Molasses blocks containing oil seed cake and or urea versus a concentrate supplement in a basal hay diet for feeding Sudan Desert lambs

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SUMMARY

Three groups of Sudan Desert lambs (10 lambs each) of 20.2 ± 0.7 kg liveweight were used in a 12-week feeding trial to compare the nutritive values of Molasses Urea Block (MUB), Molasses Urea Block with oil seed cakes (MUBcake) and a concentrate mixture when offered to supplement Sudan grass hay offered *ad. libitum.* The daily liveweight gain was found to be 61, 121 and 117 g for the groups fed on the three diets respectively. The intake of hay dry matter pre kg DM of supplement was found to be 3.6, 1.7 and 1.2 for the MUB, MUBcake and concentrates fed groups respectively. The slaughter and carcass analysis data revealed no significant differences between the MUBcake and concentrate fed groups. However, differences observed for the other groups were mainly due to variation in slaughter weight. It has been concluded that inclusion of 11.0% oil seed cakes in the MUB will substantially improve its feeding value to lambs.

INTRODUCTION

In the Sudan heavy losses in livestock are frequently reported during the long dry season due to severe shortages of feed - stuffs. The crisis has been further aggravated in recent years by drought and desertification. The use of crop residues and agro - industrial by - products which are available in abundance, in intensive livestock production system is very limited. This is partly due to their low nutritive value as in sorghum straw and cotton stalks, or due to difficulties in their use as in molasses.

Introduction of the molasses - urea - block (MUB) technique proved to be effective in enhancing the utilization of molasses` (Sansoucy, 1986). There are references to indicate that MUB is a suitable maintenance diet in times of feed scarcity (El Khidir et. al., 1989); and it may be possible to enhance the value of the MUBs as a production diet by addition of true protein source.

The work reported in this paper was initiated to examine the effect of adding oil cakes, as sources of true protein, on the nutritive value of MUB for young lambs compared with a conventional concentrate supplement.

MATERIALS AND METHODS

Livestock:

Forty Sudan Desert lambs (4 to 5 months old and 16 to 25 kg liveweight) were purchased from a local market in Khartoum province. Before commencement of the experiment the animals were ear taged, drenched with "Ivomec" against internal parasites and given prophylactic doses of Oxy tetracycline.

Diet treatments:

The experiment involved three diet treatments (table 1). These were Sudan grass hay offered *ad. lib.* (10% weigh back) and supplemented with either of one of the following supplements:

1- Molasses urea blocks (MUB),
2- Molasses urea - oil cakes blocks (MUBcake),
3- Sorghum based concentrate compound.

Diet supplement (1) and (2) is to compare the performance of the experimental sheep when NPN was the main source of nitrogen in the diet with performance when part of the NPN was replaced by a true protein nitrogen source.

Diet supplement (2) and (3) is to compare the performance of the experimental sheep when molasses was the main source of energy in the diet with performance when it was replaced by sorghum grains.

Experimentation:

The experimental animals were placed on a three - week adaptation period during which they were housed in one pen and offered diet treatment (MUB).

At the end of this period they were weighed and 30 lambs were selected and divided according to liveweight into three similar groups of ten animals each. The mean liveweight of each group was 20.2 kg ± SE 0.7.

Table 1: Ingredients of the experimental feeds.

Ingredients: g/ kg as fed	Diet treatments*		
	MUB	MUBcake	Concentrate
Molasses	510	510	
Sorghum grain			510
Urea	31	15	-
Peanut cake		55	55
Sesame cake	-	55	55
Peanut hulls	159	65	160
Wheat bran	210	210	210
Cement	80	80	-
Common salt	5	5	5
Mineral mixture **	5	5	5

** Sudan grass hay was offered ad. libitum to all treatments.*
*** The mineral mixture (VAPCO product, Jordan) contains per kg: 140 g CaPO4, 98 g MgSO4, 550 mg PbSO4, 1040 mg 1SO4, 10 mg CaCl2, 1380 mg MnSO4, 330 mg KI, 950 mg ZnSO4 and 2700 mg NaCl.*

The groups were allocated at random to the thr,-e **diet treatments. Animals in each group were housed and fed in one** pen. **A. imal pens were equipped with adequate feeding and watering facilities.**

Lambs on diet treatment (MUB) and (MUBcake) had free access to **a pre - determined weight of the block supplement. Those on diet treatment (concentrate) were offered a daily allowance of the concentrate compound regulated on weekly bases to maintain a DMI of the concentrate compound equal to that consumed** by the MUBcake group. Feeds offered and refused **were weighed and sampled weekly for subsequent chemical analysis.**

All animals were weighed at regular weekly intervals. In this study a comparative slaughter technique was adopted. Initially three lambs of a representative liveweight were slaughtered and four lambs from each group were slaughtered at the end of the experiment. Slaughtering and carcass analysis was carried out in accordance with the procedure described by Gaili (1979).

Statistical analysis:

Growth performance and carcass analysis data were examined for significance by analysis of variance according to the methods described by Snedecor and Cochran (1967).

RESUTLS

Table 2 shows the proximate analysis and nutritive values of the experimental diets. The low DOM content of the two molasses urea blocks is attributed to their high ash content. The DOMD in the MUB, MUBcake, concentrate and Sudan grass hay were 50.7, 54.9, 70.0 and 58.3 respectively.

Table 2: Proximate analysis and nutritive values of the experimental diets. (g1 kg DM)

Particular	MUB	MUBcake	Concentrate	Sudan grass hay
Crude protein	167	205	208	73
Ash	186	196	58	104
Crude fibre	96	80	98	420
Ether extract	16	30	54	20
NFE	535	489	582	383
DOM	507	549	700	583
DCP	111	140	151	39
ME (MJ/ kg DM)	7.7	8.3	10.6	8.8

The feedlot performance of the experimental groups is presented in table 3. The total DMI of the MUBcake fed lambs was 14% and 21% greater than that of the MUB and concentrate group respectively. Consistently substantial variations were observed among treatments in DMI of the two diet fractions (supplement/ roughage). The *ad. libitum* intake of molasses blocks per 100 kg liveweight was found 1474 g and 791 g for the MUBcake and MUB group respectively. The intake of the blocks by the former group was 86% higher than that of the latter. Whereas the *ad. libitum* kg intake of hay dry matter per kg dry matter supplement was found 3.6, 1.7 and 1.2 for the MUB, MUBcake and concentrate fed group respectively. Concurrently intake of DCP and ME by the MUB group was vividly lower than that observed for the other two treatments.

Table 3: Feedlot performance of the experimental lambs.

Group	MUB	MUBcake	Concentrate	SE
No. of animals	10	10	10	
Period, days	84	84	84	
Initial L.Wt., kg	20.2	20.4	20.1	2.1
Final L.Wt., kg	25.3 a	30.6 b	29.9 b	3.8
L.Wt. gain, g/ day	61 a	121 b	117 b	33
Supplement DMI, g/ day	189	370	362	
Roughage DMI, g/ day	678	617	451	
Total DMI, g/ day	867	987	813	
DCP intake, g/ day	47	76	72	
ME intake, WI day	7.4	8.5	7.8	

kg DMVIcg L.Wt. gain	**14.1**	**8.2**	**6.9**

N.B.
In this and the following table means in the same row having similar or no superscript are not significantly different (p > 0.05).

The MUBcake and concentrate fed groups reached significantly heavier live weights than the MUB treatment (table 3). That was found 20.9% and 18.1% greater for the former two groups respectively compared with the MUB group. The same trend was observed in liveweight gain for the three treatments. It is noteworthy that the efficiency of feed utilization was highest, moderate and lowest for the concentrate, MUBcake and MUB fed group respectively.

The carcass analysis data are presented in table 4. Warm carcass weight revealed significant difference among treatments. That was mainly due to variations in slaughter weights. Differences among treatments in gut fill percentage were consistent with the trend of roughage intake i.e. higher intake of roughage was coupled by greater percentage of gut fill. Carcass tissue analysis showed no significant differences among the dietary treatments

Table 4: Slaughter and carcass analysis of the experimental lambs.

	Control*	MUB	MUBcake	Concentrate	SE
No. of animals	3	4	4	3	-
Slaughter Wt., kg	20.3[a]	29.1[b]	30.1[c]	29.8	2.7
Warm carcass Wt., kg	7.7[a]	10.9[b]	12.2[bc]	12.9[c]	1.2
Dressing%	37.9	38.6	40.5	43.3	
Gut fill% L.Wt.	20.95	6[4.2]	22.9[b]	20.8	2.5
Muscle%	5.3a		59.7	60.0 b	1.8
Bone%	27.5	0.4[9]b	25.6	24.7	1.7
Sub. Cut. Fat%	7.97	25.9	7.3	7.6	1.2
Inter. Muse. Fat%	.5a	[4]b	[5.3]u	5.6[b]	0.8
Connective tissue%	2.4		2.2	2.2	0.5

** Lambs of this group were slaughtered at commencement of the experiment.*
NB.: Tissues are percentage of the carcass weight.

DISCUSSION

Results of this experiment have vividly indicated that the MUB and MUBcake induced a greater intake of roughage compared with the concentrate compound. Consistently Leng (1984), Kunju (1986) and Soetanto et. al. (1987) have reported that MUB supplementation would increase the apparent digestibility of straw due to an improved ammonia level in the rumen and eventually higher intake of the roughage. El Khidir and Thomsen (1982) elucidated the role of molasses and urea as prompt energy and nitrogen releasing sources respectively to the ruminal micro-organism and their subsequent impact to improve digestion of the structural carbohydrates. It may therefore be emphasized that MUB are of valuable use in the arid tropical regions where grasses and pasture are highly fibrous, lignified and of a low protein content (F.A.O., 1975) to support any level of livestock production (Khalifa and Prebicevid, 1966). The current study showed that feeding the lambs on MUB and Sudan grass hay sustained them at about maintenance whereas MUBcake supported a higher liveweight gain matching that of the concentrate fed group. Sudana and Leng (1986) reported similar results when feeding growing lambs on a combined supplement of MUB and cottonseed cake with straw. This finding underlined the importance of adding true protein source (oil cakes) to the MUB to support a level of gain particularly in young stock in arid and semi -arid conditions. It is noteworthy that the concentrate fed lambs showed an improved feed conversion efficiency compared with the other two experimental groups; however, the relatively cheaper feed ingredients used in the molasses blocks may not be overlooked. Furthermore the results found have eminently demonstrated that the molasses fraction in the MUBcake supported a similar lambs' performance compared with the sorghum grain in the concentrate mixture. This observation highlights the potential of molasses as grain substitute in livestock nutrition thus releasing more grain for human use.

The slaughter and carcass analysis data (table 4) revealed no significant difference between the two comparable groups fed on MUBcake and concentrate mixture. Consistently El Khidir et. al. (1983) have not observed in a previous study differences in carcass tissue percentages due to variation in the feeds offered. The observed variations for control and MUB group were mainly due to their low slaughter weights.

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