DISCUSSION

5.1 Growth performance:

The result on growth performance of the cross-bred kids on diets containing fodder beet tuber has been presented in Table 4.1. The initial average body weight of kids distributed to three different groups in randomly did not differ significantly (P>0.05) and the pooled average was found to be 9.10±1.20, 9.13±0.76 and 9.70±1.10kg in groups T₁, T₂ and T₃, respectively, at the start of experiment when the kids were in 4th- 5th month of age. The average body weight attained at the end of 90 days of experimental feeding period (when kids were of 7th- 8th month of age) were 13.04±1.48, 13.99±1.26 and 13.51±1.54 kg in groups T₁, T₂ and T₃, respectively. The differences in body weight among the three groups were statistically non-significant (P>0.05) at all the periods under study. The average fortnightly changes in body weights have been plotted graphically (fig 4.1), which showed variable trend of increase in body weight among all the groups during the entire experimental period.

The average daily gain in body weights during the 90 days of experimental feeding and growth trial (from 4th to 7th months of age) were 43.77±5.68, 54.10±5.48 and 42.33±6.45g in groups T₁, T₂ and T₃, respectively. The differences in daily gain in body weight among various groups were found to be non-significant (P>0.05).

The result indicated that diets containing fodder beet tuber at 25 and 50 per cent in the diet (w/w) in groups T₂ and T₃, respectively, did not have any adverse effect on the growth performance of kids.

The findings of the present study are comparable with the findings of Wiesner (1985) who also noted no adverse effects on feeding tamarind seed in pigs. Bhatta et al. (2000) also reported that the feeding of tamarind seed husk in cross bred dairy cows had no adverse effect on their growth performance. Similarly Ravi et al. (2000) reported that the feeding of water soaked tamarind seed in cross bred gilts had no adverse effect on their growth performance. Aenganich et al. (2009) also reported that the feeding of tamarind seed coat extract in poultry showed no adverse effect on their growth performance.

5.2 Digestibility co-efficient of nutrients of various rations:

The average apparent digestibility co-efficient of the various nutrients of the experimental rations have been presented in Table 4.4
5.2.1 Dry matter digestibility:

The average apparent digestibility co-efficient of dry matter were 69.23±0.89, 70.27±0.92 and 69.13±1.06 per cent for the groups T₁, T₂ and T₃, respectively. The differences were non-significant (P>0.05) among various groups showing no adverse effect of fodder beet tuber on the digestibility of dry matter. Bhatta et al. (2000) also reported that the effect of feeding tamarind seed husk in cross bred dairy cows on dry matter intake (DMI) and digestibility was non-significant (P>0.05).

5.2.2 Crude protein digestibility:

The average apparent digestibility co-efficient of crude protein were 72.65±0.59, 72.93±0.60 and 71.45±0.92 per cent for the groups T₁, T₂ and T₃, respectively. The effects of various treatments were non-significant (P>0.05). The results are in agreement with the observations of Thomas and Prasad (1983) who fed different levels of tamarind seed in the concentrate mixture to pig without showing any adverse effect on the digestibility of crude protein. Similarly Bhatta et al. (2000) observed significantly reduced crude protein digestibility in cross bred lactating cows fed tamarind seed husk at low concentration in the mixture.

5.2.3 Crude fibre digestibility:

Crude fibre constitutes major portion of the ruminant diet in general and goat in particular. The average digestibility co-efficient of crude fibre were 70.24±0.48, 71.46±0.42 and 70.12±0.62 per cent for the groups T₁, T₂ and T₃, respectively. The values did not differ significantly (P>0.05) among various groups.

5.2.4 Ether extract digestibility:

The apparent digestibility co-efficient of ether extract was 68.67±0.81, 69.67±0.56 and 69.17±0.83 per cent in respect of groups T₁, T₂ and T₃, respectively. The values of ether extract digestibility in various groups did not differ significantly (P>0.05) among themselves. The results are in confirmation with the findings of Bhatta et al. (2000) who observed non-significant effects on EE digestibility in cross breed lactating cows when low concentration of TSH (Tamarind seed husk) in the concentrate mixture was fed.
5.2.5 Nitrogen-free extract digestibility:

The average apparent digestibility co-efficient of NFE was 74.83±0.68, 74.56±0.82 and 75.63±0.69 per cent in respect of groups T₁, T₂ and T₃, respectively. The values of NFE digestibility in various groups did not differ significantly (P>0.05). The present findings are in agreement with the reports of Ravi et al. (2000) who also observed non-significant difference in the digestibility of NFE in crossbred gilts which were fed water soaked tamarind seed in the concentrate mixture.

5.3 Balances of nitrogen, calcium and phosphorus in kids:

5.3.1 Nitrogen balance:

The nitrogen balance study provides a quantitative measure of protein metabolism and specifically indicates whether the body is gaining or loosing protein. The results of nitrogen balance studies have been presented in Table-4.6. Perusal of this Table indicates that kids in all the groups were in positive nitrogen balance. The average daily retention of nitrogen was 8.68±0.14, 9.01±0.08 and 8.61±0.28 g against the nitrogen intake of 14.30±0.15, 14.77±0.12 and 14.42±0.13 g in groups T₁, T₂ and T₃, respectively. The differences among values of nitrogen retention were found to be non-significant (P>0.05) among various groups. The retention of nitrogen as per cent of nitrogen intakes were 60.69±0.43, 61.08±0.16 and 59.70±0.12 per cent in groups T₁, T₂ and T₃, respectively. The values did not differ significantly from each other. The daily nitrogen retained as per cent of nitrogen absorbed were calculated to be 80.66±2.05, 81.13±0.60 and 75.38±2.13 per cent in groups T₁, T₂ and T₃, respectively. They did not differ significantly (P>0.05) among themselves. The findings are in agreement with the observations of Ravi et al. (2000) in crossbred gilts which were fed water soaked tamarind seed in the concentrate mixture. Bhatta et al. (2000) reported that when cross bred dairy cows were fed TSH (tamarind seed husk) at 2.5 per cent and 7.5 per cent levels in the concentrate mixture, the balance of nitrogen was found to be similar in both the groups.

5.3.2 Calcium balance:

The results of calcium balance determination have been shown in Table 4.7. The balances of calcium were found to be positive in all the groups. The average daily retentions were 4.67±0.03, 4.66±0.03 and 4.57±0.05g against the intakes of 5.72±0.07, 5.60±0.05 and 5.67±0.09g calcium in groups T₁, T₂ and T₃, respectively. The effect of different treatments on daily retention of calcium were found to be non-significant (P>0.05).
calcium as percentage of calcium intake in various groups was found to be 81.64±0.31, 83.21±0.30 and 80.59±1.12 in groups T₁, T₂ and T₃, respectively. The highest level was observed in group T₂ which differ significantly with group T₃. However, the differences between T₁ and T₂ as well as T₁ and T₃ were found to be non-significant (P>0.05). The calcium retained as percentage of calcium absorbed in various groups was 91.74±0.12, 91.74±0.33 and 89.94±1.24 per cent. The differences among the three groups were non-significant (P>0.05). The positive balance of calcium on diets containing tamarind seed meal has also been reported by Mahto et al. (2004) who observed that when tamarind seed at 50 per cent and 100 per cent levels in the concentrate mixture were fed to the pigs, the balances of calcium was found to be positive.

5.3.3 Phosphorus balance:

The results of phosphorus balance determination have been shown in Table 4.8. The balances of phosphorus were found to be positive in all the groups. The average daily retention of phosphorus was 1.62±0.01, 1.70±0.04 and 1.72±0.02 g against the intake of 2.63±0.01, 2.60±0.03 and 2.69±0.38 g in groups T₁, T₂ and T₃, respectively. The values of daily phosphorus retention in various groups did not differ significantly (P>0.05) among the three groups. The phosphorus retention as percentage of phosphorus intake and as percentage of phosphorus absorbed also did not differ significantly (P>0.05) among the three groups.

The present findings is in agreement with the findings of Mahto et al. (2004) who also observed that when tamarind seed at 50 per cent and 100 per cent levels in the concentrate mixture was fed to the pigs the balances of phosphorus were found to be positive.

5.4 Plane of Nutrition:

The average daily total intakes as well as average intake per unit body weight of dry matter, crude protein, digestible crude protein, digestible energy and metabolisable energy were calculated and the same have been presented in Table 4.9.

5.4.1 Dry matter intake:

Dry matter intake is an indicator of the palatability of the ration and also the amount of nutrients being consumed. The average daily intakes of dry matter were 428.84±15.26, 442.26±15.41 and 418.84±9.65g in groups T₁, T₂ and T₃, respectively. The values of DM intake in various groups did not differ significantly (P>0.05) among the three groups. The
DM intake per 100 kg body weight was found to be 3.60±0.48, 3.62±0.46 and 3.68±0.58 kg in groups T₁, T₂ and T₃, respectively. All the values in respect of DM intake/100 kg body weight did not differ significantly (P>0.05) among the three groups.

Bhatta et al. (2000) reported that when cross bred dairy cows were fed TSH (tamarind seed husk) at 2.5 per cent and 7.5 per cent levels in the concentrate mixture, the differences in total DM intake in two groups were non-significant. Similarly, they also observed that the Tamarind seed Husk at a low composition had no adverse effect on DM intake in dairy cow. However, Mahto et al. (2004) observed that when tamarind seed at 50 per cent and 100 per cent levels in the concentrate mixture was fed to the pigs the total DM intake varied but differences were non-significant.

5.4.2 Protein intake:

The average daily intake of crude protein was 51.46±0.27, 49.56±0.38 and 51.63±0.52 g in groups T₁, T₂ and T₃, respectively. The intake was found to be significantly (P<0.05) lower in group T₂ than T₃. However, T₁ and T₃ did not differ significantly.

The average daily DCP intake was 37.38±0.56, 36.14±0.76 and 36.88±0.65 g in groups T₁, T₂ and T₃, respectively. The variations in DCP intake among various groups were found to be non-significant. Ravi et al. (2000) observed that when gilts were fed water soaked tamarind seed in the concentrate mixture there was non-significant difference in protein intake among various groups. Similar was the observations of Kumar and Mudgal (1980) who reported non-significant difference in protein intake in various groups.

5.4.3 Energy intake:

The optimum intake of energy is essential to sustain animal’s live weight, various physiological functions and adequate levels of production. In the present study, the average daily intake of energy was estimated as digestible energy (DE) and metabolisable energy (ME) in various groups. The average daily intakes of DE were 834.70±12.82, 803.26±15.24 and 854.72±9.18 Kcal in groups T₁, T₂ and T₃, respectively. The average daily intakes of ME were 684.45±10.24, 658.63±13.62 and 700.73±8.68 Kcal in groups T₁, T₂ and T₃, respectively. The effect of various treatments on DE and ME intake were found to be significantly (P<0.05) higher in T₁ and T₃ groups as compared to group T₂. No suitable reference was found to compare this observation.
Blood profiles:
Various haematological and biochemical constituents of blood of all the kids were analyzed at the start and end of the experiment and the results have been presented in Table 4.10 and 4.11, respectively. The values of different blood parameters studied were found within normal range and statistically non-significant difference was noted among the kids of different groups both at the start and end of the experiment.

This results thus obtained were in agreement with the values reported by Upadhyay and Rao (1985) and Prasad (1985).

5.6 Feed efficiency and economics of feeding:
The ultimate measure of quality of a feed stuff is the productivity which is the outcome of intake, digestion and utilization of digested nutrients. The value of dry matter intake per kg gain in live body weight in various groups of kids has been presented in Table 4.12

5.6.1 Dry matter efficiency:
The average total gains in live weight were 3.94±0.28, 4.86±0.36 and 3.81±0.42 kg in groups T1, T2 and T3, respectively, during the growth trial period of 90 days. The differences in total intake of feed did not differ significantly (P>0.05) among the various groups. The intake of dry matter kg/kg gains in live body weight were 6.41±0.05, 5.20±0.08 and 6.32±0.05 kg in groups T1, T2 and T3, respectively. The quantities of DM intake in respect of groups T1 and T3 were significantly (P<0.05) higher than T2.

The perusal of results obtained in respect of feed: gain ratio under various treatments revealed no adverse effect on the feed efficiency ratio. The observation was in agreement with the findings of Reddy et al. (1986) who also reported that when growing gilts were fed tamarind seed at 30 per cent level in the concentrate mixture, the feed efficiency ratio differ non-significantly.

Similarly, Aenganich et al. (2009) reported non-significant effect on the feed conversion efficiency in broiler fed 100, 200, 300, 400 and 500 mg/kg tamarind seed coat extract diet.
5.6.2 Economics of feeding:

Since feeding costs of livestock account for 70-75% of the total cost of production, it is the major item where profits could be increased through reducing feed costs and better feed utilization.

The economics of feeding has been calculated taking into account the feed cost on the basis of prevailing market prices of various ingredients of the three groups of experimental kids which have been shown in Table4.13. The cost of concentrate mixture per quintal for group T₁ (Rs.1840.00) was followed by groups T₂ (Rs. 1659.00) and T₃ (Rs. 1484.00), respectively.

The cost of green fodder (Berseem + Oat grass) was same for all the groups (Rs. 400/100 kg green Berseem and Oat grass). The perusal of the data (Table4.12) revealed that the cost per kg live weight gain was minimum in group T₂ (86.26±0.67) followed by groups T₁ (117.55±0.36) and T₃ (93.78±0.18), respectively. The present findings indicated that the feeding of fodder beet tuber was quite economical.