



CARCASS CHARACTERISTICS OF MADRAS RED LAMBS FED WITH DIETS OF VARYING PROPORTIONS OF ROUGHAGE AND CONCENTRATE

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Abstract

Twenty four Madras red lambs were weaned at 60 days of age and divided in to high forage (HF), medium forage (MF), low forage (LF) and control groups and fed with complete ration containing roughage and concentrate in the ratios of 60:40, 50:50 and 40:60 respectively. The control group was reared by grazing with concentrate supplementation @100g per head. Carcass measurements were mainly dependent on the body weight at slaughter, rather than on energy levels and age.

It was concluded that low forage feeding in lambs had significant influence on the primal cuts, meat and bone percentage and yield of offals, blood, liver, lungs and gut percentages. Similarly a high forage diet had significant influence on the bone percentage

Key words: Carcass characteristics, Madras red lambs, roughage and concentrate

With limited availability of good pasture in most instances, the energy acquired from grazing is not enough for higher production levels. Intensive feeding based on locally available crop residues, leguminous fodder and other agro-industrial by-product is an alternative promising feeding system to rear sheep economically in view of dwindling grazing resources in India. Hence the present

study was taken to study the performance of Madras red lambs under feedlot system with complete ration having different roughage to concentrate ratios.

Materials and Methods

Twenty four Madras red ram lambs born during the main lambing season were taken for the study. The experiment was conducted for a period of 105 days. The lambs weaned at the age of two months were randomly allotted to four groups (high forage, medium forage, low forage and control group) of six animals each, based on body weight.

Sorghum Stover was used as the sole source for roughage. Forages obtained as a single lot were sun cured and hay was ground through a medium mesh screen in a grinder. Three complete rations were formulated by blending sorghum stover with three different concentrate mixtures in the ratios of 60: 40, 50:50 and 40:60 roughage: concentrate respectively. Using conventional composition of the concentrate mixture the experimental rations were formulated. Experimental ration composition is furnished in Table 1.

Experimental lambs were fed on complete ration *ad libitum* from 61 to 150 days of age. Group one lambs were fed with concentrate and roughage in the ratio of 40:60, group two lambs in the ratio of 50:50

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Table 1. Concentrate Feed Formulae

Ingredients	Ration 1 60:40 (R:C)	Ration 2 50:50 (R:C)	Ration 3) 40:60 (R:C	Control
Maize	18	5	8	15
GNC	7	6	5	10
Rice polish	-	5	-	22
Broken rice	13	10	-	-
Wheat bran	-	-	-	20
Soya	-	-	-	5
Sun Flower Oilcake	-	-	-	10
Sorghum	-	12	15	-
Ragi	-	10	15	-
Cumbu	-	-	15	15
Salt	0.5	0.5	0.5	1
Mineral Mixture	1.5	1.5	1.5	2

and group three lambs in that of 60:40. The control group animals were allowed grazing during the daytime for eight hours and were supplemented with 100 g of concentrate per head per day.

At the end of the experimental period, at 105 days of age, lambs had *ad libitum* access to their experimental diets for another 24 h, which was followed by a 12 h fasting after which the lambs were weighed and slaughtered as per standard procedure. Carcasses were skinned and the weights of non-edible offals such as blood, head, skin and feet was determined. The weight of the gastro intestinal tract and its contents was also determined. The carcass was eviscerated and the hot carcass weight was determined. Dressing percentage was determined from carcass weight and pre slaughter weight. The edible offals (liver, kidneys, spleen, heart, and lung) were weighed and expressed as percentage of the live weight. The omental, mesenteric and perinephric fat were separated and also weighed.

Cut up parts (shoulder, neck, rack, breast, flank, loin and legs) were separated and weighed and expressed as carcass weight. The area of *Musculus longissimus dorsi* (loin eye muscle) was measured after cross section, and tracing the area on to an acetate paper and measuring it using a planimeter. Lean, bone and fat were separated and weighed for determination of meat: bone ratio. Their values were calculated in percentage from its carcass

weight. The data collected were subjected to statistical analysis as per the method suggested by Snedecor and Cochran (1994). The percentage data were transformed to arcsin values prior to analysis.

Results and Discussion

The lambs maintained under low forage group had significantly higher ($P<0.01$) dressing percentage (47.08 ± 0.50) than those of other experimental groups (Table 2) viz., medium forage group (44.83 ± 0.50), high forage group (42.39 ± 0.50) and control group (40.3 ± 0.99). The higher dressing percentage of low forage group lambs could be attributed to their higher body weight at slaughter. The results of the present study were in agreement with the findings of Lloyd *et al.* (1981) who reported that heavy weight lambs had higher ($P<0.01$) dressing percentage.

Among the yield of offals, there was no marked significant differences between the experimental and control groups except in the case of low forage group in the weights of blood and liver. The experimental groups differed significantly ($P<0.05$) in blood and lungs percentage and differed highly significantly ($P<0.01$) in the percentage of liver. However, there seemed to be no significant difference in the percentage of head, skin and feet between the experimental groups. The low forage group had significantly ($P<0.01$) higher yield of stomach and intestine than the other experimental groups. Similar results were observed by Mcleod and Baldwin (2000)

Table 2. Mean $\pm$ SE of carcass characteristics of Madras Red lambs under feedlot system

Parameters	Treatments			
	High Forage (HF)	Medium Forage (MF)	Low Forage (LF)	Control
Dressing percentage	42.39 ^a $\pm$ 0.50	44.83 ^b $\pm$ 0.50	47.08 ^c $\pm$ 0.50	40.30 ^a $\pm$ 0.99
Loin eye area (cm ²)	8.05 ^a $\pm$ 0.13	8.07 ^a $\pm$ 0.15	9.08 ^b $\pm$ 0.50	7.90 ^a $\pm$ 0.13
Meat (%)	61.73 ^a $\pm$ 0.39	62.59 ^a $\pm$ 0.63	64.17 ^b $\pm$ 0.39	61.08 ^a $\pm$ 0.40
Bone (%)	32.62 ^c $\pm$ 0.25	30.86 ^b $\pm$ 0.73	28.49 ^a $\pm$ 0.30	32.36 ^{bc} $\pm$ 0.25
Fat (%)	5.94 ^a $\pm$ 0.27	6.73 ^{bc} $\pm$ 0.18	7.35 ^c $\pm$ 0.29	6.30 ^{ab} $\pm$ 0.20
A. Primal cuts (%)				
Shoulder	19.00 ^a $\pm$ 0.47	19.42 ^{ab} $\pm$ 0.46	20.62 ^b $\pm$ 0.46	18.80 ^a $\pm$ 0.31
Neck	3.05 ^a $\pm$ 0.18	3.00 ^a $\pm$ 0.15	3.58 ^b $\pm$ 0.16	2.80 ^a $\pm$ 0.06
Rib	10.18 ^{ab} $\pm$ 0.28	10.72 ^b $\pm$ 0.46	11.10 ^b $\pm$ 0.43	9.44 ^a $\pm$ 0.18
Loin	8.60 ^a $\pm$ 0.26	8.75 ^a $\pm$ 0.16	9.88 ^b $\pm$ 0.33	8.73 ^a $\pm$ 0.25
B. Edible offals (%)				
Blood	2.80 ^a $\pm$ 0.07	2.93 ^a $\pm$ 0.18	3.50 ^b $\pm$ 0.13	2.93 ^a $\pm$ 0.16
Heart	0.35 $\pm$ 0.01	0.37 $\pm$ 0.01	0.38 $\pm$ 0.01	0.33 $\pm$ 0.02
Lungs	1.62 ^a $\pm$ 0.03	1.69 ^b $\pm$ 0.03	1.75 ^b $\pm$ 0.02	1.69 ^b $\pm$ 0.03
Liver	1.80 ^a $\pm$ 0.06	1.90 ^a $\pm$ 0.08	2.40 ^b $\pm$ 0.06	1.70 ^a $\pm$ 0.09
Spleen	0.185 $\pm$ 0.00	0.189 $\pm$ 0.01	0.203 $\pm$ 0.01	0.175 $\pm$ 0.01
Kidney	0.197 $\pm$ 0.01	0.220 $\pm$ 0.02	0.250 $\pm$ 0.02	0.190 $\pm$ 0.01
C. Non-Edible offals (%)				
Head	6.12 $\pm$ 0.13	6.00 $\pm$ 0.08	6.28 $\pm$ 0.11	5.82 $\pm$ 0.13
Feet	2.70 $\pm$ 0.10	2.80 $\pm$ 0.06	2.90 $\pm$ 0.06	2.60 $\pm$ 0.04
Skin	9.20 $\pm$ 0.19	9.30 $\pm$ 0.18	9.60 $\pm$ 0.06	9.19 $\pm$ 0.19
Gut	6.45 ^a $\pm$ 0.19	6.88 ^a $\pm$ 0.23	8.25 ^b $\pm$ 0.10	6.46 ^a $\pm$ 0.19

Mean values bearing different superscript in a row differ significantly ($P < 0.01$)

The lambs under low forage diet had significantly ($P < 0.01$) higher percentage of primal cuts of meat viz. shoulder, rib, breast, neck, loin and flank followed by medium forage, low forage and control group respectively. The results of the present study were in accordance with the findings of Karim and Verma (2001), who observed that the proportion of neck and shoulder was higher in lambs maintained under intensive feeding system. Similarly Al-saigh *et al.* (1988), reported that the weights of racks and loins of lambs fed with high concentrate ration were significantly higher than those fed lamb with less concentrate diet. Leg conformation is a good indicator of muscle mass. Corroborating with the findings of Lloyd *et al.* 1981, it is hereby reported that the heavy slaughter weight lambs had higher ($P < 0.05$) leg conformation.

The lambs maintained under low forage diet had significantly ($P < 0.01$) higher levels of meat and fat and significantly ($P < 0.01$) lower proportion of bones when compared to

lambs under other treatment groups. However, the low forage and medium forage groups did not differ in their fat content. In concurrence with the present findings Karim and Verma (2001) and Krishna Mohan and Charyulu (1983), observed that lambs fed with high concentrate ration had significantly ($P < 0.01$) higher proportion of fat than the lambs fed with lower concentrate diet. Similar findings were also observed by Saini *et al.* (1988), Prasad *et al.* (1981) and Karim and Rawat (1997). Among the experimental groups the lambs fed with low forage ration had significantly ($P < 0.01$) higher loin eye area (9.08 ± 0.02) than the other experimental groups. The present result was in agreement with the findings of Krishna Mohan and Charyulu (1983), who observed higher loin eye area in lambs fed with high concentrate diet (in the ratio 60:40). The present results confirm the observations of Lloyd *et al.* (1981) and Meenakshi Sundaram (2001) who reported that animals slaughtered at heavy body weight had larger loin eye area.

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