EFFECT OF EARLY WEANING DIETS CONTAINING DIFFERENT PROTEIN SOURCES ON THE PERFORMANCE OF INTENSIFIED AFGHANI LAMBS

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Summary

A study was undertaken to investigate the effect of feeding early weaning diets based on different vegetable protein sources fed to Afghani lambs. Three isonitrogenous and isocaloric complete formula diets viz., A, B and C were prepared having cottonseed meal, soybean meal and canola meal; respectively as major source of protein. Eighteen 30-35 days old Afghani male lambs were randomly allotted to three experimental diets. Lambs were fed individually twice a day for a period of 60 days. Daily feed intake and weekly weight gain was recorded. Results indicated that weight gain was significantly ($p < 0.05$) higher (282 g/lamb/day) in lambs fed diet B as compared to lambs fed on diets A (231 g/lamb/day) and C (242 g/lamb/day). No significant difference was found in feed intake among the diets. Significant difference ($p < 0.05$) were noticed in feed efficiency in lambs fed on diets A (6.88), B (5.41) and C (6.17). The economic efficiency was observed to be the best on diet B as compared to diets A and C. It was concluded that Afghani lambs (30-35 days) can be reared on early weaning diets and soybean meal was found comparatively better protein source for early weaning diet.

(**Key Words** : Afghani Lamb, Early Weaning Diets, Weight Gain)

Introduction

Pakistan is an important sheep producing country and ranks 11th in sheep population in the world (Alvi, 1991) by having 26.67 million sheep (GOP, 1992). Sheep contributed 38% in the mutton production i.e., 0.280 million tonnes. The average carcass yield of sheep was estimated at 10 to 12 kg which is about half of the other sheep producing countries (Ahmad and Cheema, 1982), partly because majority of sheep flocks are handled by the scavengers on conventional rearing system. The raising of animals specially for slaughter is still not practiced, and systematic meat production is largely ignored resulting low per unit productivity.

For the last 10-15 years, Afghani breed of sheep gained importance as mutton breed in North West Frontier Province and Pothwar area of Punjab (Hasnain, 1985). Afghani breed has come with the refugees as it is known that nomadism existed for a long time across the borders between Pakistan and Afghanistan. Now they have become transhumance as tribes can not cross the borders any more and are limited to a narrower range of travel. Scanty informations are available on the growth pattern and feed requirements of Afghani breed. It was noted that Afghani lambs exhibited 168-183 g weight gain (LPRI 7th Annual Report, 1987-88) and 200-220 g daily weight gain of early weaned lambs on fattening ration and achieved adult body weight more than 80 kg (Khan, A. G. Personal Communications) as deduced from the field observation so far carried on Afghani lambs. So, it has become necessary to explore possibilities to achieve maximum sheep production under intensified management and feeding on various vegetable protein sources i.e., soybean, cottonseed and canola meal. The present study is therefore, planned to investigate the biological and economic evaluation of early weaning diets based on different protein sources fed to early weaned Afghani lambs under intensified rearing.

Materials and Methods

A growth performance experiment on eighteen Afghani early weaned male lambs of about 30-35 days old with an average body weight of 13.5-14.5 kg was conducted for 60 days. Three isonitrogenous and isocaloric complete formula early weaning diets viz., A, B

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and C having different vegetable protein sources i.e., cottonseed meal, soybean meal and canola meal; respectively were prepared (table 1).

In all the experimental diets 20% ground wheat straw was used to obtain desirable level of fibre. Before starting the experiment all the animals were weighed and dewormed against internal parasites by administering recommended doses of nilverm and were provided with dips of neguvon for external parasites. Animals were randomly allotted to three experimental diets and were fed individually on ad-libitum basis twice a day at 08:00 and 14:00 hours to minimize sorting and wastage. Daily feed refusal was recorded prior to 08:00 hours. Fresh and clean water was made available round the clock.

Records of daily feed intake and weekly weight gain of lambs were maintained. Feed samples were analyzed for proximate chemical composition (AOAC, 1984). Data was statistically analyzed by using analysis of variance for a completely randomized design and Duncan's Multiple Range Test (Steel and Torrie, 1980) used to compare the treatment means.

TABLE 1. INGREDIENTS AND CHEMICAL COMPOSITION OF EARLY WEANING DIETS FOR LAMBS

Item	Diet		
	A	B	C
	..... (%DM)		
Ingredient (%)			
Wheat straw (ground)	20.0	20.0	20.0
Cottonseed meal	37.0	–	–
Soybean meal	–	32.0	–
Canola meal	–	–	33.0
Wheat grain (broken)	28.0	33.0	32.0
Molasses (cane)	12.5	12.5	12.5
Dical. Phosphate	1.5	1.5	1.5
Premix (Mineral and vitamin)	0.5	0.5	0.5
Salt (Sodium Chloride)	0.5	0.5	0.5
Chemical composition (%)			
Crude protein*	19.2	19.2	19.5
Crude fibre*	12.4	11.4	12.5
Total digestible nutrients**	71.3	72.5	71.5

* Analyzed value.
** Calculated value.

Results and Discussion

Weight gain

Results of the growth performance trial such as weight gain, feed intake and feed efficiency are depicted in table 2.

The average initial body weight of lambs was 14.5 kg, 13.75 kg and 13.5 kg on diets A, B and C; respectively with no initial significant difference. Final body weight of the lambs kept on diet B (30.67 kg) having soybean meal as protein source was significantly ($p < 0.05$) higher than the final body weight of lambs offered diets A (28.36 kg) and C (28.02 kg). Maximum average daily weight gain 282 g/lamb/day was observed in lambs fed on diet B compared to the lambs fed on diets C (242 g/lamb/day) and A (231 g/lamb/day). The weight gain achieved during the experimental period was approximately 140-150% higher than the weight gain obtained by the conventionally weaned Afghani lambs under routine farming system at the age of 4 months. (Khan A. G. Personal Communication). Results of this experiment are in agreement with Anderson et al. (1987) and Matras et al. (1990) who reported that the weight gain of the early weaned animals fed on concentrate was significantly higher than the conventionally weaned lambs and calves.

TABLE 2. PERFORMANCE OF LAMBS FED ON EARLY WEANING DIETS

Parameter	Diet		
	A	B	C
Experimental period (day)	60	60	60
No. of lambs	6	6	6
Initial weight (kg)	14.50	13.75	13.50
Final weight (kg)	28.36	30.67	28.02
Av. weight gain (g/day)	231^{b}	282^{a}	242^{b}
Av. daily feed intake (g)	1,590	1,527	1,495
Feed efficiency	6.88^{a}	5.41^{c}	6.17^{b}

Mean value with different superscripts in the same row differ significantly ($p < 0.05$).

Dry matter intake and feed efficiency

Daily dry matter intake was gradually increased during the experimental period and the average daily intake of lambs was observed to be 1,590 g, 1,527 g and 1,495 g on diets A, B and C; respectively (table 2). No significant difference was found in feed intake of lambs among the treatments.

The feed efficiency of the lambs fed on early weaning diets viz., A, B and C was calculated to be 6.88, 5.41 and 6.17; respectively. These were found to be significantly different from each other ($p < 0.05$). Better feed efficiency was observed for diet containing soybean meal. These results differed from those reported by Zinn et al.

(1981), found that cottonseed meal and canola meal have higher rumen undegradable protein necessary for early weaned lambs gave better results as compared to the soybean meal. Results presented in this study were supported by the findings of Matras et al. (1990) who reported that nitrogen and dry matter digestibility of soybean meal was two or three percentage units higher than canola meal in the growing lambs. Zinn and Depeters (1991) also reported that dry matter digestibility and digestible energy of soybean meal was approximately ten percentage unit higher than the canola meal in early weaned lambs and performance of the lambs was also better when fed on diet containing soybean meal. Better production performance of lambs fed on diet having soybean meal can be contributed towards the better profile of amino acids in soybean meal.

Data on the economic comparison of different early weaning diets fed to the early weaned lambs was shown in table 3.

Better feed efficiency was found when the lambs were fed diet containing soybean meal as the protein source. The feed cost per day per lamb was approximately equal for the three diets whereas the economic efficiency (cost of feed per kg weight gain) was significantly different from each other. The diet based on soybean meal was the most economical as compared to the other two diets with different sources of protein.

TABLE 3. ECONOMIC COMPARISON OF DIFFERENT EARLY WEANING DIETS

Parameter	Diet		
	A	B	C
Cost (Rs.) of 1kg Feed (DM)	3.89	3.97	3.87
Feed efficiency	6.88[a]	5.41[c]	6.17[b]
Feed cost/day (Rs)	5.57	5.35	5.23
Economic efficiency	24.11[a]	18.97[c]	21.61[b]

Mean value with different superscripts in the same row differ significantly ($p < 0.05$).

Lambs health was noticed to be generally good and no mortality was recorded in the present study which conflicts with the high mortality rate observed in individually reared early weaned lambs (Pond et al., 1982). Results, however, coincided with the findings of Lane et al. (1986) who had raised lambs weaned at 14 days and found no health problems during the first 3 months concluded that with proper management lambs can be weaned successfully at a very early age.

In the light of the results of the present study it may be inferred that the weight gain of lambs achieved by feeding the early weaning diets was approximately 2 to 3 times higher than the weight gain obtained under farmers lambs rearing practices which suggested that by feeding early weaning diets, higher weight gain can be obtained. Furthermore, results indicated that early weaning diet containing soybean meal is comparatively better protein source as compared to the other diets having cottonseed meal and canola meal.

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