FEEDING BLOOD MEAL T0 SUDAN DESERT SHEEP.

I EFFECT ON FEEDLOT PERFORMANCE AND CARCASS CHARACT- ERISTICS OF LAMPS.

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SUMMARY

Fifteen entire male Sudan Desert lambs were used to evaluate three levels (A,5; B,l0 and C,l5%) of blood meal on performance and carcass characteristics. The Diets were isocaloric (12. 0 MJ,/Kg) and the experiment extended for 70 days. The levels of blood meal had significant (P < 0.05)etfect on performance of the experimental lambs. Final weight, average daily gain, daily feed intake and feed conversion ratio differed (P < 0. 05) among dietary treatments. The Diet with 10% blood meal gave generally, the best results in all the parameters measu- ured. Also the results of the study have shown that blood meal was utilized to the extent or even better by growing lambs compared to other protein sources. Dietary blood levels had no etfect (P < 0.05) on carcass characteristics except rib eye area. Lambs fed on diet B had wider (P < 0.05) rib eye area than those fed on the other two diets.

INTRODUCTION

Protein is one of the critical nutrients for young growing animals. Convention- ally protein is usually provided to animals from plant sources. Due to escalating prices of plant proteins non - conventional sources of protein for animals need to be evaluated. Blood meal has been recently advocated as a cheap protein source in-ru minant nutrition (Stock, et al, l98l; Loerch, et al, I983). The objectives of this study were to examine the effect of different levels of blood meal on feedlot performance and carcass characteristics of Desert lambs.

MATERIALS AND METHODS

Fifteen entire Desert sheep male lambs obtained from El Huda Sheep Research Station were used in this study. The lambs were about four to five months old and weighed 14.5 Kg, on average. Three isocalnric diets (l2. O MJ,/Kg) containing differenl levels (5, l0 and 15%) of blood meal as :1 nitrogen source were utilized. The culnpmillun and chemical analysis oflhe experimental diets are given in Table l.

Table 1. Ingredients and chemical composition of experimental diets.

Item	A	B	C
		%	
i) Physical composition (As fed):			
Blood meal	5.0	10.0	15.0
Sorghum grain	10.0	10.0	10.0
Wheat bran	20.0	15.0	15.0
Molasses	20.0	20.0	20.0
Groundnut hulls	43.0	43.0	38.0
Salt	1.0	1.0	1.0
Limestone	1.0	1.0	1.0
ii) Chemical composition (DM):			
Dry matter	95.70	95.7	95.3
Crude protein	13.3	16.1	19.0
Crude fibre	18.2	17.3	13.8
Ether extract	3.0	2.6	2.5
Nitrogen - free extract	57.0	55.6	56.4
Ash	8.5	8.4	8.3

days, lost weight and was therefore excluded. Water and salt licks were available throughout the experimental period. At the end of the experimental period the lambs were slaughtered over a period cf five days and prepared for subsequent studies as described by Mansour(l987). Warm carcass weight was obtained immediately after skinning and evisceration The carcass was chilled at 4.0C' for 24 hours. The carcass was then reweighed to obtain the chilled carcass weight. The tail was removed at its articulation, the kidneys and the kidney fat were removed from the chilled carcass and the weight of each oi' these parts was recorded. The prep. ared "carcass was then halved by sawing along the vertebral column into left and right sides. The former side was then weighed and cut into wholesale joints according to Smith et al (l978). Each Joint was then first weighed and dissected into subcutaneous and intermuscular fat, muscle, bone in addition to other tissues e.g. blood vessels, nerves and glands. Statistical analysis : The data was analysed by analysis of variance technique applicable to rand- omized complete ~ block design, with missing data, for determination of statistical significance. Significant differences among individual treatment means were determined by the orthogonal polynomial methods (Steel and Torrie. l980).

RESULTS

Feedlot performance results of the experimental lambs are shown in Table 2. '1 he initial mean live weight of these lambs were similar. The final live weight, on average, differed among the dietary treatments. This parameter increased quad- ratically ($P < 0.05$) as the level of blood meal increased. Lambs fed on ration B had the highest final live weight. Lambs given ration C attained an intermecliat live weight whereas lambs receiving ration A were the lowest.

Table 2. Feedlot performance of experimental lambs.

Item	A	B	C	SE
Number of animals	4	5	5	—
Feedlot period, days	70	70	70	—
Initial body weight, kg (a)	14.7	14.6	14.6	0.27
Final body weight, kg (a)	24.1	28.1	26.0	0.74
Average daily gain, g (ab)	137.0	193.0	164.0	9.46
Average daily feed intake, kg(c)	1.02	1.13	1.06	0.024
Feed conversion ratio, kg feed/kg gain	7.3	5.8	6.5	0.45

(a) Quadratic effect ($P < o.o1$)

(b) Linear effect ($P < 0.05$)

(c) Quadratic effect ($P < 0.05$)

SE Standard error of the treatment means

The results obtained for carcass parameters are shown in Table 3. Although the results on slaughter weight were consistent with those shown for final weight, the gut fill, empty body weight, cold carcass weight, dressing percentage! measured either in terms of slaughter or empty body weight) and carcass shrinkage were not sgnilicantly affected by alteration in the level of blood meal in rations A, B and C. However, most of these parameters tended to have greater values in lambs fed on ration B. On the other hand crossectional of the muscle Longissimus dor- si increased significantly (P < 0.01) and in a quadratic manner as the proportion of blood meal increased in rations A, B and C.

Table 3. Carcass characteristics of experimental lambs.

	A	B	C	SE
Slaughter weight, kg (ab)	24.15	28.38	26.84	0.67
Gut fill (as % of slaughter wt)	14.57	15.5	14.33	1.38
Empty body weight, kg	20.69	24.00	23.00	0.82
Warm carcass weight, kg	11.3	13.1	12.4	0.56
Cold carcass weight, kg	10.84	12.65	11.96	0.57
Dressing out percentage (on slaughter wt basis)	46.69	46.22	46.04	1.15
Dressing out percentage (on empty body weight)	54.27	54.68	53.68	0.86
Carcass shrinkage, %	4.18	4.28	3.28	0.63
Longissimus dorsi area, cm2 (b)	8.0	11.2	9.7	0.57

(a) Linear effect (P < o.05)
(b) Quadratic effect (P < o.ol)
SE Standard error of the treatment means

Mean values of the carcass by - products (expressed relative to empty body weight) are shown in Table 4. None ofthese value; were significantly difierent in the three dietary groups. except those for the skin and omcntal fat. While the proportions of the skin were <ignifi('antly (P < 0.01) increased \\§th increasing blood meal level in the rations the values for omental fat were consisnzmly reduced as the prsurtion of blood meal was increased in the dietary treatments.

Table 4. Body components expressed as percentage of empty body weight of experimental lambs.

Body component	A	B	C	SE
Blood	5.38.	5,38	5.42	0.10
Head (unskinned)	8.04	7.62	8.22	0.15
Skin (a)	8.86	10.10	10.72	0.33
Feet	2.96	3.04	3.20	0.11
Rumen (empty)	3.42	3.48	3.40	0.14
Intestines (empty)	5.52	4.68	5.05	1.01
Liver	2.56	2.28	2.24	0.10
Heart	0.56	0.50	0.58	0.00
Lungs and trachea	2.60	2.70	2.56	0.25
Spleen	0.44	0.42	0.54	0.08
Pancreas	0.14	0.18	0.18	0.00
Sex organs	0.94	1.10	0.98	0.06
Kidneys	0.42	0.40	0.44	0.06
Kidney fat	1.16	0.84	1.02	0.00
Omentuma	1.38	1.12	0.80	0.11
Mesenrric fat	1.32	1.08	0.76	0.13

(a) Linear effect ($P < 0.01$)
SE Standard error of the treatment means.

The proportions of wholesale cuts in the three groups were com parable. The slaughter by - products, except skin and omentum were not influenced (P > 0.05) by dietary blood levels. Also, dietary blood levels had no significant (P > 0.05) efl'ect on percent of muscle, bone, fat and muscle to bone ratio. More- over, no significant (P > 0.05) differences were observed for subcutaneous, inter- muscular and kidney knob and channel fat depots.

Table 5. Wholesale cuts and carcass composition expressed as percentage of chilled carcass.

Cut	A	B	C	SE
Leg	26.24	26.76	26.54	0.53
Sirloin	12.86	13.58	13.88	0.59
Lion	8.26	8.54	9.02	0.51
Rack	11.22	10.78	10.54	22.59
Shoulder	20.20	19.98	19.72	0.64
Breast (a)	10.04	9.76	9.18	0.18
Flank	1.42	1.64	1.36	0.13
Shank	9.65	9.00	9.80	0.47
Tail	2.17	3.03	2.96	0.25
Carcass muscle	62.3	63.10	61.60	0.88
Carcass bone	21.4	21.70	23.70	0.70
Carcass fat	15.2	13.70	13.00	0.79
Muscle/ bone ratio	2.9	2.9	2.6	0.12

(a) Linear effect ($P < 0.01$)

SE Standard error of the treatment means.

Table 6. The distribution of carcass fat depots (a) .

Item	A	B	C	SE
Subcutaneous fat :-				
1) Percentage to the carcass weight	6.17	6.41	5.22	1.56
2) Percentage to the overall fat	46.84	48.28	43.10	4.74
Intermuscular fat :—				
1) Percentage to the carcass weight	4.82	4.00	4.31	0.58
2) Percentage to the overall fat	37.26	39.37	39.08	4.72
Kidney knob and channel fat :				
1) Percentage to the carcass weight	2.11	1.60	1.98	0.44
2) Percentage to the overall fat	15.90	13.65	17.81	2.72

(a) None of the means were statistically significant ($P > o.o5$).

SE Standard error the of treatment means

DISCUSSl0N

Feedlot pet;/ormcnse : The results obtained in Table 2 indicated that the level of blood meal supple- ment atfected, significantly, the performance of the experimental lambs. The greater feed consumption in the lambs given ration B was consistent with their greater daily growth and consequently the heavier final live weight they attained. However, feed conversion ratio was not significantly dilierent between the three rations. ' Formerly Osman (1985) supplemented high roughage rations with var ying levels of blood meal, Similarly he noted that provision of blood meal at the rate of 9'}; of such rations produced the best performance in the experimental lambs. Although different results are only relevant under their surroundings (e. g. nutrition, management .. etc.) such results may be exploited for drawing general comparisons, In this regard the present results of the lamb fed on diet B could reasonably be compared with those shown by El Khidir et al (1983) who found that feeding cotton seed cake to Sudan Desert sheep was associated with a daily growth of l9l gm in their live weight. . In contrast Pollott, et al (1978) have obtained a growth rate of l06 gm/day for a group of Sudan Desert Sheep and is considered a relatively poor performance compared with the present finding. On the other hand the mean values of 25 l and 237 gm/day l‘ or live weight growth in Desert sheep (Osman et al, 1967 and Sull- eman and El Amin, 1980) were considerably greater than our present finding. In regard to feed utilization for live weight growth the present observations indicated that feeding the experimental rations A, B and C to the lambs had not significantly changed their mean values for feed conversion ratio. However, lam- bs fed on ration B tended to have the smallest value for this ratio. In compar- ison with former records obtained, for example, by Osman et al, l96'1; Pollott ct al l978; Sulieman and El Amin, 1980 and El Khidir et al l983, the present {erf‘ormance is fairly similar. Contrary to this the results reported by El Hag and Ekkfiag (1981) and El Khidir et al (i984) for feed utilization in Desert sheep were lower than those of our study. Previously, Stock et al (l983) have shown the advantage of feeding blood meal to that of feeding soybean meal with urea in the growth and feed utilization of lambs. It can, broadly, be inferred from the present study, and those reviewed that blood meal was utilized to the same extent or even better by growing lambs than other traditional or in common use protein sources. Carcass characteristices .- As it was mentioned above lambs fed on diet B had the greatest final live weight in contrast to either of lambs given diet A or C. Consequently the former lambs also produce the heaviest slaughter weight among these experimental lamb groups. The mean values of dressing percentage were similar in the three groups. On average these values were also similar with those shown by El Hag and El Hag (l98l) whereas they excelled those values repo- rted by El Shafei,(l967) Sulieman and El Amin, 1980 and El Khidir et al, (l983)for Desert sheep. On the other hand, these carcass values have also ret- ained their similar’ty within lamb groups A, B and C even when they were expr- essed in terms of the empty body weight. likewise they were also similar to those reported by Osman et al (1970), Gaili (1977) for Sudan Desert sheep and Younis et al ([975) for Egyptian Desert sheep. Carcass shrinkage is one of the important carcass parameters since it has a direct relationship to the carcass quality and carass weight. It is of particular importance in meat marketing and export. In the present study carcass shrinkage was not influenced by level of blood meal and results obtained appeared to be lower than those recorded by Osman and El Shafei (l967) and Sulieman and El Amin (1980). Variations in degree of carcass fat cover, carcass retention time, refrigerator temperature and humidity are possible causes of variation in carcass shrikage values. Development in the muscle Longissimus dorsi is closely related to the development and muscling of the carcass. In this study the value of the erosssectional area of lambs fed on ration B was found to be superior to either of the value shown for lamb group A or C. However, on average, these values were similar to the values reported by Kauffman et al (l968), El Shafei and Osman, (l97l) and Field and Schoonver (l967),who indicated that there was a linear increase in the rib eye area with the inrcrease in live weight. On the other hand the eye rib area obtained by Osman et al (1970) and Sulieman and El Amin (1980) was smaller than that shown in this study. N01! — CflfCRSS (.'~)Il1p0!12fllJ .' Since there no direct relationship between true growth and gut content it is nioresoundto relate the development of different body parts to the empty body weight than the live weight. The recorded in the present study for non- carcass components are in line with those reported by Sulieman and El Amin (I980). The similarity of the values of these components (except for the skin and omentum) coincides, broadly, with the obsservation of Paisson and Verges (l 952); Wilson, (I958) and Gaili (1977) who showed that nutritional treatment imposes no efiect on non-carcass components. Carcass composition : It has been shown ('l'able3) that carcass joints and carcass tissue components were not significantly (P < 0.0S)afi'ected by the rations introduced in groups A, B and C. However, the mean values obtained for muscular tissue were greater than those reported by El Khidir et al (1983); El Khidir et al (1984) and Sulieman et al (I986). The values obtained for bone in this study compare favourably with those reported by Osman et al (I970) for Sudan Desert Sheep. But they were lower than those recorded by Osman and ElShafie (1967) and Gaili (1977) for the same type of sheep.. On the other hand, El Khidir et al (1983) and Osman (1985) have shown a lower carcass bone proportions (20.1 and 19 "X" respectively) than those reported in the present study. In general, and as inferred by Gaili (l977) the percentage of bone in carcasses of Sudan Desert sheep is high and that of its edible meat is low compared with the specialized mutton breeds of sim- ilar carcasses. However, the results obtained in this study for fat percentage (13.7 %) compared favourably with those indicated by Sulieman et al (l986).'On the other hand, present values of this parameter were lower than those reported by El Khidir et al(1983) and El Khidir et al (i984) in earlier studies for Sudan Desert sheep. The disnéution of carcass fa! depirs : In this study the inclusion of different levels of blood meal did not produce any significant (P < 0.05) effects on the distribution of carcass fat depots among the experimental lambs (Table 4). The subcutaneous fat is found to be higher than the intermuscular fat. This is in agreement with Callow (1948) and Kem- pster (1981) who also reported that the subctaneous fat had a relatively greater growth rate than intermuscular fat. It has been generally noted that the genotype and nutrition onfounded the development pattern of fat (Lister, 1976; Keinpster, 1981) Also Kempster (l98l) has shown that the enviro nmental and genetic component tended to influence fat partitioning among fat depots. Fat depots in earlier fattening animals results in an increased proportion of subcutaneous fat relative to intramuscular fat.

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