



Effect of concentrate and urea molasses mineral block supplementation on the growth performance of Mecheri lambs

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Decreasing grazing lands and low productivity of animals, coupled with irregular pattern of rainfall are the important factors affecting the profit of sheep rearing. Chronic shortage of feed and fodder and their poor nutritive value could be tackled to some extent by way of supplementation with concentrate feed and any other feed supplements. Use of NPN substances like urea was tried to replace the costly source of proteins in ruminant diet. Urea molasses mineral block (UMMB) is made by combining urea, molasses and minerals in a form that can be used for feeding of animals and it has been used successfully in cattle (Singh *et al.* 2010). In some countries, UMMB have been tried for small ruminants also (Forsberg *et al.* 2002). In India studies on supplementation of UMMB for small ruminants UMMB are limited. Hence, the present study was conducted to find out the effect of concentrate and UMMB supplementation on the growth and carcass characteristics of Mecheri lambs for mutton production.

A growth trial was conducted with 40 Mecheri ram lambs. The animals were divided into 5 groups of 8 animals each, distributing them according to their body weight. Animals were in the age group of 2 to 4 months, weaned, and average body weight was 9.8 kg. The ram lambs born in main lambing season (i.e. December to February) were selected and the treatment groups were — T₁ - Grazing alone, T₂ - grazing with concentrate supplementation, T₃ - grazing with UMMB supplementation, T₄ - intensive rearing with concentrate supplementation,

T₅ - intensive rearing with UMMB supplementation.

The groups T₁, T₂ and T₃ were sent for grazing. T₄ and T₅

groups were kept under stall feeding. Stall fed animals were offered CO-3 grass (*bajra* × Napier Hybrid variety), subabul (*Leucana leucocephala*), horse gram (*Macrotyloma uniflorum*) husk, and sorghum (*Sorghum bicolor*) stover at different times of the day. The requirements were calculated based on the body weight of the animals, recorded once in 15 days. Animals were provided with individual feeders so that the left over could be measured. Weighment of animals was done fortnightly before feeding. Concentrate feed was offered to the animals according to their body weight. The allowance was increased based on the body weight and age of the animals. UMMB of 3 kg size were purchased from Karnataka Milk Federation (KMF), Bengaluru and were offered to the animals on a plastic container. UMMB was made by cold process and the composition of UMMB was, molasses - 45%, urea - 3%, bran - 13.25%, rice polish - 14%, calcite - 6%, calcium oxide - 4%, magnesium oxide - 4%, diammonium phosphate - 10% and trace minerals - 0.75%. The data recorded were analysed statistically as per Snedecor and Cochran (1996).

Body weight: The means (±SE) of body weight of main season Mecheri ram lambs are presented in Table 1. Results revealed that there was no significant difference in body weight of Mecheri lambs maintained under different treatments up to 45 days of the experiment. But it differed significantly ($P < 0.01$) from 60 days till 150 days of the experiment. Body weight of Mecheri ram lambs increased as a result of supplementation. At the end of experiment, body weight was significantly more in concentrate feed supplemented group (T₂) than animals of unsupplemented group (T₁) and it concurs with the findings of Petit and Castonguay (1994). UMMB supplementation also resulted in increase in body weight of T₃ group compared to unsupplemented (T₁) group, and the findings are in agreement with, Forsberg *et al.* (2002) and (Singh *et al.* 2010). Urea molasses products/UMMB has been suggested a versatile supplement for sheep and goat by many (Golluscio *et al.*

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1998, Currier *et al.* 2004). Since there was no significant difference in the body weights between concentrate supplemented (T_2) and UMMB supplemented (T_3) groups during most of the periods of the experiment, it can be inferred that UMMB could be successfully used to replace the concentrate feed for sheep.

Generally, the body weights of grazing groups with supplementation (T_2 and T_3) were higher than the stall fed groups (T_4 and T_5). Similar findings were reported in many works (Karim and Verma 2001) though some other works reported the *vice-versa*. This mainly depends upon the available grazing resources in the area, season or rainfall, adaptability of the animals to stall feeding and type of diet offered. Those who reported higher body weight in intensive system in our country have used composite or complete diet of concentrate and roughages (Karim *et al.* 2004). But in this experiment, conventional green and dry fodders were used.

The reduced weight gain/loss of weight in stall fed groups up to 60 days of experiment was mainly because of flea problem and not due to treatment effect. Thereafter the groups started gaining weight and exceeded the control group (T_1) towards the end of the experiment. But they did not differ significantly except with concentrate supplemented (T_2) group. Since the main season lambs were reared in monsoon, pasture availability was good and growth was moderate, even without any supplementation. It has been reported that UMMB utilization was better when there was inadequate or deficient nutrition.

Average daily body weight gain: Means ($\pm$ SE) of average daily body weight gain of main season Mecheri ram lambs are presented in Table 2. There were significant differences between the ADG of groups from the period of 15–30 days of the trial, even though their body weights did not differ significantly up to 45 days. Significant differences were observed in the ADG of different groups at all stages of the

Table 1. Mean ($\pm$ SE) of body weight (kg) of main season Mecheri ram lambs

Period	Grazing only (T_1)	Grazing with concentrate (T_2)	Grazing with UMMB (T_3)	Stall fed with concentrate (T_4)	Stall fed with UMMB (T_5)
Initial weight ^{NS}	9.85 $\pm$ 0.61	9.83 $\pm$ 0.63	9.88 $\pm$ 0.68	9.83 $\pm$ 0.77	9.80 $\pm$ 0.57
15 days ^{NS}	10.18 $\pm$ 0.69	10.15 $\pm$ 0.74	10.17 $\pm$ 0.98	10.33 $\pm$ 0.78	10.10 $\pm$ 0.70
30 days ^{NS}	10.88 $\pm$ 0.66	11.68 $\pm$ 0.84	11.20 $\pm$ 1.02	11.13 $\pm$ 0.83	10.45 $\pm$ 0.63
45 days ^{NS}	12.33 $\pm$ 0.66	13.40 $\pm$ 0.85	12.40 $\pm$ 1.02	11.93 $\pm$ 0.83	11.08 $\pm$ 0.66
60 days ^{**}	13.28 ^{ab} $\pm$ 0.75	15.13 ^{bc} $\pm$ 0.84	13.94 ^{ab} $\pm$ 1.05	12.15 ^{ab} $\pm$ 0.68	10.88 ^a $\pm$ 0.48
75 days ^{**}	14.35 ^{ab} $\pm$ 0.75	16.68 ^{bc} $\pm$ 0.82	15.46 ^{ab} $\pm$ 1.17	13.28 ^a $\pm$ 0.72	11.78 ^a $\pm$ 0.54
90 days ^{**}	15.13 ^{ab} $\pm$ 0.78	18.08 ^{bc} $\pm$ 0.80	16.83 ^{ab} $\pm$ 1.20	14.68 ^a $\pm$ 0.69	12.80 ^a $\pm$ 0.49
105 days ^{**}	15.95 ^{ab} $\pm$ 0.79	19.43 ^{bc} $\pm$ 0.82	18.17 ^b $\pm$ 1.25	15.95 ^{ab} $\pm$ 0.75	13.90 ^a $\pm$ 0.43
120 days ^{**}	16.60 ^{ab} $\pm$ 0.85	20.75 ^{bc} $\pm$ 0.77	19.40 ^b $\pm$ 1.18	17.30 ^{ab} $\pm$ 0.75	15.30 ^a $\pm$ 0.34
135 days ^{**}	17.40 ^a $\pm$ 0.87	22.15 ^{bc} $\pm$ 0.82	20.37 ^b $\pm$ 1.22	18.78 ^{ab} $\pm$ 0.73	16.98 ^a $\pm$ 0.35
150 days ^{**}	18.65 ^a $\pm$ 0.89	24.46 ^b $\pm$ 0.89	21.77 ^{ab} $\pm$ 1.16	20.70 ^a $\pm$ 0.78	18.85 ^a $\pm$ 0.38

Means bearing the same superscript within a row do not differ significantly. * Significant ($P < 0.05$). **, highly significant ($P < 0.01$).^{NS}, nonsignificant.

Table 2. Mean ($\pm$ SE) of average daily body weight gain (g) of main season Mecheri ram lambs

Period	Grazing only (T_1)	Grazing with concentrate (T_2)	Grazing with UMMB (T_3)	Stall fed with concentrate (T_4)	Stall fed with UMMB (T_5)
0–15 days ^{NS}	21.67 $\pm$ 15.52	21.67 $\pm$ 27.01	28.57 $\pm$ 17.80	33.33 $\pm$ 12.60	20.00 $\pm$ 14.91
15–30 days [*]	46.67 ^{ab} $\pm$ 13.57	101.67 ^c $\pm$ 15.72	68.57 ^{bc} $\pm$ 9.84	53.33 ^{ab} $\pm$ 16.33	23.33 ^a $\pm$ 17.77
30–45 days ^{**}	96.67 ^b $\pm$ 8.64	115.00 ^b $\pm$ 8.33	80.00 ^{ab} $\pm$ 10.89	53.33 ^a $\pm$ 14.47	41.67 ^a $\pm$ 9.57
45–60 days ^{**}	63.33 ^b $\pm$ 13.74	115.00 ^c $\pm$ 7.94	102.86 ^{bc} $\pm$ 9.96	15.00 ^a $\pm$ 12.46	–13.33 ^a $\pm$ 16.13
60–75 days ^{**}	71.67 ^{ab} $\pm$ 9.06	103.33 ^c $\pm$ 9.34	100.95 ^{bc} $\pm$ 8.16	75.00 ^{ab} $\pm$ 7.10	60.00 ^a $\pm$ 7.56
75–90 days ^{**}	51.67 ^a $\pm$ 5.88	93.33 ^b $\pm$ 7.13	91.43 ^b $\pm$ 7.93	93.33 ^b $\pm$ 6.17	68.33 ^{ab} $\pm$ 5.88
90–105 days [*]	55.00 ^a $\pm$ 6.39	90.00 ^b $\pm$ 5.49	89.52 ^b $\pm$ 10.37	85.00 ^b $\pm$ 7.94	73.33 ^{ab} $\pm$ 10.08
105–120 days ^{**}	43.33 ^a $\pm$ 5.49	88.33 ^b $\pm$ 9.06	81.90 ^b $\pm$ 11.79	90.00 ^b $\pm$ 4.88	93.33 ^b $\pm$ 4.36
120–135 days [*]	53.33 ^a $\pm$ 7.13	93.33 ^{bc} $\pm$ 15.94	64.76 ^{ab} $\pm$ 20.25	98.33 ^{bc} $\pm$ 11.80	111.67 ^c $\pm$ 10.67
135–150 days ^{**}	83.33 ^a $\pm$ 6.04	121.90 ^b $\pm$ 11.05	93.33 ^{ab} $\pm$ 13.65	128.33 ^b $\pm$ 10.06	125.00 ^b $\pm$ 7.10
0–150 days ^{**}	58.67 ^a $\pm$ 2.52	95.24 ^d $\pm$ 2.94	80.19 ^c $\pm$ 3.06	72.50 ^{bc} $\pm$ 3.61	60.33 ^{ab} $\pm$ 4.45

Means bearing the same superscript within a row do not differ significantly. * Significant ($P < 0.05$). ** highly significant ($P < 0.01$).^{NS} non-significant.

experiment. Many workers have reported an increase in the ADG of sheep as a result of supplementation with concentrate feed or any other suitable feed supplements. Petit and Castonguay (1994) also reported that duration required for fattening was less for supplemented groups.

In the stall fed groups, initial drop in the ADG for the first 2 months period was mainly because of ectoparasitism. Though the incidence was seen in all the 5 groups, stall fed animals were affected more compared to the grazing groups, which resulted in reduced ADG in these groups. But in sheep and goats, the phenomenon of compensatory weight gain has been reported (Atti and Ben Salem 2007) and this may be the reason for the comparatively higher ADG in stall fed groups towards the final month of the experiment.

The main season lambs were reared from April to September which was summer followed by south-west monsoon in the region. Corresponding to the pasture condition and availability of grazing the ADG differed between periods. It was lower in the initial months, increased during June and July in case of grazing groups. Then there was a decrease between 75 and 120 days i.e. in August, when monsoon rains decreased. In the final months i.e. by September, the ADG was maximum. These differences in ADG were because of the changing pasture condition and the same was reported by Ajoy Mandal *et al.* (2007).

In general, supplemented groups (T_2 , T_3 , T_4 and T_5) performed better than the unsupplemented (T_1) group towards the final months of the experiment. Increase in ADG was better in concentrate supplemented groups than UMMB supplemented groups. This is in accordance with the works conducted by Morales *et al.* (2000) and Debasis and Singh (2003). Overall ADG values of the groups indicated that supplementation significantly ($P < 0.01$) increased the ADG of main season lambs. Overall ADG was significantly higher in T_2 group (95.24 g) and T_3 group (80.19 g). T_4 group had the next higher value (72.50 g). There was no significant difference between T_1 (58.67 g) and T_5 (60.33 g) groups.

In this experiment, UMMB supplementation increased the ADG of animals on grazing. This indicates that UMMB could be used as a potential supplement by the farmers as it is easy for feeding (Morales *et al.* 2000). UMM blocks can be conveniently placed in animal shed just like a salt lick and animals can lick the block or bite small chunks over a period of time especially during evening and morning hours when the animals are idle and it does not require additional labour unlike concentrate feeding. Moreover, it provides a slow and sustained source of supplement to the animals. Slow intake or consumption also tunes the animals' digestive system for better utilization of the NPN.

SUMMARY

Present study was carried out to find out the effect of concentrate and urea molasses mineral block supplementation on growth performance of 40 weaned Mecheri ram lambs

under two systems of rearing, for 5 months. It was observed that supplementation significantly increased the body weight of grazing lambs and UMMB was found to be a versatile supplement for growing Mecheri sheep. Animals under grazing with supplementation had significantly higher ADG than animals under stall feeding.

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