EFFECT OF DIETS WITH DIFFERENT FORAGE TO CONCENTRATE RATIO FOR FATTENING OF LOHI LAMBS

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ABSTRACT

The objective of this study was to determine the effect of different forage to concentrate ratios for fattening of Lohi lambs. For this purpose, 75 lambs were randomly divided into 3 groups A, B and C, with 25 lambs in each group. Berseem fodder was supplemented with concentrate at different ratios (forage to concentrate) as 75:25, 50:50 and 25:75 and fed to groups A, B and C, respectively for a period of 66 days. The feed intake of lambs of group C (1938 ± 135g) was the highest, followed by group A (1723 ± 156g) and group B (1628 ± 152g). Daily body weight gain averaged 105 ± 12, 144 ± 09 and 168 ± 14g and feed conversion ratio averaged 16.41, 11.30 and 11.53, for groups A, B and C, respectively. Statistically, differences in feed intake, daily weight gain and feed conversion ratio among lambs of three groups were significant ($p<0.05$). Dressing percentage averaged 46.80 ± 1.5, 46.93 ± 1.4 and 48.88 ± 1.5 for the respective diets. Dressing percentage was higher ($p<0.05$) in group C compared to groups A and B, however, no difference was observed between the latter two groups. Similarly, no differences were found in percent of crude protein, fats and total ash in carcasses of all three groups. Feed cost for one kg body weight gain averaged Rs.74, 61 and 55 for groups A, B and C respectively. These results indicated that forage to concentrate ratio of 25:75 is most appropriate for economical mutton production form Lohi lambs.

Key words: Concentrate, berseem fodder, fattening, carcass percentage, Lohi lamb.

INTRODUCTION

The meat production in Pakistan includes beef (48%), mutton (32%) and poultry (20%, Anonymous, 2006-07). The demand for food of animal origin in the country is increasing as the socio-economic conditions are getting improved. Among the red meat, mutton is preferred over beef and poultry meat by the people of Pakistan and lambs are the major source of mutton production in the country.

Sheep rearing mainly depends on grazing which alone is not sufficient for optimizing live weight gain and wool production (Mahajan *et al.*, 1976). However, at the same time fattening of lambs for quality meat has narrow margin of profit. Optimum growth can be obtained with appropriate combination of concentrate and forage in the lamb's diet. Mahajan *et al.* (1976) and Kochapakdee *et al.* (1994) have reported the importance of concentrate supplementation in growth and productivity of sheep and goats in pasture based grazing. They also reported that grazing alone may not be sufficient for optimizing live weight gain and wool production. Very little work of lamb fattening has been reported under intensive feeding in Pakistan. The present study therefore, was planned to determine the appropriate fodder to concentrate ratio in the diet of Lohi lambs for economical mutton production in the country.

MATERIALS AND METHODS

For this study, 75 Lohi lambs of 24 ± 2 kg body weight and 6 ± 0.3 months of age were purchased from the local market and randomly divided into three groups A, B and C, with 25 lambs in each group. Berseem forage supplemented with concentrate at three forage to concentrate ratios (Table 1) was offered to all three groups of lambs on dry matter basis. Ingredients and chemical composition of diets is given in Table 2.

Table 1: Forage to concentrate ratio of experimental diets

Group	Forage (%)	Concentrate (%)
A	75	25
B	50	50
C	25	75

Before starting the trial, a 10 days adaptation period was given in which the animals got adjusted to various diets. Each morning the weighed quantities of concentrate diet were offered to each group. When they had finished the concentrate diet, chopped berseem (without any straw) was offered according to the above mentioned schedule. The concentrate and fodder were offered 20% higher than their nutritional requirement to make the whole feeding system as *ad-libitum*. The experiment lasted for 66 days. Deworming and

vaccination against enterotoxaemia and pleuropneu-monia was done to all the animals in the beginning of trial. Body weights were recorded in the beginning of the trial and then at the end of the experiment. The experiment was conducted at Livestock Production Research Institute, Bahadurnagar, Okara, Pakistan.

Table 2: Ingredients (%) and chemical composition of ration (on dry matter basis)

Ingredients	Concen-trate	Fodder
Broken corn grains	49.40	--
Rice polishing	40.50	--
Cane molasses	6.00	--
Urea	1.70	--
Maize gluten (20%)	1.45	--
Vitamin mineral premix	0.65	--
Common salt	0.30	--
Total	100.00	--
Chemical composition		
Dry matter (%)	87.90	20.27
Crude Protein (%)	14.85	18.82
ME (Mcal/kg)*	03.07	02.19

* Calculated values.

Economic analysis

Economic analysis of data was done using the technique of Perrin *et al.* (1979). In calculating economics, ingredient cost of diet of group A (75:25) was used as Rs.7.79/kg; that of diet of group B (50:50) as Rs. 8.75/kg; and that of diet of group C (25:75) as Rs. 9.22/kg.

Statistical analysis

Data on weight gain, feed intake, feed conversion ratio and carcass percentage were analyzed through analysis of variance technique by using completely randomized design, while Duncan's Multiple Range test was used to compare means (Steel *et al.*, 1997). Data were analyzed using computer software MSTAT-C.

RESULTS AND DISCUSSION

Production performance of lambs of groups A, B and C fed diets containing forage:concentrate ratio of 75:25, 50:50 and 25:75 respectively, is presented in Table 3. The quantity of concentrate and green fodder were offered on dry matter basis.

Dry matter intake

The feed intake (concentrate + berseem forage) of lambs of group C was higher (1938 ± 135g), followed by group A (1723 ± 156g) and group B (1628 ± 152g). Statistical differences in feed intake among lambs of three groups were found to be significant (p<0.05). These results are similar to those found by Mahgoub *et*

al. (2000) in Omani sheep lambs fed high density energy diets. Bowman and Asplund (1988) observed increased feed intake and performance in sheep with the addition of a legume to a grass diet. Similarly, forage intake was high as the portion of legume (concentrate) in the diet was increased (Orr and Treacher, 1989).

Weight gain

Average daily weight gains were 105 ± 12, 144 ± 09 and 168 ± 14g for groups A, B and C, respectively. Highest (p<0.05) weight gain was observed in group C and lowest in group A. Average daily weight gain of group B was also statistically different (P<0.05) from group A and group C. These results are in line with the experimental findings of Gabrovska and Ganovski (1986), who reported that when two groups of female lambs were fed roughages and concentrates with different combinations (25:75 and 75:25) from the age of two weeks to one year, maximum weight gain was observed in group fed 75% concentrate.

These findings are further supported by Mahgoub *et al.* (2000), who studied the effects of dietary energy density on feed intake, body weight gain and carcass chemical composition of Omani growing lambs and observed higher body weight gains and better carcass composition by increasing energy levels in the diet. Schiere *et al.* (2000) found higher growth rate in group fed energy rich high concentrate diet than grazing alone and supplementation of grazing by concentrate feeding was more economical than the intensive fattening. In the present study, the cost of one kg body weight gain was Rs. 74, 61 and 55 for the respective feeding regimens.

Dressing percentage

The carcass dressing percentage was 46.80 ± 1.5 for the group A, 46.93 ± 1.4 for B and 48.88 ± 1.5 for C (Table 4). The carcass percentage was significantly (p<0.05) higher for group C compared to groups A and group B, whereas difference between the latter two groups was non significant. Differences in percent of crude protein, fats and total ash contents of meat were non significant among all groups (Table 4).

Bellof *et al.* (2003) reported that crude protein in meat increased gradually from group A (17.18%) to group C (18.65%) by increasing feed intensity. The fat percentage also had similar increasing trend but these changes were non significant. Mahgoub *et al.* (2000) studied the effects of dietary energy density on feed intake, body weight gain and carcass chemical composition of Omani growing lambs and found that meat production from sheep in Oman was improved in the form of higher body weight gains and better carcass composition by increasing energy levels in the diet. However, carcass characteristics, generally, were similar among treatments.

Table 3: Growth performance and economics of lambs raised on different fodder to concentrate ratio feeding

Parameters	Treatments (Forage:concentrate ratio)		
	A (75:25)	**B (50:50)**	**C (25:75)**
Daily weight gain (g)	105 ± 12^c	144 ± 09^b	168 ± 14^a
Daily concentrate (DM) intake (g)	316 ± 75	634 ± 55	950 ± 44
Daily fodder (DM) intake (g)	1407 ± 110	994 ± 105	988 ± 122
Total DM intake (g)	1723 ± 156^b	1628 ± 152^c	1938 ± 135^a
Feed conversion ratio	16.41^a	11.30^b	11.53^b
Economics			
Cost of feed + fodder/day (Rs.)*	7.79	8.75	9.22
Feed cost/kg weight gain (Rs.)	74.00	61.00	55.00

[a,b] Values in the same row with different superscripts differ (p<0.05).
 *Ingredient cost per kg concentrate ration was Rs. 7.0, while that of per kg chopped green fodder was Rs. 0.75.

Table 4: Carcass percentage and meat composition of experimental animals

Parameters	Treatments (Forage:concentrate ratio)		
	A (75:25)	**B (50:50)**	**C (25:75)**
Dressing percentage	46.80 ± 1.5^b	46.93 ± 1.4^b	48.88 ± 1.5^a
Carcass composition (%)			
Crude Protein	17.18	18.49	18.65
Crude fat	6.75	7.73	7.46
Total ash	5.23	5.91	5.63

Values in rows with different superscripts differ significantly (p<0.05).

Conclusion

Results of the present study indicated that forage to concentrate ratio of 25:75 on dry matter basis is most appropriate for economical mutton production in Lohi lambs.

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