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FEEDLOT PERFORMANCE OF WEANER LAMBS ON CONVENTIONAL AND NON CONVENTIONAL TOTAL MIXED RATION

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Abstract: Eighteen weaned Patanwadi and Merino× Patanwadi lambs of about 200 days of age (13.83 to 14.43 kg) were randomly divided into three dietary treatments on body weight basis viz. T1: TMR I- Conventional group; T2: TMR II- Supplemented non conventional group-I and T3: TMR III- Supplemented non conventional group-II. Average final body weight at the end of experiment was 27.42±1.29, 23.33±0.70 and 19.98±0.94 kg in TMR-I, TMR-II and TMR-III, respectively. The body weight gain and body measurements were significantly (P<0.05) influenced by the treatments. The Dry Matter (DM) intake (kg/head) during the entire experimental period was recorded 104.38±5.27, 94.71±1.72 and 83.76±5.48 in TMR-I, TMR-II and TMR-III, respectively which differed (P<0.05) significantly. The digestible crude protein (DCP) and total digestible nutrient (TDN) intake/head under TMR-I, TMR-II and TMR-III groups did not differed from each other. The estimated total feed cost (Rs./animal) for experimental lambs was lower (P<0.05) in TMR-III (637.56±24.66) followed by TMR-II (673.60±7.00) and TMR-I (980.62 ±59.75). The return as percent of feed cost and feed cost (Rs. /kg dressed weight) were 125.02±6.98 and 58.27±4.41, 147.32±3.40 and 43.52±1.15 and 130.50±4.75 and 50.87±2.54 in TMR-I, TMR-II and TMR-III, respectively which reflects that significantly (P<0.05) lower total feed cost incurred in non conventional groups. Lambs fed with non conventional based TMR had similar live weights as those fed conventional TMR but economical to achieve those weights.

Keywords: Azolla, P.J. Pods, Corn steep liquor, Weaner lambs.

Introduction

The quantity and quality of rangeland vegetation available for sheep and goats are highly variable depending on its state and season. About 80-90% of the Indian national rangeland could be same as “poor” to “very poor”. It is paradoxical that on one side there is huge shortage of feed resources and on the other, India is endowed with an abundant variety of agro-industrial by products and nonconventional feed resources which are not effectively utilized to the extent they can be. Azolla is tiny plant, has nitrogen fixing property and blue green algae grow on it as symbiont. It’s worth as the cheapest source of green manure for paddy fields and as a maintenance feed for sheep and in growth ration for kids (Tamang and

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Samanta, 1993). Prosopis Juliflora Pods are available to the tune of 4.00 million tons in Gujarat and 12.00 million tons in India whereas availability of Corn steep liquor annually to the extent of over 4.0 thousand tons in Gujarat and 10.0 thousand tons in India (Talpada *et al.,* 1987). There is a need for designing and developing economic stall feeding system for sheep by way of using the available non conventional feeds to the maximum possible extent without affecting health status and production of the animals. The experiment was initiated to study the feasibility of using Azolla, Prosopis Juliflora Pods and Corn Steep Liquor in the ration of weaner lambs.

Materials and Methods

Present study was conducted at Instructional Farm of Veterinary College, Anand Agricultural University, Anand. Eighteen weaned Patanwadi and Merino× Patanwadi lambs of about 200 days of age (13.83 to 14.43 kg) were randomly divided into three dietary treatments on body weight basis viz. T1: TMR I-Conventional group (Maize- 20%, Ground nut cake- 20%, Rice polish- 12%, molasses- 10%, mineral mixture- 3% and urea treated wheat straw 35 %), T2 : TMR-II supplemented non conventional group I (Azolla-10%, P J Pods -25 %, Corn steep liquor -7 %, G N Cake-10 %, molasses- 10%, mineral mixture- 3% and urea treated wheat straw- 35 %) and T3: TMR-III supplemented non conventional group II (Azolla-20%, P J Pods -14 %, Corn steep liquor -15 %, molasses- 10%, vegetable oil – 3%, mineral mixture- 3% and urea treated wheat straw- 35 %. The animals were fed in individual cement concrete manger on either conventional or non-conventional total mixed rations. All animals were dewormed with suitable drug before starting the experiment. Water was offered to animals twice a day in plastic bowl and required quota of total mixed ration was offered at 9.00 am and 15.00 pm for 112 days. At the final stage of the feeding experiment, 4 lambs from each treatment were shifted to metabolic cages. An adaptation period of 7 days in cage was followed by 7 days of collection period during which quantity of feed offered, feed residue, total faeces voided and total urine output of animals were recorded over 24 h. Then samples of feed offered, residue, faeces and urine were preserved. The chemical analysis of the collected samples was carried out using AOAC (1995) methods. At the end of growth trial two lambs from each treatment group were fasted for 24 hours and then slaughtered by traditional ‘Halal method’. The organs, head, cannon, empty GI tract and primal cuts were weighed on sensitive dial type balance with a capacity of 2 kg where as pelt free carcass, hot carcass, skin and GI tract filled with ingesta were weighed on pan balance. The realizable receipts were computed based on the information from retailers in the local market. The

mutton and liver were sold on weight basis but the skin, head, cannon, empty rumen and the intestine were sold on fixed price irrespective of weight. The data were analyzed following two factorial completely randomized designs (Snedecor and Cochran, 1994).

Results and Discussion

Growth performance

The data on average body weight, body weight gain and body measurements of experimental lambs are depicted in Table 1. The average final body weight at the end of the experiment was recorded 27.42 ± 1.29, 23.33 ± 0.70 and 19.98 ± 0.94 kg in TMR-I, TMR-II and TMR-III, respectively. The treatment groups differed from each other ($P<0.05$). The average body weight at 9 months in the semi intensive system for breeds were reported to be 18.06 kg (Patanwari) and 17.35kg (Merino x Patanwadi) by Vataliya (1994). These values are lower than the present findings. The average daily gain of lambs in present experiment in TMR-I, TMR-II and TMR-III was found to be 119.40 ± 5.40, 79.46±3.50 and 54.86±3.34 g. There were significant ($P<0.05$) differences among the treatment groups with regards to the daily weight gain indicated that incorporation of Azolla at 10 % level and more in the weaner ration reduces the growth rate. These values were about 4 times on TMR-I and 2.5 times on TMR-II, higher as compared to that observed by Vataliya (1994). This indicates superiority of total mixed ration over semi-intensive system. Thus the findings of this study make a strong case for feeding of total mixed ration.

The overall trend of increase in heart girth was similar while increase in height at withers under TMR-I (7.83±0.83) group were recorded significantly higher ($P<0.05$) than TMR-II (5.72±0.43) and TMR III (5.08±0.46) which did not differ among themselves but increase in body length (cm) under TMR-I (12.70±0.87) and TMR-III (8.46±0.78) was superior ($P<0.05$) compared to TMR III (5.72±0.28). These results agree with the observations of earlier workers (Saiyed, 1994; Patel, 1995 and Savsani, 1998) showing more or less same heart girth, height at withers and body length for animals of same breed and similar age which were reared either on conventional or non-conventional feedlot rations.

Feed intake and feed efficiency

The dry matter intake (kg/100kg body weight) of experimental lambs (Table 2) was recorded to be 2.58 ± 0.40, 3.93 ± 0.18 and 3.64 ± 0.20 for TMRI, TMR-II and TMR-III, respectively. The ration effect was found to be significant ($P<0.05$) but ration showed non significant effect on dry matter intake when expressed in terms of g/d, kg/day and g/kg $w^{0.75}$. The present finding on DM intake was higher than those reported for lambs (Ravikala, 1992) and on non

conventional concentrate mixture (Saiyed *et. al.,* 2003). The values on DM intake indicated that the incorporation of Azolla, P J Pods and Corn steep liquor has no adverse effect on voluntary feed intake of experimental lambs. The DCP intake in terms of g/ head/day and kg /kg gain observed during current experiment under TMRI, TMR-II and TMR-III group did not differ from each other. However, DM and TDN intake per kg gain was higher in non conventional group ($P<0.05$). In this study the DM, DCP and TDN intake in TMRI, TMR-II and TMR-III, were higher than ICAR (1985) recommendation indicating that non conventional based total mixed ration provide nutrients for growth as efficiently as the conventional ration.

Carcass traits

The average values of dressing percentage in lambs on live and empty live weight basis were 46.51± 1.25 and 58.64±2.50, 42.86± 1.66 and 56.33±0.05 and 43.70± 0.64 and 54.74± 1.92 in TMRI, TMR-II and TMR-III groups, respectively. The TMR-III group (5.35±0.25) had lower hot carcass weight (kg) as compared to TMR-I (10.05±0.45) and TMR-II (8.45±0.50). The dressed weight and dressing percentage on live weight and empty body weight recoded in the present study was higher than reported by Saiyed *et al.* (2003) but comparable with the findings of Patel *et al.* (1995). The results imply that incorporation of more than two non conventional ingredients in the formulation in the weaner ration had no any adverse effects on carcass traits.

Economics of feeding

The total feed cost (Rs./animal) for experimental lambs (Table 3) was worked out as 740.62 ± 59.75, 433.60 ± 7.00 and 433.56 ± 24.66 in TMR-I, TMR-II and TMR-III, respectively. The non conventional groups (41%) recorded significantly ($P<0.05$) lower feed cost than conventional TMR-I, on account of the use of cheaper ingredients in formulation of non conventional TMR. The return as per cent of feed cost was higher in TMR-II (147.32 ± 3.40) followed by TMR-III (1130.50 ± 4.75) and TMR-I (125.02 ± 6.98). The difference was statistically significant ($P<0.05$). This trend was due to difference in feed cost (Rs./ animal) which is highest in TMR II. The present findings are more or less comparable with Savsani (1998). Similarly, the feed cost per kg dressed weight was significantly lower in TMR-II (43.52 ± 1.15) followed by TMR-III (50.87 ± 2.54) and TMR-I (58.27 ± 4.41). The TMR-II recorded significantly ($P<0.05$) lower contribution than either TMR-I or TMR-III groups. In other studies the feed cost was found significantly lower when non conventional feeds were

used (Prasad *et al.,* 1988; Reddy, 1987; Ravikala, 1992, Patel *et al.,* 1995 and Saiyed *et al.,* 2003).

Conclusion

The inclusion of *prosopis juliflora* pods and *Azolla* as non-conventional feeds had 2.5 times higher weight gain as compared to reported values on rearing lambs of Patanwadi and Merino × Patanwadi lambs under semi intensive system of management. At the same time the feed cost was lower when expressed in terms of Rs./kg gain during the entire experiment with 22 % more return over feed cost as compared to conventional feeding.

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Table 1: Body weight, body weight gain and body measurement of weaner lambs under feedlot system

Particular	**TMR-I**	**TMR-II**	**TMR-III**
Body weight (kg)			
Initial	14.04±0.60	14.43±0.58	13.83±0.82
Final	27.42^{c}±1.29	23.33^{b}±0.70	19.98^{a}±0.94
Gain (g/d)	119.40^{c}±5.40	79.46^{b}±3.50	54.86^{a}±3.34
Body measurements (cm)			
Initial			
HW	51.44±1.02	50.80±1.47	51.44±0.64
HG	59.27±1.12	59.69±1.27	59.06±1.46
BL	49.11±0.85	49.53±1.14	49.53±1.39
Final			
HW	59.22±0.71	56.52±1.82	56.52±0.28
HG	76.41±1.92	74.08±1.76	69.85±1.94
BL	61.80^{b}±1.02	58.00^{a}±1.26	55.24^{a}±1.22
Gain (cm)			
HW	7.83±0.83	5.72±0.43	5.08±0.46
HG	17.14±1.70	14.39±2.26	10.80±1.01
BL	12.70^{c}±0.87	8.46^{b}±0.78	5.72^{a}±0.28

Means with different superscripts (a, b and c) in row differed significantly (P<0.05)

Table 2: Feed and water intake and feed efficiency of weaner lambs

Particular	TMR-I	TMR-II	TMR-III
Dry matter intake			
kg/h	104.38±5.27	94.71±1.72	83.76±5.48
g/d	931.94[a]±47.07	842.69[b]±38.64	747.93[a]±48.96
kg/100 kg b.wt	4.49±0.14	4.53±0.08	4.51±0.10
g/kg W 0.75	95.56±2.38	94.06±1.60	90.88±2.32
Nutritive intake (g/h/d)			
CP	129.26±6.52	114.94±5.27	99.48±4.12
DCP	112.62±5.66	82.24±3.77	69.26±2.88
TDN	603.33±30.47	475.78±21.81	405.72±26.50
Water intake			
ml/d	2.43±0.11	2.20±0.10	2.16±0.06
l/100 kg B.wt	11.96±0.81	12.09±0.78	13.22±0.70
g/kg W 0.75	253.62±14.00	250.46±14.27	264.76±11.96
l/kg DMI			
Intake (kg/kg gain)			
DM	8.04a±0.10	10.62b±0.58	14.01c±0.94
DCP	0.97±0.12	1.06±0.06	1.30±0.09
TDN	5.20a±0.64	6.11ab±0.33	7.60b±0.51

Means with different superscripts (a and b) in row differed significantly (P<0.05)

Table 3: Feed cost of weaner lambs

Particular	Total feed cost (Rs/animal)	Realizable Receipts (Rs./animal)				Return over feed cost (%)	Feed cost/kg live wt. gain(Rs.)	Feed cost/kg dressed wt.(Rs.)
		Mutton	Liver	other	Total			
TMRI	980.62[b] ±59.75	1019.86[c]±48.16	30.22±1.42	160	1210.09[c]±49.58	125.02[a]±6.98	56.98[ab]±6.60	58.27[b]±4.41
TMR II	673.60[a]±7.00	799.86[b]±24.04	32.50±0.94	160	992.37[b]±24.99	147.32[b]±3.40	49.51[a]±2.68	43.52[a]±1.15
TMR III	637.56[a]±24.66	684.80[a]±32.16	31.80±1.49	160	876.60[a]±33.66	130.50[a]±4.75	72.18[b]±5.27	50.87[ab]±2.54

Means with different superscripts (a and b) in column differed significantly (P<0.05)