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PERFORMANCE OF CHOLISTANI MALE CATTLE CALVES FED FATTENING RATION UNDER LOCAL CLIMATIC CONDITIONS

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A study was conducted to evaluate the performance of calves of Cholistani breed of cattle fed on fattening rations under local climatic conditions. Twenty male calves of approximately equal weight, age and size were included in the experiment. All the calves were below one year of age (8-12 months) and their average weight was 133 lbs (105-165 lbs.) The animals were divided into four homogenous groups, A, B, C and D of five calves in each according to their initial bodyweight and were allotted to four rations, A, B, C & D. Corresponding to each group. The experiment lasted for 91 days. Daily weight gain, feed and protein utilization efficiencies were compared among groups. The calves fed cottonseed cake based diet (Ration, B) gained the highest weight 0f 0.71 kg/head/day followed by Anmol Vanda* based diet (Ration, A) (Control Group) gained 0.69 kg while maize gluten and wheat bran based diets gained 0.62 kg (Ration, D) and 0.50 kg (Ration, C) respectively. All groups significantly differed ($P<0.01$) from each other for daily weight gain but there was no significant difference ($P> 0.05$) between Groups A,B & D and C & D. All groups also significantly differed ($P<0.01$) from each other for feed utilization efficiencies, but there was no significant difference ($P>0.05$) between groups A&B, B&D and C&D. The results for feed conversion efficiencies were 8.13 / 7.26 kg, 10.24 / 9.21 kg, 13.93 / 12.58 kg and 11.86 / 10.73 kg on as fed and DM basis for rations, A, B, C and D respectively .The results for protein utilization efficiency differed ($P<0.01$) among groups but it was the lowest in case of group A and no significant difference was found between the groups A&B, B&D and C&D both on as fed and DM basis. The Protein utilization efficiencies were 1.13/1.01kg, 1.35/1.21kg, 1.84/1.66kg, 1.56/1.42kg 0n as fed and DM basis for rations A, B, C and D respectively. All the rations were equally good for live weight gain in calves however ration C was the lowest among the other groups. The Cholistani cattle calves possessed great potential to be used for fattening and although the feed and protein conversion efficiencies were slightly better for Anmol vanda, but on the basis of more weight gain and lower cost, the cotton seed cake based diet was recommended to Cholistani farmers for fattening their animals.
A concentrate ration being prepared on commercial basis at difference Livestock Farm of Punjab and used as a source of protein.

Keywords: Cholistani cattle breed, Anmol Vanda, feed ingredients, rations, calves feed, protein efficiencies, fattening

INTRODUCTION

Pakistan has been gifted with best breeds of all kinds of animals and Cholistani breed of cattle is one of the famous dual purpose cattle breed with its habitat in a widespread desert situated in Bahawalpur region of the southwest Punjab province of Pakistan located at a latitude of 27^0 to 40^0 north & longitude of 57^0 to 60^0 east. The length of the desert is 480 km and the breadth is 32 km -190 km (Akbar *et al.* 1996) (Fig.1.).
Cholistan is a typical rangeland which contributes significantly towards country supply line for milk & meat. The average rainfall in this area is 180 mm which may be as low as 2 mm in the dry season of the year. The only feeding source for the livestock is the patchy vegetative growth, halophytic plants & trees/bushes. Total livestock population in Cholistan area estimated during 2006 was 12,9,528 heads of animals, out of which cattle were 5.67,510; sheep were 3,56,024; goats were 2,57,285; camels were 11,328 and buffaloes were 9,923 (Livestock Census of Pakistan, 2006) (Fig.2).
The livestock sector in Pakistan contributes 11 % of total country's GDP & provides a major work force (30-35 million people) of rural population & is considered to be the best sector to help in alleviating the rural poverty (Economic Survey of Pakistan, 2007-08).
The demand of red meat is rising rapidly throughout the world due to both human population and shift in food buying habits in urban centers (FAO, 1973). This trend holds true for all the countries including Pakistan. Throughout the world the growth of the urban centres is four to five times greater than for a country / rural population as a whole (Poleman, 1972). This has put a pressure on livestock producers to gear up the supply of red meat for its growing demands. The ecology & economical position of the tropical countries is different from the temperate zone of the world particularly the South Asian countries, where more land use resources are needed to grow staple foods (Rice, Wheat and

Maize) for human population rather than feeding animals. The only choice left with these countries for livestock feeding is the use of cereal straws, mill by-products, agro industrial wastes & Non Protein Nitrogen (NPN) sources.

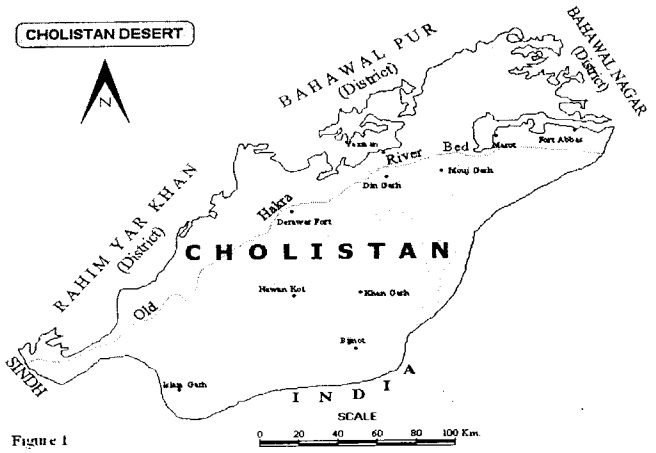

Fig. 1. Location map of Cholistan Desert

guidelines to the local farmers community for their motivation to use the best economical fattening ration formulated from locally available feed ingredients to be used for fattening their animals under local climatic conditions.

MATERIALS AND METHODS

The fattening trial was conducted at Govt. Livestock farm, Jogaitpeer, situated within the vicinity of Cholistan desert. The farm is a property of provincial Livestock & Dairy Development Department which is engaged to do research on Colistani breed of cattle & sheep. The farm administration provided the facilities like animal sheds, calves, feed ingredients, labour & other allied facilities free of cost which helped a lot to complete this experiment.

Twenty male calves of approximately similar age, weight & size of cholistani breed of cattle were included in this study. The calves were divided into four homogenous groups A, B, C & D of five animals in each according to their initial body weight. Four rations, A, B, C & D were formulated from locally available feed

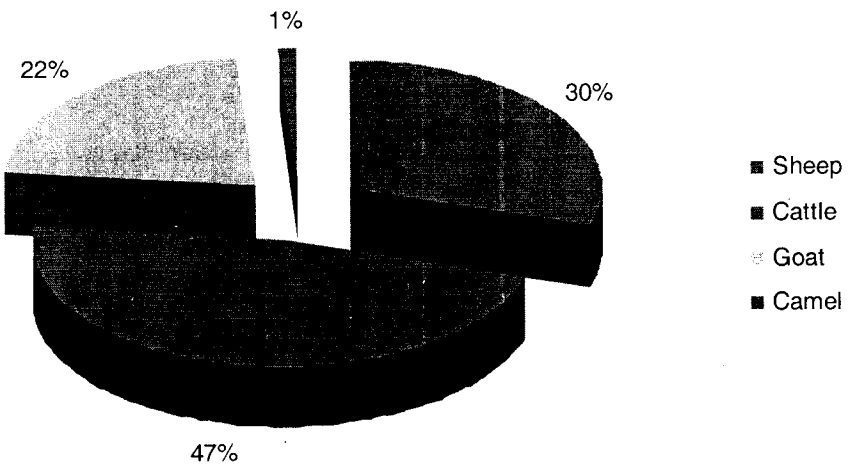

Fig. 2 Livestock Population in Cholistan Desert
Processed from the figures of Livestock census, 2006 (Pakistan)

In Pakistan and other developing countries of the region, the availability of quality feed throughout the year and its high cost are the major constraints for livestock production. However, combined use of cereal straws and locally available protein and energy rich sources of mill by-products such as cotton seed cake, maize gluten, wheat bran, urea and molasses when fed to ruminants can produce good results for the supply of red meat for the urban centres.

The present study/ experiment was therefore planned/ conducted to evaluate the performance of male calves of Cholistani breed of cattle and to provide necessary ingredients of approximately same protein & energy levels. Composition of each ration is shown at table- 1.

The calves were allotted to four rations corresponding to each groups of calves. Before the start of the experiment, all the animals were dewormed with Alfendazole @ 1ml/8kg body weight. Fifteen days preliminary feeding was given to calves to get themselves used to the rations.

The animals were weighed at the start of the experiment early in the morning at 07:00 a.m. before feeding and watering and every week thereafter at the same time. Each group of animals were offered a

Table 1. Ingredients and chemical composition (%) of experimental rations

Ingredients	Rations			
	A (Anmol Vanda)	B (CSC Based)	C (Maize Gluten Based)	D (Wheat Bran Based)
Cotton seed Cake	22	27	-	-
Maize Gluten (30%)	10	-	13	-
Wheat Bran	33	30	30	46
Maize Grain	15	-	-	-
Molasses	17	19	22.5	24
Wheat Straw*	-	20	30	25
Urea	-	01	1.5	2
DCP	02	02	02	02
Salt	01	01	01	01
Total	**100**	**100**	**100**	**100**
Analysis				
Dry Matter	89.40	90.00	90.30	90.50
Crude Protein	13.86	13.18	13.21	13.21
TDN	65.00	64.50	64.00	64.00

*As the wheat straw was not part of ration A, therefore 1.5kg wheat straw per head per day was mixed with the ration to equalize the protein and energy levels with other rations

weighed quantity (08 kg per head per day) of experimental rations twice daily i.e. in the morning & in the afternoon. Each animal was given the green fodder at the rate of 02 kg/ head/day to meet their carotene requirements. The feed refused by each group was weighed next morning to record the daily amount of feed consumed by each group of calves. The calves were kept and fed in groups of five animals each in a separate enclosure and were offered fresh and clean water twice a day. The experiment lasted for 91 days.

Complete record of daily feed consumed & weekly weight gain of each group & individual animal was maintained. Weekly weight gain, feed consumption for each group of calves was calculated to see the effect of each ration on the performance of the calves. The feed and protein conversion efficiencies of all four rations was calculated on the basis of daily feed/protein consumed/kg body weight gain.

The data thus collected was subjected to statistic analysis using Analysis of Variance Technique with the help of MS Stat computer Software & analysis of variance by Steel & Torie (1960). The composition of mean difference was calculated by using Dunken`s Multiple Range Test (Dunken 1945).

RESULTS AND DISCUSSION

Production performance of Cholistani cattle calves fed on Anmol Vanda (Ration-A) and indigenous feed ingredients based rations, B, C and D is presented in table-2.

Weight gain

The results of the present study on daily weight gain per calf was the highest (0.71 kg) for group of animals fed on cotton seed cake based diet (Ration-B) followed by the group of calves fed on Anmol Vanda based diet (0.69 kg) (Ration-A). The daily weight gain per calf for other groups of animals given maize gluten and wheat bran based diets (Ration-C and Ration –D) was 0.5 kg and 0.62 kg respectively. Statistically, all the groups differed ($P<0.01$) from each other but there was no significant difference ($P> 0.05$) between calves fed on Rations A, B and D. No significant difference ($P>0.05$) in daily weight gain was also observed between the animals fed ration C and D. Although there was no significant difference among groups but the calves fed on ration B was recommended to Cholistani Livestock Farmers for fattening their animals on the basis of higher weight gain and lower cost.

The results of present study were in agreement with the work done by Church *et al.* (1963) who recommended a protein level of 11.5% for fattening of weaned calves while Perry *et al.* (1967) found no significant difference ($P>0.05$) on growth rate of steer calf fed Urea and natural protein supplemented diets. Erbersdobler and Gropp (1973) concluded from their study on veal calves that Soybeans is good vegetable protein milk replacer source. While Mcdowell and Urdaneta (1975) reported in their paper, the study of white *et al.* (1971) that steer gained a live weight of 0.83 kg, 0.81 kg and 1.22 kg / head / kg fed on all concentrate and 5% and 20% straw supplemental

Table 2. Performance of Cholistani cattle calves fed different rations

Parameters	Rations			
	A (Anmol Vanda)	B (CSC Based)	C (Maize Gluten Based)	D (Wheat Bran Based)
No. of Calves	5	5	5	5
Days of Experiment	91	91	91	91
Average Initial Wt. Of 5 Animals (Kg)	530	645	721	765
Average final Wt. of 5 animals after 91 days (Kg)	845	966	947	1045
Average total gain of Wt. of 5 animals in 91 days (Kg)	315	321	226	280
Average total gain in Wt. per animal in 91 day (Kg)	63.00	64.20	45.20	56.00
Average daily gain in Wt. per animal (Kg)	0.69	0.71	0.50	0.62
Average daily feed intake per animal (Kg)	5.43	6.69	6.49	7.02
Average daily feed required per kg gain in Wt. per animal (Kg) (Feed efficiency on as fed basis)	8.13	10.24	13.93	11.86
Average dry matter intake required per kg gain in Wt. per animal (Feed efficiency on DM basis)	7.24	9.21	12.58	10.73
Average daily protein intake per animal (Kg)	0.75	0.88	0.86	0.93
Average daily protein required per kg gain in Wt. per animal (Protein efficiency on as fed basis)	1.13	1.35	1.84	1.57
Average daily protein required per kg gain in Wt. per animal (Protein efficiency on DM basis)	1.01	1.21	1.66	1.22

diets. Ahmad and Pollot (1977) reported the growth response of Sudan Zebu calves with initial live weight of 75 kg and 8 months of age for 112 days growth trial, an Average Daily Gain (ADG) of 0.55 kg, 0.75 kg and 0.85 kg fed on three levels of crude protein groundnut based diets. Serafy (1977) reported that male calf from weaning to 150 kg body weight required 70-75% Total Digestible Nutrients (TDN) and 15-17% Digestible Protein (DP) to get 0.7 kg to 0.8 kg ADG. While Silvestre *et al.* (1977) reported from their study on Zebu Bulls that live weight gain increase with increasing level of Urea and Molasses mixture up to 30 g Urea /kg of Molasses and the animals gained 0.734 kg body weight and then it decreased linearly. Bagg *et al.* (1985) in their experiment on effect of protein on growth of Holstein heifers calves from 2-10 months of age reported that the calves required 0.65 kg-0.95 kg of protein to get ADG of 0.83 kg -1.06 kg. Gerrits *et al.* (1996) reported in two separate experiments on Holstein cross Dutch calves an ADG of empty body weight 0.64 kg & 1.34 kg respectively fed on different levels of protein & protein energy free diets. Rasid *et al.* (2001) in their experiment on evaluation of complete ration consisting road side grass, maize silage and water hyacinth grass leaves on indigenous bull calves of Bangladesh, reported ADG of 1.52, 1.15 and 1.07 kg fed on three different rations. Atwood *et al.* (2001) reported that animals gained at a faster rate fed on nutritionally mixed ration than non nutritionally balance ration (0.92 kg per head per day vs. 0.89 kg per head per day) but the difference was statistically non Significant. Brown *et al.* (2005) in the experiment on affect of increasing energy & protein intake on body growth & carcass composition of heifer calves reported an ADG of 0.38 kg & 0.69 kg for moderate & high protein diets, respectively. Jabbar *et al.* (2006) in their experiment on cross bred Sahiwal*Freisian male calves of 9-10 months of age weighing 70-90 kg in a 112 days trial reported an ADG of 0.73 kg, 0.72 kg & 0.71 kg for cottonseed cake, sunflower meal & cottonseed cake + sunflower meal based diets and there was no significance difference among groups on ADG. Mahmoudzadeh *et al.* (2007) in their experiment on response of male buffalo calves to different levels of energy & protein in finishing diets reported an ADG of 0.633 kg, 0.898 kg and 0.554 kg and 0.689 kg, 0.71 kg and 0.680 kg for three levels of energy and protein diets respectively and the difference was significance among diets.

Feed efficiency

The results of present study on feed intake & feed utilization efficiencies both on as fed & DM basis indicated that the all the groups differed significantly ($P<0.1$) from each other and there was no significant difference ($P>0.5$) between the groups A & B, B & D and C & D. The results on feed intake on as fed basis for the present study was 5.43 kg, 6.68 kg, 6.49 kg and 7.02 kg for rations A, B, C & D respectively. Similarly the feed utilization efficiencies on as fed and DM basis were 8.13/7.26 kg, 10.24/9.21 kg, 13.93/12.58 kg and 11.86/10.73 kg for rations A, B, C & D respectively.

The result of present study are in agreement with the work done by white *et al.* {1971} who reported daily dry matter intake of 7.10 kg , 7.2 kg and 7.9 kg in steers fed on all concentrate, 5% and 20% wheat straw supplemented diets respectively. Similar results have also been reported by Ahmad and Pollot (1977) who showed that a total dry matter intake of 4.3 kg, 5.0 kg and 5.0 kg per head per day is required for an average daily growth rate of 0.55 kg, 0.75 kg and 0.85 kg per animal with feed conversion efficiencies of 7.8 kg, 6.60 kg and 5.80 kg on DM basis in Kenana Zebu calves fed on three levels of protein as concentrates supplemented with groundnut hay respectively. Rashid *et al.* (2001) in their experiment on indigenous bulls in Bangladesh fed on rations containing road side grass. Maize silage or water Hyacinth leaves reported the feed efficiencies of 21.74 kg, 16.61kg and 19.92 kg and the rations differed significantly (P< 0.01) from each other. Atwood *et al.* (2001) reported that the calves offered mixed ration tended to eat more than the animals offered a feed of choice. Jabbar *et al.* (2006) reported the feed intake and feed conversion ratios of 5.2 kg, 5.5 kg and 5.7 kg and 7.1 kg, 7.7 kg and 8.0 kg in crossbred calves fed on three concentrate rations (A, B and C) based on cotton seed cake (CSC), sunflower meal (SFM) and both CSC+SFM respectively with no significant difference among groups of calves. Mahmoudzadeh *et al.* (2007) reported that daily dry matter intake was not significantly different between treatments when the male buffalo calves were fed to three levels of energy and three levels of protein diets but the feed conversion ratio was significantly lower when the animals were fed medium energy diets. The figures for dry matter intake and feed conversion ratio for high(E-1), medium (E-2) and low (E-3) energy diets were 5.87 kg,6.52 kg & 4.66 kg and 9.40 kg , 7.27 kg &8.47 kg respectively which almost correspond to the figures for the present study.

Protein efficiency

The data of present study revealed that average daily protein intake per calf was 0.75 kg, 0.88 kg, 0.86 kg and 0.93 kg for groups A,B, C and D respectively. Likewise the protein utilization efficiencies both on as fed and DM basis were 1.13/1.01 kg,1.35/1.21 kg,1.84/1.66 kg and 1.57/1.42 kg for rations A, B, C and D respectively. The results of the present study indicated that all groups differed (P <0.01) from each other however there was no significant difference (P >0.5) among A & B, B & D and C & D Group of calves. The findings of present study are in consistent with the results of Ahmad and Pollot (1977) who reported that the Kenana Zebu cattle calves consumed 0.443 kg, 0.605 kg and 0.700 kg of protein when fed on three diets of different protein levels and there was a significant difference (P<0.05) among groups. Similar results have also been reported by Bagg *et al.* (1985) who reported that Holstein heifer calves of 2 to 10 months of age required a crude protein level of 0.65 kg to 0.95 kg to get a daily average weight gain of 0.83 kg to 1.06 kg. The data presented by Mahmoudzadeh *et al.* (2007) on crude protein conversion ratio (CPCR) in male buffalo calves are in consistent with present study. The figure for three energy and three protein diets were 1.0 kg, 0.7 kg & 0.9 kg and 0.8 kg, 0.80 kg & 0.90 kg respectively.

CONCLUSION

Locally available feed ingredients are equally good to be used for the formulation of fattening rations. The Cholistani male calves possessed a great potential to be fattened for the production of meat and although the feed and protein conversion efficiencies were slightly better for Anmol Vanda, but on the basis of more weight gain and lower cost, the cotton seed cake based diet was recommended to Cholistani farmers for fattening their animals.

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