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CHANGES ARISING FROM DOCKING OF FAT-TAILED SHEEP IN FEEDLOT PERFORMANCE

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ABSTRACT

To study the effect of docking on feedlot performance of fat-tailed sheep eighteen ram lambs were randomly divided into two groups as they were born. One group served as the control while the other lambs were docked on the day of birth. The lambs were creep fed up to two months of age. Then they were weaned and kept in individual pens and given *ad libitum* the same creep ration for 154 days. At one week intervals weight of animals and the amount of feed consumed were recorded. At the end of the experiment four animals out of each group were randomly selected, and upon slaughtering; carcass weight, weight of tallow around internal organs and depth of fat over the 12th ribs were recorded.

The following means values were observed by docked and control groups, respectively; weight at two months of age, 19.7 ± 0.47 and 20.34 ± 0.08 kg; gain during individual, feeding, 36.18 ± 1.01 and 31.38 ± 2.19 kg($p > .05$); feed conversion during individual feeding, 6.97 ± 1.10 and 7.96 ± 1.11 kg ($p < .05$).

Total internal tallow as percentages of carcass weight were 6.06 ± 0.13 and 2.14 ± 0.97 for docked and control groups, respectively ($p < .05$). Caudal fat as percentages of carcass weight were 9.09 ± 1.40 and 25.26 ± 2.20 for docked and control groups, respectively ($p < .01$). Average depths of fat at the 12th ribs were 20 ± 1.40 and 13 ± 0.90 mm for docked and control groups, respectively ($p < .01$). There were some indications that relatively most of the fat in docked group was stored as subcutaneous fat and internal fat.

INTRODUCTION

Probably the fat-tailed sheep are more tolerant to feed shortages prevalent in most parts of Iran, than the European breeds. The hardiness of fat-tailed sheep in this area is mostly due to the storage of fat in their tails during lush season, which can be used up during the frequent long periods when plant growth is dormant or in drought years (6).

Russel, *et al* (5) reported that loss of weight of maternal tissue of free grazing hill ewes during pregnancy was 51% fat. The largest single contribution to loss of fat during this period was that of subcutaneous fat which was depleted by 86%. It is also reported that occurrence of ewe mortality in hill flocks was greatest during the month while fat reserves were least (1).

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Table 1: Comparison of Gain in Docked and Cotnrol Group.

Treatment	No. of Lambs	Birth Weight kg	Weight at two months of age kg.	Gain during 154 days individual feeding kg	Rate of gain (kg/day)
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
Docked	9	5.30 ± .34	19.70 ± .47	36.18 ± 1.01	0.233 ± .022
Control	7[2]	5.15 ± .48	20.34 ± .80	31.38 ± 2.19	0.203 ± .123

2. Two lambs died, one before entrance to individual feeding and one after;

Table 2. Average Feed Conversion at Four Weeks Intervals (during individual feeding)

Treatment	Four Week Internal 1	2	3	4	5	6[3]	Mean ± SE
Docked	3.63	5.25	5.50	7.49	8.93	11.00	6.97 ± 1.10[4]
Control	4.61	5.27	8.00	8.01	10.03	11.82	7.96 ± 1.11

3. Feed conversion during the last two weeks

4. $p < .05$

The metabolism of the fat tail of Syrian sheep was studied by measuring arteriovenous concentration differences (4). In fed animals the adipose tissue took up glucose and ketone bodies and released lactate and free fatty acids. After 48 to 144 hours of fasting uptake of glucose and ketone bodies continued and the free fatty acid release was increased.

While the storage of fat in the tail of fat-tailed sheep is important as a survival mechanism under certain conditions of nutritional stress, the value of this function in animals being fed for slaughtered has not been adequately examined. Comparing cost of protein and fat deposition shows that 2.11 times more energy is required for formation of 1 gram fat as compared to 1 gram protein (2). On the other hand recently, the demand for animal protein is increasing while the demand for animal fat is decreasing. Therefore, it would be desirable to reduce the amount of fat in the tail of fattening lambs of native breeds in an attempt to increase the relative protein content of body. If increasing the relative protein content of body is impossible it is probable that part of fat supposing to be accumulated in tail, being deposited as marbling and subcutaneous fat. No information is available in the literature on the effect of docking on feed efficiency. There is limited and contradictory information on increased internal or subcutaneous fat deposition following docking of the fat-tailed sheep. Joubert and Ueckermann (3) cited results of Epstein which show that all losses of fat that would normally be stored in the tail was compensated by the greater amount of fat tissue and muscle especially in the hind quarters of docked animals, however, this finding was not supported by Joubert and Ueckermann (3).

This preliminary study was undertaken to study the effect of docking on gain and feed efficiency of lambs, and to observe the effect upon fat distribution in the body.

MATERIALS AND METHODS

Eighteen ram lambs from the university flock were randomly divided into two groups as they were born. Animals in one group served as the control, whereas the other group docked on day of birth. Docking was performed by locally anesthetizing the tissues with novacain, cutting the tail with a knife, and burning it with a heated instrument. The animals were creep fed up to two moths of age. Then they were weaned and kept in individual pens and given the same creep ration *ad libitum* for 154 days. The percentage components of the ration were as follows: alfalfa hay 50%, cottonseed meal 15%, barley 30%, dried beet pulp with molasses 4%, and bonemeal 1%. The ration contained 60% Total Digestible Nutrients (TDN) and 12.6% Digestible Protein (DP) (calculated). The ingredients were ground to pass a sieve with an opening of 4.76 mm, before mixing. At one week intervals weights of animals and the amounts of feed consumed were recorded.

At the end of the experiment four animals out of each group were randomly selected, and the following data were recorded upon slaughtering; carcass weight, weight of tallow around internal organs and depth of fat at the region of the 12th ribs.

Table 3. Comparison of Fat Distribution on Docked and Control Groups.

Treatment	Depth of fat on 12th rib: mm	Tallow around heart (%)	Tallow around kidney (%)	Tallow around digestive tract (%)	Total tallow (%)	Caudal fat (%)	Total Separated fat (%)
	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
Docked	20±1.40	0.15±0.03	0.87±0.28	5.10±1.73	6.06±0.13[5]	9.09±1.40	16.15±0.56[6]
Control	13±0.90	0.08±0.00	0.34±0.10	0.45±0.23	2.14±0.97	25.26±2.20	27.40±2.40

5. $p < .05$
6. $p < .01$

RESULTS AND DISCUSSION

The results show in Table 1, indicate that the average gains during individual feeding were 36.18 ± 1.01 and 31.38 ± 2.19 kg for docked and control groups, respectively. The difference was not statistically significant (p >05). Feed conversion at 4-week intervals and as a whole for 154 days of experimental period are shown in Table 2. It shows that as the length of experiment increased, the efficiency of the animals decreased in both groups. Average feed conversion during the whole period was 6.97 ± 1.10 and 7.96 ± 1.11 kg for docked and control group, respectively (p <.05). Although the higher efficiency and a tendency toward higher rate of gain in the case of the docked group might be interpreted as a possibility of change in fat metabolism, no conclusion could be drawn from this data.

Table 3 represents tallow around internal organs, and caudal fat as percent of carcass weight. Total internal fat as percentages of carcass weight were 6.06 ± 0.13 and 2.14 ±0.97 for docked and control groups (p <.05). Caudal fat as percentages of carcass weights were 9.09 ± 1.40 and 25.26 ± 2.20 for docked and control groups, respectively, (p <.01). The data show that there was a tendency for docked group to have more tallow compared to the control group, but on the other hand the docked group had less caudal fat.

Total separated fat as percentages of carcass weight were 16.15 ± 0.56 and 27.40 ± 2.40 for the docked and control group, respectively (p <.01). On the other hand depth of fat at the 12th rib was more for docked as compared to control group (p <.01). Therefore there were some indications that a part of the fat in docked group was stored as subcutaneous fat and internal fat.

It might be also postulated that a part of the fat in the docked group might be stored as extra marbling as compared to control group but no data were obtained to support this suggestion.

This preliminary experiment shows that further experiments on docking fat-tailed sheep are warranted in view of the possibility of shortening the fattening period of lambs on feed and improving the efficiency of feed conversion.

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