STUDY ON GROWTH POTENTIAL OF SIPLI AND THALLI BREEDS OF SHEEP ON DIFFERENT RATIONS

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Abstract

A study was carried out to evaluate the comparative nutritive value of cotton seed cake and cotton seed meal in Thalli and Sipli breeds to assess their fattening potential. For this purpose 60 male lambs, 30 each of Thalli (T) and Sipli (S) of almost equal weight and age were selected. Lambs of each breed were further sub-divided into two equal groups of 15 animals each TA, TB, SA and SB. Each group consisted of three replicates of 5 animals each. Two isocaloric and isonitrogenous experimental rations i.e. A and B were formulated using cottonseed cake and cotton seed meal as major vegetable protein source. Ration A was allotted to group TA and SA; and ration B was allotted to TB and SB. The effect of feeding cottonseed cake and cottonseed meal on the growth rate, feed consumption and feed utilization was recorded. The growth was significantly better on cotton seed cake than on cotton seed meal containing rations. There was non-significant difference in fattening potential between both the breeds. However, there was an increasing tendency in fattening potential for Thalli than Sipli lambs. Nevertheless, there was significant increase in feed consumption of lambs fed on ration A containing cotton seed cake. The digestibility of ether extract was significantly higher for ration B containing cotton seed meal and there was non-significant increasing tendency for the digestibility of crude ash in experimental ration B on both breeds of sheep. It might be attributed to the poor condensed palatability of cotton seed meal as compared to cotton seed cake (Milis and Liamadi, 2007).

Keywords: Thalli, Sipli, Breeds, growth, Ration

INTRODUCTION

In Pakistan, sheep is the major source of livelihood for over a million farmers especially in arid regions where crop production and dairy farming is not feasible. The sheep provides 21.9% of the meat produced in the country in addition to 50.3 thousand tons of carpet type wool per annum. However per animal productivity of local sheep for mutton as well as wool is relatively low which renders it uneconomical for commercial mutton and wool production.

The per capita consumption of meat in Pakistan is 20.5 kg, which is far below than the standards of advanced countries and of the world health organization (Pakistan economic survey 2008-09). While considering the different means to cope up with the ever increasing demand for animal origin protein, sheep occupy an important place in the country for production of mutton, a choice meat of high nutritive value. There are about twenty breeds of sheep in various parts of the country, classified as fat tailed and thin tailed and both are reared for mutton and wool production.

Mutton production in the country is related to the population of sheep and the feed resources available. Good nutrition of the sheep is obligatory for better and more production of mutton. Feed resources for sheep like other classes of livestock are green fodder, dry roughages, range lands and pastures. Due to agricultural and industrial development in the country appreciable quantities of the agro-industrial by-products are also available for feeding of livestock. Generally the sheep and goats are maintained on the range lands which constitute about 70-73% of the total area of the country. According to an estimate, there is an acute shortage of feed resources for livestock in the country (Agri census, 2006). Like other classes of livestock, sheep is no exception to the above fact and the feed supply to sheep is also not sufficient as the range lands in the country are poorly managed and over grazed. These facts lead to the conclusion that feeding of sheep in the country is inadequate and hence, productivity of mutton is not according to the genetically potential of indigenous breeds of sheep and goats.

The present study was designed and evaluate to determine their fattening potential and the effect of different rations comprising of indigenous agro-industrial by-products on the feed lot performance of two indigenous sheep breeds of the arid zones of the country (Thalli and Sipli).

MATERIAL AND METHODS

An experiment was conducted to study the growth of two local sheep breeds maintained in the arid zones of the country Thalli and Sipli. Feeding and digestibility trials were conducted to evaluate in vivo digestibility of D.M, C.P.C.F, E.E. and ash content of rations containing of cotton seed cake, and cotton seed meal on weight gain and efficiency of feed utilization.

Procurement of Material

All the ingredients, cotton seed cake, cotton seed meal, wheat bran, rice polishing, molasses, oats, hay and mineral mixture were purchased from the market. The proximate analysis of the above ingredients is given in table-3. Thirty male young lambs of each breed of Thalli and Sipli with almost similar age and weight were procured from the Government Livestock Farms and divided

randomly into two equal groups (15 lambs each). Each group of lambs was further sub-divided into 3 replicates of 5 animals each.

Composition of Rations

Two isocaloric and isonitrogenous rations A and B were formulated. In Ration A cotton seed cake was used as the major protein supplement, where as in ration B cotton seed cake was replaced by cotton seed meal on protein equivalent basis. The other ingredients of both the rations were almost the same with slight adjustments to make isocaloric and isonitrogenous.

Feeding Trial

All the animals were dewormed appropriately. In the beginning of the experiment the animals were fed for a transitional period of 15 days during which they were accustomed to the experimental rations. The daily ration requirements were worked out on the basis of feed consumption during transitional period. The ration was offered to the animals twice daily i.e. morning and evening (give exact time such as 08:00-18.00). Data of feed consumption was recorded daily. Fresh and clean water was provided ad-libitum throughout the experimental period. The feeding trial was conducted for a period of 70 days.

The data of weekly weight gain, feed consumption and feed efficiency of each animal was recorded and analyzed statistically.

Digestibility Trial

At the end of the feeding trial, digestibility trial was carried out for duration of 5 days. For this purpose, 24 animals were selected to form each replicate. The amount of feed consumed and faeces voided during 24 hours of each animal was recorded (how? Using bag or cage). Then the oven dried faecal and ration samples were proximately analyzed according to the method of AOAC (1970). Data on feed consumed and faeces voided by the animals of each breed is given in appendix I, II, III and IV. The digestibility of dry matter, crude protein, crude fiber, ether extract, mineral matter and nitrogen free extract was determined from the analytical data of the feed consumed and faeces voided. To assess the effect of environmental stress on the performance of animals, different meteorological parameters i.e. temperature, humidity and rain fall were also recorded.

Statistical Analysis of date/ Data Manipulation

The data was analyzed for weight gain, feed consumption, feed efficiency and digestibility of various nutrients in the breeds fed on different experimental rations. The data analyzed after Steel and Torrie 1992, by analyzing variance

RESULTS AND DISCUSSION

This study was conducted to evaluate the growth potential of two sheep breeds (Thalli and Sipli) and also to study the effect of two different rations, one based on cotton seed cake and the other on cotton seed meal.

Weight Gain

During the feeding trial, weekly weight gain of the animals were recorded. The total weight gain was calculated on the basis of the difference between initial weight and the final body weight of the animal. The results are elaborated in table 4. The lambs of both breeds were fed rations A and B for

70 days. Thalli breed lambs fed rations A and B, gained on an average of 11.83 and 11.55 kg, respectively. While Sipli breed lambs fed on rations A and B gained an average 11.74 and 10.73 kg, respectively. The statistical analysis of weight gain of the two sheep breeds (Thalli and Sipli) showed a non-significant difference but the two rations (A and B) gave significant ($p<0.05$) effect on weight gain of the animals. The maximum weight gain (11.83 kg) was attained by Thalli lambs fed on ration A having cotton seed cake followed by Sipli lambs also fed on ration A containing cotton seed cake. Thalli and Sipli lambs fed on ration B containing cotton seed meal had the minimum weight gain. This indicated that ration A was significantly better than ration B with regard to the growth performance of the lambs. The weekly collected data on weight gain of the animals is shown in table 4. During the 4th week of the experiment the lambs of both breeds fed on different experimental rations showed negative weight gain. This might be attributed to the higher atmospheric temperature and exceptional increase in the number of flies thereby causing the managemental stress and loss of weight of the animals. When the flies' problem was controlled, the lambs again started gaining weight. The cotton seed cake contained higher content of fat (essential fatty acids) as compared to cotton seed meal which might have promoted the weight gain of lambs fed on rations containing cotton seed cake. Similar results reported by Dagalashani et al (2002) in which the nutrient digestibility in lambs fed CSM supplemental diet were fed (re-write). The average daily weight gain of Thalli lambs were 169 and 165 gm on rations A and B respectively. In case of Sipli the average daily weight gain was 167.6 and 153.3 gm on ration A and B respectively. These results are also in agreement with those of Ahmad *et al*. (1962), Anwar (1963) who reported a daily weight gain of the lambs as 159 gm, 154 gm and 180 gm respectively. Mohsin (1989) studied corn gluten feed, corn gluten feed + cotton seed cake and cotton seed cake on the fattening performance of lambs and concluded that cotton seed cake containing ration was the best. However, Zaheed et al (2001) reported a significantly higher daily weight gain of 320 gm, of the fattening lambs on cotton seed meal ration, which was much higher than the recorded values in this experiment. This might be due to the breed difference of sheep used in the two studies. Though the breed effect on weight gain of the lambs was non-significant but Thalli breed showed (11.83 and 11.55 kg on ration A and B respectively) slightly higher weight gain as compared to Sipli (11.74 and 10.73 kg on ration A and B, respectively). This indicated that Thalli breed had slightly better growth potential than Sipli breed.

Feed Consumption

Average weekly feed consumption per animal is given in table 7. The cumulative feed consumption of Thalli lambs at the end of 70 days of the experiment fed on ration A and B was 122.7 and 115.16 kg, whereas in Sipli lambs fed on similar was 121.84 and 116.00 kg respectively. Maximum feed intake (122.7 kg) was recorded in Thalli lambs fed on ration A having cotton seed cake followed by Sipli lambs (121.84 kg) fed on ration A, Sipli lambs (116.0 kg) fed on ration B and the lowest feed consumption (115.16 kg) was recorded in Thalli lambs fed on ration B. Statistical

analysis showed that both the breeds of sheep, Thalli and Sipli had non significant effect on feed consumption (Table 8). But the effect of different experimental rations A and B on the feed consumption of the lambs was significant. Ration A having cotton seed cake was consumed significantly ($p<0.05$) more by both Thalli and Sipli lambs as compared to ration B having cotton seed meal. The more consumption of ration A having cotton seed cake by both Thalli and Sipli lambs might be due to the better palatability of the ration. The similar results reported by Kotas et al (1999) worked on performance of growing fattening lambs fat diet containing different proportion of Cotton Seed Meal .

Feed Efficiency

The feed efficiency of the lambs was calculated on the basis of total feed consumed divided by total weight gain by each group of animals. The average FCR of Thalli and Sipli lambs fed on ration A and B was 10.36, 9.97, 10.38 and 10.81 respectively. The feed efficiency of the lambs of Thalli and Sipli breeds fed different experimental rations were non-significant. Neither experimental rations A and B nor breeds (Thalli and Sipli) gave significant effect on feed efficiency of the lambs. However slightly better feed efficiency (9.97) was observed in Thalli lambs fed on experimental ration B having cotton seed meal. Comparatively slight poor feed efficiency (10.81) was recorded in Sipli lambs fed on ration B. These findings closely coincide to the findings of Billah (1966), Basra (1987), and Mohsin (1989) who reported feed efficiency of lambs fed on different fattening rations as 10.7, 10.14 and 9.05 respectively. The FCR of animals in all experimental groups was negative during 4th week of the experiment. A similar tendency was observed in the weight gain of the lambs fed on different experimental rations. This might be due to climatic stress with higher atmospheric temperature and flies problem as observed during that experimental duration. All these factors resulted in weight loss and negative feed efficiency in the experimental animals.

Digestibility of the Nutrients

The average dry matter digestibility in Thalli and Sipli lambs fed on ration A and B (TA, TB, SA and SB) were 68.33, 70.48, 66.89 and 65.17 percent respectively. The highest digestibility (70.48%) was observed in Thalli lambs fed on ration B (TB) while the minimum (65.17%) was noted in Sipli lambs fed on ration B (SB). However results with regard to dry matter digestibility in Thalli and Sipli lambs fed on different experimental rations were statistically non-significant. The lowest DM digestibility of ration B in Sipli lambs corresponded to its poor feed efficiency. However Basra (1987) reported a better value of 70.09 to 75.78 percent as co-efficient of digestibility for dry matter in sheep which are also in contras to the finding of Nagalskshmi (2002). Showing little overall benefit of raw and iron treated Cotton Seed Meal fed and Lambs. The difference in digestibility and absorption were observed in 3 hair sheep breed by Wildens et al (2005). When growth, intake, and digestibility of nitrogen use in alfa alfa hay fed were observed.

Crude Protein

The average value of digestibility of crude protein for Thalli and Sipli lambs fed on rations A and B

(TA, SA and SB) were 71.12, 72.65, 69.85 and 67.73% respectively (. The maximum (71.12%) crude protein, digestibility was noted in Thalli lambs fed on experimental ration A, while the lowest (67.73%) digestibility was determined in Sipli lambs fed on ration B. However, the crude protein digestibility was determined in Sipli lambs fed on ration B and were statistically non-significant. The effect of breed of lambs on the digestibility of crude protein was also non significant. These findings of the study are in agreement with Huston and Mourice (1971) who reported 73.7 percent digestibility of crude protein in sheep. Whereas results obtained by Kostas Kandylis *et al* (1992) that cotton seed cake was incorporated into diets at levels of 0, 15 and 30%. After being fed for 62 days and having reached a liveweight of approximately 26.7 kg, five male lambs from each treatment were slaughtered and carcass data were collected. Results of the growth trial showed that there were no significant differences in feedlot performance or carcass analysis among the lambs fed these diets.

Crude Fiber

The crude fiber digestibility in Thalli and Sipli lambs fed on rations A and B (TA, TB, SA and SB) were 57.59, 52.65, 55.72 and 44.30% respectively. The best crude fiber digestibility (57.59%) was observed in Thalli lambs fed experimental ration A (TA) containing cotton seed cake. The same ration (A) in Sipli Lambs also gave higher value ($p<0.05$) of crude fiber digestibility than ration B, containing cotton seed meal. Statistically significant difference ($p<0.05$) was observed between the effect of rations on crude fiber digestibility of ration A, it might be due to the presence of some factors (S) in cotton seed cake responsible for improving the digestibility of crude fiber as compared to cotton seed meal. Such factors might have increased the viability of the ruminal micro flora which ultimately resulted in higher crude fiber digestibility. The results of present study are in accordance with Mohsin *et al.* (1989) who reported 53.33 to 60.22%.

Ether Extract

The average digestibility of ether extract in Thalli and Sipli lambs fed on rations A and B (TA, TB, SA and SB) were 78.74, 86.95, 77.79 and 84.58% respectively. The best ether extract digestibility (86.95%) was observed in Thalli lambs fed on experimental ration B containing cotton seed meal. The same ration (B) gave better ether extract digestibility in Sipli lambs. The statistical analysis of the results revealed that the effect of ration on ether extract digestibility was highly significant. The ration B containing cotton seed meal had significantly ($p<0.05$) higher ether extract digestibility than ration A containing cotton seed cake. The Thalli lambs showed significantly ($p<0.05$) higher ether extract digestibility as compared with Sipli lambs.

Mineral Matter

The average digestibility of mineral matter in Thalli and Sipli lambs fed on rations A and B (TA, TB, SA, SB) were 46.98, 53.51, 44.65 and 45.16% respectively. The statistical analysis revealed that neither the breeds of sheep nor the rations had non-significant difference in the digestibility of mineral matter. The results of present study are in agreement with Basra (1987) who reported 44.96 – 55.51% digestibility of mineral matter in

sheep. These results however are not agreement with the findings of Mohsin *et al*. (1989), who reported 37.42 to 38.24% digestibility of mineral matter in sheep.

Nitrogen Free Extract

The average digestibility of nitrogen free extract by Thalli and Sipli lambs fed on rations A and B (TA, TB, SA and SB) were 74.73, 76.66, 73.62 and 72.65% respectively. There was a non-significant difference in the digestibility of NFE in Thalli and Sipli lambs fed on different experimental rations. Similar results were reported by Mohsin *et al.* (1989) and Basra (1987). However there were increasing tendency in NFE digestibility for group TB followed by TA, SA and SB respectively.

Economic Appraisal

Ration A having cotton seed cake was cheaper as compared to ration B having cotton seed meal. The feed cost per kilogram of gain in body weight was Rs.15.54 and 16.35 in Thalli lambs fed on ration A and B, respectively. The prevailing price of mutton at the time of conduct of experiment was Rs.44. The ration A proved more economical than ration B.

CONCLUSION

The results indicated that Thalli breed of sheep has better growth potential as compared to Sipli breed while ration containing cotton seed cake revealed enhanced feed intake and better economical weight gain in comparison to ration containing cotton seed meal.

Table 1. Composition of Experimental Rations (%)

Rations		
Ingredients	**A**	**B**
Oats hay	20	15
Cotton seed cake	30	-
Wheat bran	20	20
Cotton seed meal	-	19
Rice polishing	14	25
Molasses	15	20
Mineral mixture	1	1

Table 2. Showing Composition of Mineral Mixture Used in all the Experimental Rations

Di calcium phosphate (DCP powder)	74.000 kg
Common salt (Nacl)	24.450 kg
Copper sulphate ($CuSO_4$)	10.250 kg
Zinc sulphate ($ZnSO_4$)	0.250 kg
Cobalt sulphate ($CoSOS_4$)	0.250 kg
Pottassium iodide (Kl)	0.050 kg
Magnessim sulphate ($MnSO_4$)	0.250 kg
Ferrous sulphate ($FeSO_4$)	0500 kg
Total	**100.000kg**

Table 3. Chemical Composition of Experimental Rations (%)

Rations		
Ingredients	**A**	**B**
Dry matter	94.37	93.44
Crude protein	13.09	13.60
Crude fiber	20.38	17.16
Ether extract	6.87	7.21
Ash	8.30	9.22
Nitrogen free extract	51.36	52.81

Table 4. Weight Gain of the Lambs Herd per Day (Gms)

	Thalli		Sipli	
Period (Day)	**A**	**B**	**A**	**B**
1-7	209	221	202	154
8-14	252	217	198	203
15-21	42	28	71	154
22-28	-90	-35	-14	-11
29-35	376	262	300	295
36-42	90	195	214	180
43-49	176	204	171	100
50-56	195	128	176	138
57-63	95	242	171	95
64-70	345	188	187	226
Total	**1690**	**1650**	**1676**	**1533**

Table 5. Analysis of Variance for Weight Gain of Different Groups and Replicates at the End of 70 Days

Source of variation	Degree of freedom	Sum of square	Mean square	F. value
Rep.	2	3.5	1.75	0.052 N. S
Breed	1	126.75	126.75	3.74 N. S
Feed	1	252.08	252.08	7.438 *
Feed x breed	1	76.58	76.58	2.25 N. S
Error	6	203.34	33.89	---
Total	**11**			

Table 6. Difference of Treatment Means on Application of LSD Techniques for Ration Effect on Weight Gain at the End Of 70 Days

		Means difference from		
Treatment	Means	SB	TB	SA
TA	167.0	15.7 **	4.0 N.S	1.4 N.S
SA	167.66	14.3 **	2.6 N.S	-----
TB	165.0	11.7 *	----	-----
SB	13.33	-----	-----	------

** Highly significant ($p<0.05$)
* Significant ($p<0.05$)
N. S Non-significant

Table 7. Feed Composition per Head per Week (Kgs)

	Thalli		Sipli	
Period (Day)	**A**	**B**	**A**	**B**
1-7	9.8	9.94	12.60	9.87
8-14	10.23	10.78	10.22	10.57
15-21	10.90	9.94	10.50	10.08
22-28	11.13	10.50	10.29	10.64
29-35	12.00	12.04	12.32	12.53
36-42	13.00	12.74	10.30	13.09
43-49	12.96	12.74	12.81	12.67
50-56	14.28	14.74	14.00	11.69
57-63	13.23	11.69	13.30	12.39
64-70	14.42	11.90	15.19	12.32
Total	**122.7**	**115.16**	**121.84**	**116.00**

Table 8. Analysis Of Variance for Feed Consumption of Different Groups at the End of 70 Days

Source of variation	Degree of freedom	Sum of square	Mean square	F. value
Rep.	2	8150	4075	1.85 N. S
Breed	1	1875	1875	0.85 N. S
Feed	1	46875	46875	21.31*
Feed x breed	1	3675	3675	1.67 N. S
Error	6	13200	2200	---
Total				

* Significant ($p<0.05$)
N. S Non-significant

Table 9. Difference of Treatment Means on Application of LSD Techniques for Feed Consumption at the End of 70 Days

		Means difference from		
Treatment	Means	TB	SB	SA
TA	1750	160 **	100 *	10 N.S
SA	1640	150 **	90	-----
SB	1650	60 N.S	----	-----
TB	1590	-----	-----	------

** Highly significant ($p<0.05$)
* Significant ($p<0.05$)
N. S Non-significant

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