage. The average aflatoxin (B_1) production was highest ($P<0.05$) at 15% moisture level and 28 days of feed storage (15ppb) and was well within the permissible limit of 20-30 ppb. At 15% moisture level for 14 days of storage the fungal growth and aflatoxin (B_1) production was maximum ($P<0.01$) in flake (unground) form as compared to the ground form. The results of this study suggested that the moisture level in feeds should be less than 10% for safe storage and feeds with above 12.5% moisture level should be used within a week period or should be dried for safe storage.

Abs. No.19

Status of Pollutants and Trace Elements in Water, Soil, Vegetation and Dairy Animals in Industrial Area of Bangalore

N.K.S. Gowda,* V. Malathi, S. Jash and K.S. Roy

S : Indian Journal of Dairy Science 56 (2): 86-90

Peenya industrial town in the peri urban region of **B**angalore city in Southern India was surveyed for the collection of samples of water, sewage, soil, vegetation (weeds/local grasses/green fodder) available in the polluted areas. Samples of dung, milk and blood were also collected from dairy animals reared in this area. Pollutants like Lead (Pb), Cadmium (Cd), Fluoride (F), Nitrate (NO_3) and trace elements like Copper(Cu), Zinc(Zn) and Iron(Fe) were estimated in the collected samples. Simultaneously samples collected from pollution free areas were also estimated for these elements. Results indicated higher Pb (0.17±0.01&35.30 ± 6.70 ppm) and Cd (0.05 ± 0.001 ppm) in water and soil samples of industrial area. Fluoride and NO_3 in water were below the safe limits. Lead (2.4-145 ppm) and Cd (0.50-10.00 ppm) contents were higher in vegetation collected from different localities of the polluted area. Trace elements (Cu,Zn,Fe) status was higher in samples of water, soil and vegetation in industrial area. Dung and milk samples of dairy cattle/buffaloes in these areas also showed higher Pb (0.55±0.18 & 0.47 ±0.06 ppm) and Cd(0.32±0.01 & 0.05 ± 0.01 ppm) content respectively. Analysis of whole blood of these animals showed comparatively higher Pb(0.09±0.03±ppm) and Cd(0.065±0.014 ppm), whereas the levels of Cu and Zn in the blood plasma were similar to the normal values. The results of this study indicated the wide contamination of soil, water and green vegetation in industrial area and also the ingestion of toxic pollutants in higher amounts, which was reflected through the analysis as dung, blood, and milk of dairy animals.

SHORT COMMUNICATION

Abs. No.20

Nutritional Evaluation of Different Varieties of Sunflower Heads

S. Anandan, G.K. Anilkumar and K.S. Ramachandra

S: Indian Journal of Animal Nutrition 20(2) 212-216, 2003

Forty-two varieties of sunflower heads (SFH) were analyzed for proximate composition, cell was constituents and in vitro digestibility to compare and assess the varietal differences. The chemical composition and digestibility values of SFH revealed the superiority to conventional roughages like cereal straws and stoves in terms of higher protein and lower fiber levels. The proximate principles and digestibility values across the varieties were highly significant ($P<0.01$) which could also be due to improper removal of seeds or presence of partially filled seeds, in addition to varietal differences.

Abs. No.21

Limiting amino acids in the bypass protein fraction of some commonly used Feedstuffs

K T Sampath,* M Chandrasekhraiah[2] and A Thulasi[3]

S: Indian Journal of Animal Sciences 73 (10): 115-1158, October 2003

Studies were conducted to determine the availability of limiting amino acids (lysine and methionine) in the bypass protein fraction of some commonly used feedstuffs. The feedstuffs, viz. groundnut-cake, cottonseed-cake, maizen gluten meal (40%CP) silkworm pupae, bajra grain broken rice, rice polish and navanae (setaria italica) contained 0.85 and 0.25;1.65 and 0.34;1.33 and 0.88; 1.71 and1.08; 1.48 and 0.11, 0.70 and 0.10, 0.95 and 0.17 and 1.48 and 0.14%lysine and methionine respectively. The above feedstuffs were incubated in nylon bags in the rumen of three fistulated-crossbred steers for 24hr. The lysine and methionine disappearance from these feedstuffs during 24hr incubation in the rumen were 76.25 and 65.43;47.86 and 57.84; 81.92 and 52.65;26.39 and 26.19;83.48 and 74.69,88.48 and 96.98,71.99 and 78.01 and 76.99 and 74.98% in groundnut-cake, cottonseed-cake, maize gluten-meal (40%CP), silkworm pupae, peal millet grain, broken rice, rice polish and navanae (Setaria italica) respectively. The bypass protein fraction of cottonseed-cake and silkworm pupae were good source of lysine and the bypass proteins fractions of maize gluten-meal (40%CP) and silkworm pupae were good sources of methionine.

Abs. No.22

Effect of Strategic Supplementation of Finger Millet straw on Milk Yield in Crossbred Cows – On – Farm Trial*

M. Chandrasekharaiah, K.T. Sampath* and U.S. Praveen

S : Indian Journal of Dairy Science 57(3): 192-197.

Two on –farm lactation trials of 6 months and 3 months duration were conducted in two villages i.e. Anagalapura and menesi, respectively of Doddaballapura taluk of Bangalore district in Karnataka state to Study the effect of strategic supplementation to the basal diet of finger millet straw in lactating crossbred cows. Twenty four crossbred cows (8 to lits/day) were divided into two groups (Control and Experimental) of 12 each in Anagalapura village and 16 crossbred cows (8 to 10 lits/day) were divided into 8 each in Menesi village. In both the villages. The cows in Control group were fed finger millet straw with supplements such as groundnut cake and wheat bran as practiced by the farmers. Animals in Experimental group were fed finger millet straw with groundnut cake, wheat bran and maize grain by replacing part of wheat bran in this group. The animals in both the groups were fed ad libitum finger millet straw as the major source of roughage. The average milk yield/day/animal in Experimental group was significantly higher ($P<0.05$) than those in Control group in Anagalapura (9.28 ± 1.25 lit/day vs 8.35 1.10) and Menesi (8.13 1.15 lit/day vs 7.05 ± 1.13) villages. It was found that the digestibility of all the nutrients (DM, OM, CF, EE, NFE, NDF and ADF) except CP was significantly ($P<0.05$) higher in Experimental group than in Control group. The DCP and TDN contents recorded were 5.49 ± 0.29 and 72.51 ± 3.49 and 6.73 ± 0.58 and 66.67 ± 2.05 in experimental and control groups, respectively. The farmers income was increased by Rs. 10.54 and Rs. 13.46/cow/day respectively, in Anagalapura and Menesi villages by improved method of feeding. The study indicated that strategic supplementation of finger millet straw with limiting nutrients i.e. energy through maize grain improved the utilization of finger millet straw, thereby increased milk production . Hence with minimum alteration in the existing feeding practices by scientific intervention, the farmers income can be increased through enhanced milk production.

Abs. No.23

Micronutrient Content of Certain Tropical Conventional and Unconventional Feed Resources of Southern India

N.K.S. Gowda,* J.V. Ramana, C.S. Prasad and Khub Singh

S: Tropical Animal Health and Production, 36(2004) 77-94

The ash, silica and certain important micronutrients were estimated in conventional and unconven-tional feed and fodder resources available in Southern India. Commonly used dry roughages, such as paddy straw, ragi straw, maize kadbi/stalk, bajra stalk and wheat straw, were high in ash(9.9%±0.77%) and silica (6.4%±0.65%) and low in most of the other micronutrients. Except iron, with paddy straw containing most silica (>9%) Cultivated non-leguminous (maize, jowar) and improved green crops (hybrid napier, guinea, green panic, NB-21, CO-1) were also high in ash (10.5%±0.60% and 12.5%±0.51%)but were moderate sources of P, Mg and Cu and good sources of Zn (98±13.8 PPm and 55±6.7 ppm). Leguminous green fodders (stylosanthus, lucerne, cow pea, soyabean) were excellent sources of Ca (1.9%±0.16%), Mg (0.40%±0.05%), Cu (30±5.2ppm), Zn(121±14.7 ppm) and Fe (1234±166ppm) and moderate sources of P.Mixed local grasses and weeds were high in silica (6.9%±1.00%) but were good sources of Cu, Zn and Fe. Cereal grains (maze, wheat,rice,ragi) were low in ash (2.9%±0.33%) and were relatively poor sources of Ca (0.22%±0.03%), Mg (0.19%±0.03%) and Cu (13±3.1ppm). Pulses were low to medium sources of most minerals and good source of Fe(1230±293ppm). Oil seed cake/extractions (groundnut cake, cotton seed cake, soyabean meal, sunflower cake, safflower cake)and cereal by –products (rice polish, rice bran, wheat bran) were excellent sources of P (1.1%±0.47% and 2.3%±0.19%) and good sources of Zn (65±3.9ppm and 66±10.7ppm) and Fe(938±130ppm and 662±126ppm). Among the unconventional feeds screened, orange peel, sunflower heads, meat meal, rubber seed cake, spirulina algae and sea weeds contained plentiful Ca, Zn and Fe: tree leaves/top feeds (mulberry, erythrina, glyricidia, banana, subabul, gourndnut haulms) were excellent sources of Ca (1.5%±0.13%), Zn (120±22.9ppm)and Fe (1033±133ppm) but relatively poor sources of P.Soyabean husk, cocoa seed husk, rubber seed cake and meat meal were moderate to good sources of P (1.0% and 0.33%).The high Zn and Fe values of most feeds/fodders were probably due to soil contamination. This account of the micronutrient content of feed/fodder resources should help in strategic supplementation intended to alleviate local deficiencies.

Abs. No.24

Chemical Composition and in vitro Digestibility of Certain Commonly used Feedstuffs in Ruminant Rations

M. Chandrasekharaiah, K.T. Sampath*, U.S. Praveen and Umalatha

S : Indian Journal of Dairy Science 57 (2): 114-117.

Studies were conducted to evaluate chemical composition, in vitro dry matter, organic matter and neutral detergent fibre digestibility of commonly used feedstuffs such as groundnut cake (expeller), groundnut cake(deoiled), cottonseed extraction, cottonseed cake (expeller), repeseed extraction, chilliseed cake (expeller), chilliseed cake (deoiled), maize gluten meal-60, plam kernel meal, salseed extraction, navane (Setaria italica), wheat bran, deoiled rice bran, maize grain, jowar grain, silkworm pupae (deoiled) and silkworm pupae. Among the feedstuffs studied highest amount of crude protein (CP) is present in silkworm pupae (deoiled) (72.07%) and the lowest in jowar grain (5.03%). Crude fibre (CF), neutral detergent fiber (NDF)and acid detergent fibre (ADF)were higher in palm kernel meal (42.79% CF,84.57%NDF and 64.57%ADF). Nitrogen free extract content was higher in jowar (87.69%) and maize grain (86.45%) and lowest in silkworm pupae deoiled (9.02%). Highest in vitro digestibility (IVDMD and IVOMD). i.e. >70%was observed in maize grain and jowar grain, followed by maize gluten meal-60, groundnut cake (expeller), Setaria italica, groundnut cake (deoiled), salseed extraction, repeseed extraction, wheat bran, cottonseed extraction and silk worm pupae.Higher IVNDFD values (>50%) was observed in jowar grain, maize gluten meal-60, maize grain, setaria italica, repeseed extraction, and salseed extraction. Howerer, long –term studies are required to make use of the feedstuffs such as silkworm pupae, silkworm pupae (deoiled) and chilliseed cake (expeller and deoiled) in ruminant rations.

Abs. No.25

Assessment of Animal and Feed Resources Available in Coastal Region of Karnataka

S.S. Raju, S. Anandan, U.B. Angadi and K.S. Ramachandra

S: Indian Journal of Animal Nutrition 2004, 21 (3): 206-209

The status of animal feed resources availability in coastal Karnataka region comprising of Uttara and Dakshina Kannada has been assessed using secondary data on crop production, land utilization pattern and livestock census. Livestock distribution revealed that cattle were predominant species (79%) followed by buffaloes (18%) and small ruminants (3%) constituted a small proportion in the coastal region. In Uttara Kannada buffaloes were predominantly used for milch purpose (48%) While in Dakshina Kannada they were mainly used for draught purpose (70%). The costal region has a total potential of 1.3 million tones of dry matter, of which crop residues, greens and concentrates accounted for 44, 52 and 4% respectively. After fulfilling the requirement of the improved poultry the feed balance works out to be 4.25kg/Ruminant Livestock Unit/day for the coastal region indicating deficiency of feed resources against the minimum requirement of 7.0kg.

Abs. No.26

Utilization of Dietary Nutrients, Retention and Plasma Level of Certain Minerals in Crossbred Dairy Cows as Influenced by Source of Mineral Supplementation

N.K.S. Gowda,*C.S. Prasad, L.B. Ashok and J.V. Ramana

S: Asian-Aust. J. Anim. Sci. 2004. Vol 17, No. 2 : 221-227

Nutrient utilization and plasma level of minerals were studied in lactating crossbred cows fed supplemented from different source of minerals. Twelve crossbred cows of first to third lactation during their mid stage of lactation were distributed equally under two groups and were fed concentrate mixture, green fodder (para grass) and finger millet straw as per requirement Cows in group I were fed concentrate mixture supplemented with 1% mineral mixture whereas cows in group 11 were not supplemented with mineral mixture in the concentrate mixture but were offered additional quantity of green fodder (1 kg DM/cow/day) to compensate for the requirement of minerals. Balance study conducted towards the end of 120 days of feeding experiment indicated that the total dry matter intake in both the groups did not differ significantly. The cows in group 11 offered additional quantity of green fodder consumed significantly ($P<0.05$) more of green fodder (5.11 vs. 4.51 kg/animal/day) and the cows in group 1 consumed significantly ($p<0.01$) more of finger millet straw (1.71 vs. 0.92 kg/animal/day). The digestibility of major nutrients did not differ between the groups except for ether extract which was significantly ($p<0.05$) lower in cows fed additional green fodder. The total daily intake of P, Cu, Fe and Co did not differ significantly in both the groups whereas significantly higher intakes of Ca, Mg, Zn and Mn were observed in cows supplemented with inorganic source of minerals. However, supplementation through both the sources could meet the mineral requirement in group I and group II. The gut absorption (%) of all the minerals was comparable between the groups except for Mg which was significantly ($p<0.05$) higher in cows supplemented mineral mixture. The net retention of all the minerals was significantly more in the group supplemented with inorganic source of minerals. Except for P, Mg and Co the retention as percentage of total intake was comparable for all minerals in both the groups. Irrespective of source of mineral supplementation the average monthly blood plasma mineral levels (Ca, P, Mg, Cu, Zn, Fe) were within the normal range and comparable between the groups. Lower level of Cu observed at the start of the experimental feeding in both the groups increased with the advancement of supplemental feeding. The plasma Zn and Fe content in cows of both the groups did not vary. The blood plasma level of some minerals (Ca, P, Mg and Cu) was significantly higher towards the end of experimental feeding as compared to the initial values due to the reduction in milk yield with advancement of lactation or due to supplemental effect of minerals. It could be concluded that supplementation of minerals through inorganic source is better utilized in terms of retention as compated to green fodder (para grass), which is a moderate source of most nutrients.

Abs. No.27

Effect of Supplementation of micronutrients through different sources on the production performance in crossbred dairy cows

N.K.S. Gowda,* C.S. Prasad[2] and J.V. ramana[3]

S: Indian Journal of Animal Sciences 74 (6): 653-657, June 2004

Study was conducted to know the lactation performance in 12 crossbred cows fed diets with inorganic and organic source of micronutrient supplementation under each of the dietary treatment. Cows in group 1 were fed concentrate mixture supplemented with 1% commercial mineral mixture, whereas cows in group 2 were fed with additional green fodder as a strategic supplement in place of 1% inorganic mineral mixture to meet the mineral needs for 120 days. There was no significant difference in the total dry matter intake in both the groups (10.75 and 10.41 kg). The average daily intake of Ca(55.23 and 41.96g), Cu(173.19 and 137.10 mg), Zn (800.70 and 625.39mg) and Mn (1147.49 and 924.11mg) was significantly ($P<0.05$) higher in group 1 fed diet supplemented with mineral mixture than in group 2. However, the average daily intake of P (103.45 and89.97 g), Mg(32.69 and 27.71 g), Fe (7025 and 6860 mg) and Co (19.73 and 16.53 mg) did not differ significantly amongst the 2groups indicating that the cows in group 2 fed no mineral mixture could derive these micronutrients through the consumption of additional quantity of green fodder provided to them. The net percentage of P in the dry matter consumed by the cows in both the groups was higher (0.86—0.96%) than that of Ca (0.42-0.51%) due to the inclusion of wheat bran and groundnut-cake in the concentrate mixture, which are rich sources of P. The unit dietary level of Cu (13-16ppm), Zn (60-75ppm), Fe (653-659 ppm), Mn (88-106 ppm) and Co (1.58-1.83 ppm) in the dry matter consumed by the cows in both the groups was higher then the recommended levels as the concentrate ingredients and green fodder consumed were good sources of these micronutrients. The cows in group 2 fed additional green fodder recorded a non –significant reduction in the average mild yield (4%FCM), 7.69 L /day as compared to 8.08 L per day in group 1 during the 120 days of feeding experiment. Milk composition also did not show significant variation between the groups except the milk ash which was significantly less in group 2. It can be concluded from this study that strategic supplementation of micronutrients through local para grass for crossbred cows producing upto 10 L of milk could meet the trace mineral requirement but the major minerals like Ca and Mg could not be met and required to be supplemented

Abs. No.28

Selection of transformants of Escherichia coli containing cellulose gene from Ruminococcus albus isolated from rumen of crossbred steers

M. Chandrasek haraiah,* A Thulasi and K.T. Sampath

S: Indian Journal of Biotechnology Vol 3. July 2004. PP 431-434

Considered best fibrolytic bacterium was isolated and characterized from the rumen of crossbred steers. It was found as wrinkled white colonies, slightly elevated with a slightly undulated margin, no surface spreading with the absence of liquefaction and a zone of hydrolysis. The cells were gram positive single cocci or diplococci. R. albus DNA was a high molecular weight DNA and it had just moved out of the well during electrophoresis. A genomic library of the Hind III fragments of R.albus DNA in pBR322 was constructed in Escherichia coli. Four clones were obrained with cellulose activity

Abs. No.29

Effect of some chemical and herbal compounds on growth of Aspergillus parasiticus and aflatoxin production

N.K.S. Gowda*, V. Malathi, R.U. Suganthi

S : Animal Feed Seience and Technology 116 (2004) 281-291

The anti-fungal properties of a series of chemical and herbal compounds at different levels was tested on potato dextrose agar. Among the chemical compounds, propionic acid at 0.1-05%, ammonia at 0.5% copper sulphate at 0.08-0.5% and benzoic acid at 0.1-0.5% completely inhibited Aspergillus parasiticus growth. Urea, citric acid and sodium propionate had moderate anti-fungal Properties (36-64% reduction). Among the herbal compounds, clove oil at 0.5% completely inhibited fungal growth. Compounds which inhibited fungal growth by at least 20% were selected to test thir efficacy to inhibit fungal growth and aflatoxin production in feeds. All the selected chemical and herbal compounds reduced ($P< 0.01$) fungal growth (i.e. fungal spore count) and aflatoxin production. Propionic acid at 0.05-0.5% sodium propionate at 0.1-0.5% benzoic acid at 0.2% and ammonia at 0.5% completely inhibited aflatoxin production. Reduction in aflatoxin production was high with 0.5-1% citric acid (91-94%), 0.1-0.5% urea (93-96%) and 0.08% copper sulphate (85%). Clove oil at 0.5-1% inhibited aflatoxin production completely. Moderate reduction in toxin production occurred with 0.2-1% turmeric (63-84%), 0.1-1% onion (64-76%) and 0.2-1% garlic (71-84%). Among the chemical compounds tested in feeds. Propionic acid sodium propionate, benzoic acid and ammonia were the best anti-fungal compounds, followed by urea and citri acid. Among the herbal compounds, clove oil was the best followed by turmeric, garlic and onion.

Abs. No.30

Bovine Spermatozoan Motility Behaviour in Cervical Mucus and its Relationship to Fertility

P.V. Sarma. I. J. Reddy and P.A. Saarma*

S: IJAR 17(2), 1996; 136-137

The pattern of bovine cervical mucus penetration and migration by spermatozoa can provide a useful information in andrological studies with respect to sperm behavior and sperm interaction on female genitalia for selecting samples of semen with optimal characteristics for higher fertility.

Abs. No.31

Effect of Buffalo Follicular Fluid Alone and in combination with PMSG And M199 on in vitro Buffalo Oocyte Maturation

P. S. P. Guptha,*S. Nandi, B. M. Ravindrnatha and P.V. Sarma

S: Asian-Aust. J. Anim. Sei. 2001. Vol. 14, No. 5 : 693-696

The effect of replacement of in vitro maturation medium completely with the buffalo follicular fluid (buFF) on in vitro oocyte maturation of buffalo oocytes was studied. 5 to 8 buffalo cumulus oocyte complexes were cultured in a single drop with each of the eight media studied i.e., M199+steer serum (10% v/v), M199+steer serum (10% v/v) +PMSG, M199+buFF (10% v/v). M199+buFF (10% v/v)+PMSG, M199+buFF (50% v/v), M199+buFF (50% v/v)+ PMSG. buFF (100%) and buFF+PMSG at 39^{O} C and 5% CO_2 in air for 24 h. Supplementation of M199 with Steer serum alone resulted in IVM rate of 35% only. When the above medium was supplemented with PMSG, the maturation rare rallied to 82% Significant increase in the maturation rates were observed when M199 was supplemented with increasing levels of buFF A further increase in the maturation rate was also obtained when PMSG was incorporated into the medium of M199 supplemented with buFF the rate of maturation was to the tune of 91% when oocytes were matured in buFF alone which was increased non significantly on the addition of PMSG. Highest maturation rate (97%) obtained with M199+buFF (50%v/v)+PMSG did not differ significantly from that obtained by either M199+buFF (10%v/v)+PMSG or buFF +PMSG It is suggested that buFF alone without any supplementation can form the effective in vitro maturatrion medium for buffalo oocytes.

Abs. No.32

Effect of commercial available PMSG on maturation, fertilization and embryo development of buffalo oocytes in vitro

P.S.P. Guptha, S. Nandi[A], B.M. Ravindranatha and P.V. Sarma

S: Repord. Fertil. Dev., 2001.13.355-360

In vitro fertilization (IVF) technology provides an opportunity to produce embryos for genetic manipulation, embryo transfer and basic research in developmental physiology, and can be exploited for emerging biotechnologies such as transgenesis and cloning. In the present study, the effects of different concentrations of commercially available pregnant mare serum gonadotrophin (PMSG) (Folligon; Interver, International B.V.,Boxmeer, Holland) in oocyte culture media, on maturation, fertilization and embryonic development of buffalo oocytes in vitro were investigated. Oocytes aspirated from abattoir-derived ovaries were cultured in media containing TCM-199 + PMSG at 0,2.5,20,30,40 and 50 IU mL^{-1}in presence or absence of steer serum (10%) for 24h in a CO_2 incubator. The maturation rate was assessed on the basis of degree of expansion of cumulus cells. The matured oocytes were inseminated with 9-10 x 10^6 spermatozoa mL^{-1} in Brackett and Oliphant medium and the cleavage rate was recorded 40-42 h after insemination. Uncleaved oocytes were stained with aceto-orcein for evaluation of fertilization rates. The cleaved embryos were further cultured in TCM-199 + 10% steer serum on buffalo oviducal cell monolayer for 7 days. Maturatration, fertilization, cleavage and embryonic development were significantly higher ($P<0.05$) in oocytes culturd in TCM-199 + 10% steer serum supplemented with 40 and 50 IU PMSG mL^{-1} It is concluded that commercially available PMSG can effectively be used in place of pure follicle-stimulating hormone for in vitro maturation of buffalo oocytes, making it cost effective for IVFstudies.

Abs. No.33

Trypan Blue staining to Differentiate live and dead Buffalo Oocytes and its effect on Embryo Development in Vitro

P. S. P Gupta, S. Nandi , B.M. Ravindranatha, H.M. Raghu and P.v. Sarma

S: Buffalo Journal (2002) 3: 321-330

The present study was conducted to validate trypan blue as a stain to differentiate the live and dead buffalo occytes and its effect on embryo development in vitro. In experiment 1, aspirated buffalo COCs were artificially killed by heat and cold shock and keeping them in glacial acetic acid and ethanol (1:3v/v) for 24 h and then stained with three different concentrations (0.025%,0.05% and 0.1%) of trypan blue for 1, 1.5, 2,2.5,3,5 and 10 minutes to validate trypan blue as a stain for detecting dead buffalo COCs and to investigate the optimum concentration of trypan blue and staining time required to detect dead buffalo COCs. In experiment 2, the viability and maturation rates of different grades of freshly aspirated buffalo COCs on trypan blue staining (0.05%) for different time periods were examined. In experiment 3, the effect of trypan blue staining on developmental competence of buffalo oocytes in vitro was studied. Results suggested that trypan blue at a concentration of 0,05% and 2 minutes of staining time were found to be optimum for differentiating dead buffalo COCs. The viability of good, fair and poor COCs were 95.2, 86.1 and 17.7%, respectively after exposure to trypan blue (0.05%) staining for 2 minutes. Trypan blue staining of oocytes had no adverse effect on developmental competence of buffalo COCs but presence of trypan blue (0.05%) in the maturation medium significantly ($P \leq 0.05$) reduced the developmental potential of the buffalo COCs. Selection of oocytes using morphological parameters of COCs coupled with trypan blue staining may increase the overall embryo production in vitro.

Abs. No.34

IN Vitro effects of different levels of Commercially available PMSG on Buffalo Oocyte Maturation

B.M. Ravindranatha, S. Nandi, P.S.P. Gupta and P.V. Sarma

S: Buffalo Journal (2002) 1: 101-107

Studies were conducted to investigate the effects of different levels of commercially available PMSG on buffalo oocyte maturation in vitro. Buffalo oocytes were aspirated from ovaries collected from a local slaughter house. Only oocytes with more than tow layers of cumulus cells and homogenous ooplasm were cultured into 50μ1 droplets of five different culture systems-(i) TCM-199 + Steer Serum (10%) – control (ii) TCM-199 + Steer Serum (10%) + PMSG (2.5 I.U/ml.) and (iii) TCM-199 + Steer Serum (10%) + PMSG (20 I .U.ml.) (iv) TCM-199 + Steer Serum (10%) + PMSG (30 I.U.ml.) and (v) TCM-199 +Steer Serum(10%) +PMSG (40 I.U.ml.) in a 35 mm petridish. The droplets were covered with warm (38-39^{o}C) mineral oil and incubated in a CO_2 incubator (38-39^{o}C,5% CO_2 in air, 90-95% relative humidity) for 24 h. Maturation rate were assessed by evaluation of cumulus cells expansion and identifying first polar body extruded in the perivitteline space under stereo zoom microscope. Maximum maturation rate (>80%) was observed when oocytes were cultured in media supplemented with 40 I.U. PMSG/ml. we may conclude that PMSG can effectively be used in maturation of buffalo oocyte in vitro at the level of 40 I.U./ml.

Abs. No.35

In vitro maturation of buffalo oocytes with epidermal growth factor and fibroblast Groth factor

P.S.P. Gupta[1], B.M. Ravindranatha[2]. S.Nandi[3]. and P.V. Sarma[4]

S: Indian Journal of Animal Sciences 72 (1): 23-26, January 2002

The present study was conducted to investigate the optimum concentration of epidermal growth factor (EGF) and fibroblast growth factor (FGF) for in vitro maturation of buffalo oocytes and to examine the effect of these growth factors when used alone or along with pregnant mare serum gonadotrophin (PMSG) on the same. In experiment 1. aspirated oocytes were cultured in TCM-199 supplemented with EGF (10.20.30 ng/ml) or FGF (10.20.30ng/ml) in a CO_2 incubator at 38.5^{o}C for 24 hr. Maturation was assessed by examining the expansion of cumulus cell mass and metaphase 11 stage after staining in aceto-orcein. 20ng/ml was the optimim concentration of both EGF and FGF for buffalo oocyte maturation. Hence, in experiment 2, oocytes were culture in TCM-199supplemented with PMSG (40 IU/ml) and EGF(20ng.ml), FGF(20ng/ml) or both. TCM-199+EGF(20 ng/ml) + PMSG(40 IU/ml) were an ideal chemically defined medium for buffalo oocyte maturation.

Abs. No.36

In vitro culture of buffalo (Bubalus bubalis) Preantral follicles

P.S.P. Gupta, S. Nandi,* B.M. Ravindranatha, P.V. Sarma

S: Theriogenology 57 (2002) 1839-1854

Growth of buffalo preantral follicles in culture was studied to investigate the effect of size of preantral follicles, individual or group culture, long-term culture of preantral follicles for (40 days), addition of human follicle stimulating hormone (FSH), insulin-transferrin-selenium (ITS), growth factors (epidermal growth factor (EGF), fibroblast growth factor (FGF), vaso active intestinal polypeptide (VIP) in culture media, and substitution of pregnant mare serum gonadotrophin (PMSG) for FSH as gonadotrophin source in culture media. Preantral follicles were isolated mechanically from ovarics of matured, nonpregnant slaughtered buffaloes and cultured in droplets of culture media under mineral oil in a 35mm petri dish in a CO_2 incubator (38-39 ^{o}C,5% CO_2 in air, 90-95% relative humidity) for 15 days. Preantral follicle isolation and washing medium consisted of Minimum Essential Medium (MEM) supplemented with steer serum (10%), glutamine (2mM), sodium pyruvate (0.23mM), hypoxanthine (2mM) and gentamycin (50 μg/ml). respectively. In Experiment 1. we placed isolated preantral follicles individually or in groups of 2-4 preantral follicles in 30 or 50 μ1 droplets, respectively, using two culture media: washing media and washing media + ITS(1%) + FSH(0.05 IU/ml). respectively. In Experiment 2, we grouped isolated preantral follicles were grouped into six different size classes: ≤36,37-54,55-72,73-90,90-108 and ≥109μm. We cultured groups of 2-4 preantral follicles in washing media + ITS (1%) + FSH(0.05IU/ml) in a CO_2 incubator for 15 days. In Experiment 3, we allocated groups of 2-4 preantral follicles to 10 treatments: (1) only washing media, (2) washing media + FSH(0.05 IU/ml). (3) washing media + ITS(1%), (4) washing media + ITS(1%) +FSH(50 IU/ml), (5)washing media + TIS (1%) +EGF(50 ng/ml). (6) washing media + ITS(1%) +FSH(0.05 IU/ml) +EGF (50 ng/ml). (7) washing media ITS (1%) FGF(50ng/ml), (8) washing media +ITS (1%) + FSH (0.05 IU/ml) + FGF (50ng/ml). (9) washing media + ITS(1%) + VIP(50ng/ml). and (10) washing media + ITS(1%) +FSH(0.05 IU/ml) +VIP(50ng/ml). In Experiment 4, based on the results of Experiment 3. We incubated preantral follicles from those treatments showing significantly)P<0.05) higher growth up to 40 days. In Experiment 5. we allocated groups of 2-4 preantral follicles to two treatments: (1) washing media + PMSG(50IU/ml). And (2) washing media+

Abs. No.37

Timing of Sequential changes in Cumulus cells and first Polar body Extrusion during in Vitro Maturation of Buffalo Oocytes

S. Nandi,* B.M. Ravindranatha, P.S.P. Gupta, P.V. Sarma

S: Theriogenology 57 (2002) 1151-1159

Studies were conducted to investigate the degree of the cumulus cell expansion and expulsion of the first polar body in relation to time of incubation in three different culture media during in vitro maturation of buffalo oocytes and to suggest a suitable practical method for assessment of in vitro maturation rate of buffalo oocytes. Buffalo oocytes were aspirated from ovaries collected from a local slaughterhouse. Only oocytes with more than two layers of cumulus cells and homogenous ooplasm were cultured into 50 µl droplets of three different culture systems: (1) TCM-199 + steer serum (10%); (2) TCM-199 +steer serum (10%) +PMSG(40IU/ml); and (3) TCM-199 + steer serum (10%) + PMSG (40 IU/ml) + estradiol 17ß (1µg/ml) in a 35 mm Petri dish. The droplets were covered with warm (39 C) mineral oil and incubated in a CO_2 incubator (39 C. 5% CO_2 in air, 90-95% relative humidity for 16-18.20.22.and 24 h. The maturation rate was assessed by evaluation of degree of cumulus cells expansion and identifying first polar body extrusion into the perivitelline space under stereo zoom microscope. Matured oocytes were inseminated in vitro with 9-10 million sperm/ml of Brackett and Oliphant (BO) medium. Cleaved cmbryos were cultured in TCM-199 supplemented with steer serum (10%) for 8 days Cumulus expansion and extrusion of first polar body commenced at 16 and 17 h. respectively. Of buffalo oocyte culture. These events mainly exhibited during 22-24 h of culture. Oocytes with Degrees 1 and 2 cumulus cells expansion and extruded first polar body in degree 0 oocytes may be considered as matured and can be used in IVF studies.

Abs. No.38

Influence of 2 – bromo- α –ergocryptine on Plasma Prolactin, Oestradiol-17 ß and Progesterone Levels in Domestic Hen

I.J. Reddy*, C.G. David and Khub Singh

S: Aus. J. Anim. Sci. 2002. Vol 15, No. 8 : 1103-1109

This Study investigated the effect of 2-bromo- α – ergocryptine (anti prolactin agent) on plasma levels of prolactin, oestradiol -17ß and progesterone in domestic hen during the active period of lay. Fifty healthy female White Leghorn birds were administered with anti prolactin agent (2-bromo–α-crgocryptine, Sigma-USA., methane sulphonate salt, $C_{32} H_{40} BrN_5 .CH_4 SO_3$)subcutaneously @ 100 µg/kg body weight at weekly intervals frok 17^{th} to 36^{th} week of age. Another group of fifty birds as controls were given placebo in place of bromocriptine. The level of prolactin remained lower in treated birds than in the control birds from 19 to 36 weeks of age. Level of prolactin even in the control group was found to decrease during the peak production period. Oestradiol-17ß and progesterone concentration in treated birds were significantly ($P<0.01$) higher than the controls during the treatment. Egg production, is positively correlated with oestradiol-17ß (r=0.02; r-0.67) and progesterone (r=0.49; r=0.90) in control and treated groups respectively where as prolactin level is positively correlated with egg production in the control birds (r=0.07). Prolactin levels were negatively correlated with egg production (r= -0.55) in treated birds; and oestradiol-17ß (r= -0.71;r= -0.53) and progesterone (r= -0.22; r= -0.27) respectively in control and treated groups. The total number of pause days during the treatment period decreased significantly ($p<0.01$) in the treated group compared to the control group.The reduction in pause days in treated group resulted in 1.76% increase in Egg production over that in control group. The increase in egg laying days and the total egg production were found to be significant ($p<0.01$). These results indicate that a lower level of prolactin in circulatory blood enhances egg production in the domestic hen.

Abs. No.39

The possible role of prolactin in laying performance and steroid hormone secretion in domestic hen (Gallus domesticus)

I.J. Reddy,* C.G. David, P.V. Sarma, and Khub Singh

S: General and Comparative Endocrinology 127 (2002) 249-255

The aim of this study was to investigate the basic physiological mechanism involved in taking pauses between the sequences of egg laying in domestic hen to improve egg production by extending the sequence length and decreasing the intersequence pause days by modulating the prolactin concentration in birds.Fifty healthy female white leghorn birds were administered anti-prolactin agent (2-bromo- α – ergocriptine, Sigma, USA) subcutaneously at 100µg/kg body weight at weekly intervals from 17^{th} to 36^{th} week of age. Another group of fifty birds was given placebo in place of the modulating agent. The level of prolactin remained lower in the treated birds than in the control birds throughout the production cycle up to 72 weeks of age. The level of prolactin in the control group was found to decrease during the peak production period. The average percentage of egg production from 19 to 72 week period was 87.67 in the treatment group as compared to 83.56 in the control group. Oestradiol-17ß and progesterone concentrations in the treated birds were significantly ($P < 0.01$) higher than those in control birds, during and after withdrawal of the treatment. Prolactin level was negatively correlated with egg production ($r = -0.02$; $r = - 0.12$) and with oestradiol-17ß ($r = -0.75$; $r = - 0.38$) and progesterone ($r = - 0.20$; $r = - 0.83$), respectively, in control and treatment groups. The total number of pause days during the production period decreased significantly ($P < 0.01$) in the treatment group, resulting in a 4.11% increase in egg production. It is concluded that there is a consistent relationship between plasma prolactin in the physiological range and laying performance in domestic hen.

Abs. No.40

Oocyte Recovery Rates in Relation to Morphology and Weight of the Ovaries in Buffaloes

P.S.P. Gupta, S. Nandi, H.M. Raghu, B.M. Ravindranatha and P.V. Sarma

S: Indian Journal Animal Res., 37 (2): 147 –148, 2003

Oocytes retrieved from abattoir derived buffalo ovaries were classified into three categories I.e.ovaries with corpus luteum (CL), ovaries without CL and pooled ovaries. Correlation coefficient was calculated between the ovarian weights and the oocyte recovery rates for all the three categories of ovaries. Ovarian weight of ovary with CL was significantly more than that of ovary without CL. There was a positive correlation between the ovarian weights and the oocyte recovery rates in all the three categories of ovaries.

Abs. No.41

Oviposition Patterns Associated with Prolactin Concentration in Domestic Chicken (Gallus domesticul)

C.G. David, I.J. Reddy* and Khub Singh

S: Asian-Aust. J. Anim. Sci. 2003. Vol 16, No. 1565-1571

Physiological mechanisms, involved in unusual ovulatory sequences in domestic hen are remaining undefined. One hundred individually caged white leghorn birds were divided into two equal groups viz. control and treatment. And 2-bromo – α – ergocryptine, was administered to birds in the treatment group to modulate prolactin (PRL) secretion from anterior pituitaty gland. The effect of modulation of PRL concentration on egg production, sequence length and intersequence pause length were studied by analysis of oviposition records of the birds from 24 to 72 weeks of age. The surviving 48 birds in the control and treatment groups averaged 34.58 ± 1.7 and 25.67±1.15 sequenees of oviposition. With a mean sequence length of 9.92 ±0.63 and 14.04±1.12 days respectively. Most of the birds had a single characteristically long sequence during the entire reproductive cycle, which averaged 46.04 ± 3.09 days in the control birds and 59.33.±4.44 days in the treated birds. 2-bromo – α –ergocriptine treatments had significantly decreased (P≤0.01) the circulating concentrations of PRL compared to the birds of the control group. This resulted in a significant increase (P≤0.01) in the number of laying days in birds of the treatment group with a concomitant decrease in the intersequence pause length. The decreased PRL levels during prime sequences in birds of the both groups. reveals the negative role of the circulating PRL levels on egg production with concomitant shorter intersequence pause length. Hence, modulation of PRL with dopamine agonist may enhance the reproductive efficiency of hens later in life

Abs. No.42

Use of Cystic Follicular Fluid for Buffaloo Oocyte Maturation in Vitro

S. Nandi, P.S.P. Gupta, B.M. Ravindranatha and P.V. Sarma

S: Indian Journal of Animal Res. 37 (1): 40 – 43. 2003

Studies were conducted to examine the effect of substitution of serum with cystic follicular fluid in the IVM media and also to test the efficacy of cystic follicular fluid (buCFF) at 50 and 100 per cent levels for in vitro maturation of buffalo oocytes. Results indicated that buffalo cystic follicular fluid supplemented with PMSG Possess the ability for induction of buffalo oocytes and could be successfully tried as buffalo oocyte maturation medium. Buffalo cystic follicular fluid as a whole maturation medium also has the ability to induce the cumulus expansion which may be cost effective for the IVM of buffalo oocytes.

Abs. No.43

Developmental competence and post-thaw survivability of buffalo embryos produced in vitro: effect of growth factors in oocyte maturation medium and of embryo culture system

S. Nandi, B.M. Ravindranatha, P.S.P. Gupra. H.M. Raghu, P.V. Sarma

S: Theriogenology 60 (2003) 1621-1631

The present study was conducted to examine the effects of supplementation to IVM medium of epidermal growth factor (EGF), fibroblast growth factor (FGF) and vasoactive intestional peptide (VIP) along with pregnant mare serum gonadotrophin (PMSG) on oocyte maturation and cleavage of buffalo embryos (experiment 1). The developmental competence of cleaved embryos cultured in either a complex co-culture system (TCM-199 +10% serum +oviduct cel monolayer) or defined media (a) modified form of synthetic oviductal fluid (mSOF) was evaluated (experiment 2). The post-thawmorphology and survivability of frozen blastocysts developed from embryos cultured either in complex or defined medium was compared (experiment 3). Aspirated oocytes were cultured in maturation medium (TCM-199+PMSG(40 IU/ml—control) supplemented with EGF (20ng/ml). FGF (20ng/ml) and VIP(20ng/ml). either alone or in combination, in a CO_2 incubator at 38.5 C for 24 h. Maturation rate was assessed and oocytes were inseminated in vitro with frozen-thawed sperm processed in Brackett and Oliphant (BO) medium. The cleaved embryos were cultured either in complex co-culture system or mSOF. Results suggested that EGF had more beneficial effect on buffalo oocyte maturation, and embryo cleavage than FGF. Addition of VIP to the oocyte maturation medium did not improve the results. Blastocyst yields from buffalo oocytes were significantly higher in a complex co-culture system than in difined media (mSOF) when oocytes were matured in presence of EGF either alone or in combination with FGF and VIP. The mean percent of morphologically normal blastocysts after thawing and their survivability were significantly higher in blastocysts obtained from embryos cultured in mSOF than those cultured in complex co-culture system.

Abs. No.44

Modulation of prolactin levels for increased egg production in domestic hen

I.J. Reddy[1], C.G. David[2], P.V. Sarma[3] and Khub Singh[4]

S: Indian Journal of Animal Sciences 73 (7): 743-747, July 2003

This study was carried out to investigate the basic mechanism involved in taking pauses between the sequences of egg laying in domestic hen and also to extend the sequence length, egg production and to decrease the intersequence pause days by modulating the prolactin levels in birds. White Leghorn healthy female birds (50) were administered with anti prolactin agent subcutaneously @ 100 µg/kg body weight at weekly intervals from 17th to 36th week of age. Another group of 50 birds as controls was given placebo in place of the modulating agent. The level of prolactin remained lower in the treated birds than that in the control birds throughout the production cycle up to 72 weeks of age. The level of prolactin even in the control group decreased during the peak production period. The number of total pause days in full production period up to the age of 72 weeks decreased significantly in treated group in comparison to the control group. The reduction in puse days in treated group resulted in 4.11% increase in egg production over that in control group. The increase in egg laying days and the total egg production were significant. The average percentage of egg production from 21 to 72 weeks period was 87.67 in treated group as compared to 83.56 in control group. These results indicated that modulation of prolactin levels using bromocryptine enhances egg production in domestic hen.

Abs. No.45

Progesterone and nucleic acid contents of buffalo corpus luteum in relation to stages of estrous cycle

S. Mondal[1], Vijay Kumar[2], I. J. Reddy[3] and Khub Singh[4]

S: Indian Journal Sciences 74 (7): 710-712, July 2004

Study on the variations in weight, concentration of progesterone, DNA and RNA content of corpus luteum was conducted to delineate the changes during different stages of estrous cycle in buffaloes. Buffalo ovaries with CL (32) were collected from slaughterhouse immediately after slaughter. Stages of reproductive cycle were studied by examining biometry and morphology of corpus luteum. Depending on the colour, vasculature, size and consistercy, the stages assigned to corpora lutea were CL – 1 (days 1-4 of cycle), CL – 2 (days 5-10 of cycle), CL – 3 (days 11-17 of cycle) and CL – 4 (days 18-20 of cycle). The CL was excised from rest of the ovarian tissue and weighed quantity of the fraction of luteal tissue was stored at – 20^{o}C for assay of progesterone. The size and weight of CL increased with growth of CL till it attained peak stage of its development and then size and weight started declining with its regression. CL extract mean progesterone concentrations were 7.27± 0.95 μg/g , 8.98 ±0.67μg/g 11.44±1.42 μg/g and 3.99±0.71 μg/g in the first, second, third and fourth stage CL respectively. The DNA and RNA contents of CL were 1.18±0.13 and 4.69±0.41 mg/g; 0.98±0.11 and 2.96±0.13mg/g; 1.33±0.24 and 2.66±0.33mg/g; 1.39±0.17 and 3.11±0.79 mg/g during the first, second, third and fourth stage of estrous cycle respectively. Functional activity of corpus luteum was maximum during third stage of the estrous cycle in buffaloes as compared to other stages.

Abs. No.46

Relative functionality attributes of right and left ovaries in buffaloes (Bubalus bubalis)

P.S.P. Gupta[1], S. Nandi[2] and P.V. Sarma[3]

S: Indian Journal of Animal Sciences 74 (5): 477-479, May 2004

Proper implementation of reproductive technologies in buffalo. A species of high dairy merits, necessitates in depth studies on its ovarian functions. Present study aimed to elucidate the relative functionality attributes of right and left buffalo ovaries of slaughtered mature riverine buffaloes. Weight of the ovary (2.53 and 2.65 g), follicular fluid volume per ovary (0.19 and 0.24), the number of follicles (4.97 and 5.12), oocytes (3.14 and 3.23), corpora lutea (0.37 and 0.41) and corpora albicans (0.31 and 0.20) present in the right and their left ovaries, respectively, were not significantly different. These results suggest equal participation of the right and the left ovary in reproductive functions of buffalo.

Abs. No.47

Development of Gene Transfer Systems in Rumen Bacteria – a review

M. Chandrasekharaiah, A. Thulasi and K.T. Sampath

S : Indian Journal Dairy & Biosciences 11: 1-8

Development of gene transfer system is of great importance to genetically modify the rumen bacteria. Specific genes could be introduced into the rumen bacteria by genetic engineering and it may be possible to improve plant cell wall digestion, detoxify certain plant toxins etc. which will have bearing on improved nutrient utilization and animal production . Different shuttle vectors have been synthesized from native plasmids to be used as effective gene transfer vehicle for the rumen bacteria. Though some of these vectors are stable and efficient, the others are not. A lot of speculation is there regarding the prospects of genetically modified organisms. Recent reports on cloning of the dehalogenase gene from Moraxella spp. Into Butyrivibrio fibrisolvens and its stability over 500 generations without antibiotic selection has raised hopes. However, research on rumen bacteria with regard to genetic manipulation is still very much in its infancy and modified organisms have yet to find their way from the test-tube to the animal in any significant numbers even for research purposes.

Abs. No.48

Organochlorine Pesticide Residues in Feeds and Fodders and their Excretion in Milk – a Review

K.S.N. Prasad and Aruna Chhabra

S: Indian Journal of Dairy and Biosciences, 11, 2000

Contamination of feeds and fodders by organochlonine pesticide residues (OCPRS) has drawn attention of researchers as they seldom are metabolised in animal system and are excreted in milk. Further, there is dearth of information on technological know-how for their detoxification. Problems associated with OCPRs and a few remedial measures are discussed in this review.

Note:

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