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EFFECTS OF DRIED RUMEN CONTENTS LEVEL IN RATIONS ON THE PERFORMANCE OF SHUGOR DESERT SHEEP IN HALFA ELGADEDA, KASSALA STATE, SUDAN

Amani A. B. Osman¹ --- Asma H.M. Hamed^{2†} --- Mohmed E. Elimam³

¹Department of Animal Production, Faculty of Agriculture and Natural Resources, Kassala University, Halfa Elgadedda, Sudan

²Department of Animal Productions, Faculty of Agricultural and Environmental Sciences, University of Gadarif, Sudan

³Goat Research Centre, Faculty of Agriculture, University of Gezira

ABSTRACT

*Twelve Shugor Desert lambs at 9-12 month old and weighing about 25kg were used to study effects of different levels of dried rumen contents in rations on lamb's performance in Halfa Elgadedda, Kassala State, Sudan. The animals were divided into three groups according to body weight and allocated at random to isonitrogenous and isocaloric rations with 0, 5 or 10% dried rumen contents. They were offered the rations ad lib. in one meal at 8 am. They were allowed a 15 days preliminary period and fattened for 49 days. Barseem (*Medicago sativa*) was fed once weekly. The data was statistically analyzed according to the completely randomized design. Final BW, daily feed intake, total weight gain and daily weight gain varied among different levels of dried rumen contents in rations, but not significantly ($P>0.05$). They were highest in animals fed 10% dried rumen contents and least in animals fed no dried rumen contents. Final BW (kg) was 30.27, 31.25 and 31.75 in animals fed 0, 5 and 10% dried rumen contents, respectively. Daily feed intake (kg/day) was 01.20, 01.27 and 01.28, respectively. Total weight gain (kg) was 4.25, 4.63 and 5.75, respectively. Daily weight gain (g) was 150, 165 and 207, respectively. Feed conversion ratio varied among levels of dried rumen contents in rations, but not significantly ($P>0.05$). It was 8.81, 7.87 and 7.61 in animals fed 0, 5 and 10% dried rumen contents, respectively.*

Keywords: Rumen contents, Performance, Desert sheep, feed conversion ratio, Sudan.

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† Corresponding author

Contribution/ Originality

This study is one of very few studies which have investigated the effect of dried rumen content on the performance of shugor lambs. Its primary contribution is finding that dried rumen contents had no negative effects on lambs' performance and it can be added up to 10% in the rations.

1. INTRODUCTION

Sheep production is very important in the Sudan including Halfa Elgadida area in the Butana plain, Kassala State, Sudan due to high population, wide distribution, reputed breeds and contribution to meat self-sufficiency and exports [1]. Sudanese sheep meat is highly demanded since they depend on rangeland and no feed additives or growth promoters are used which affect humans and animals health. Nutrition is a major obstacle for sheep production due to rangeland deterioration for many reasons [2, 3]. In addition there are seasonal variations in rangeland plants types, biomass and quality with serious impacts on animal's health and performance, especially in the dry season [4]. It was concluded that Desert sheep production systems are determined by nutritional seasonality [5].

The deficit in animal feeds was 23.689 million tones DM. Agro- industrial by products are important in filling the nutritional deficit, especially in the dry season [6]. However, crop residues generally have low nutritive value due to low CP and high fibres and hence low digestibility, feed intake and animals' performance [7]. Concentrates are not commonly used in traditional systems due to high cost. It is important to exploit cheap feeds including animal wastes to reduce cost and improve nutritive value, performance and profits and avoid pollution.

Slaughter houses by products including blood, bone and meat meals and rumen contents are used as animal feeds. Rumen contents alone or mixed partially replaced protein or energy in ruminants feeds [8, 9]. Rumen contents result mainly from anaerobic fermentation and production of high quality microbial protein and volatile fatty acids and significant amounts of microbial storage carbohydrates, lipids and minerals [10]. The proximate analysis of rumen contents in the Sudan was 95.54% DM, 18.83% CF, 13.21% CP, 0.62 EE, 39.57% ash and 27.77% NFE and gross energy was 4186 kcal [11]. It also had 14.4%, 4.2%, 41.1% and 9.7% CP, EE, ADF and ash, respectively in feedlot steers [9]. Rumen contents composition in cattle was 12%, 16.2, 25.4%, 2.3, 13.5, 0.21 and 0.62 for DM, CP, CF, EE, ash, Ca and P, respectively and calculated ME was 17.3Mj/kg DM [12].

In Holstein steers fed diets with 30% Alfalfa hay (ALF) or dried rumen contents (DRC) the latter decreased OM and ADF rumen digestion, OM post-ruminal digestion and OM, ADF, N and DE total tract digestion [13]. It increased ruminal microbial and N efficiency. Estimated DE was 1.21 Mcal/ kg for DRC and approximately 51% of medium-quality alfalfa hay.

Dried rumen contents had no negative effects on diets acceptability. There is no available information on using rumen contents in sheep rations in Halfa Elgadida. Consequently, Shugor

sheep were fed rations with different levels of rumen contents to determine the effects on sheep performance.

2. MATERIALS AND METHODS

2.1. Study Area

The study described below was conducted in the goat pens in the animal production farm in the Faculty of Agriculture and Environmental Sciences, Kassala University in Halfa Elgadida, Kassala State in June and July 2013.

2.2. Animals

Twelve Shugor Desert male lambs at 9-12 month old and weighing about 25.kg were used in this study. They were bought from Halfa Elgadida livestock market and transported by car to the animal production farm. They were rested, ear tagged and housed in individual pens shaded with corrugated iron sheets and feed and water troughs were provided. The animals were treated against external and internal parasites and injected with Oxytetracycline for optimum health during the experiment. They were weighed and divided into three groups according to body weight and the groups were then allocated at random to the three experimental rations.

2.3. Feeds and Feeding

Cattle rumen contents were collected from Halfa Elgadida slaughter house and transported by car to the animal production farm. The rumen contents were spread on plastic sacks and sun dried for one week. It was then stored in plastic sacks.

Three isonitrogenous and isocaloric rations containing 0, 5 or 10% dried rumen contents were used in this experiment. Table 1 shows the ingredients and calculated CP and ME of the rations fed to Shugor Desert lambs in Halfa Elgadida. The animals were fed groundnut haulm *ad lib.* and were changed gradually to the experimental rations to avoid digestive disturbances.

The animals were fed green Barseem (*Medicago sativa*) once weekly to maintain normal gut functions and a source of vitamins. The animals were fed the experimental rations *ad lib.* for 15 days as a preliminary period. They were then fed the experimental rations for 49 days. The rations were fed in one meal in the morning at 8 am.

Clean water was available all time. The animals were weighed before the morning meal at the beginning of the experiment and then weekly to the end of the experiment. They were fastened for 12 hrs. before weighing to avoid the variations in gut contents. Daily feed intake was determined by offering preweighed rations and collecting and weighing the refusals before the morning meal in the following day.

2.4. Calculations and Statistical Analysis

Feed intake was calculated as the difference in weight between offered rations and the refusals. Total weight gain was calculated as the difference between initial and final body weights.

Daily weight gain was calculated by dividing the weight gain by the day between them. Feed conversion ratio was calculated by dividing the feed intake by total weight gain.

The data was statistically analyzed according to [Snedecor and Cochran \[14\]](#) using the completely randomized design.

3. RESULTS AND DISCUSSION

Table 2 shows the effects of different levels of rumen contents in rations on the performance of Shugor lambs. Final BW, daily feed intake, total weight gain and daily weight gain varied among different levels of rumen contents in rations, but not significantly ($P>0.05$). They were highest in animals fed 10% rumen contents and least in animals fed no rumen contents.

Feed conversion ratio varied among different levels of rumen contents in rations, but not significantly ($P>0.05$). It was highest in animals fed no rumen contents in rations and least in animals fed 10% rumen contents in rations. The increased Shugor sheep final BW was mainly due to increased weight gain associated with increased daily feed intake in this study. The improved feed intake with increasing rumen content in rations was mainly due to its palatability.

This was supported by the evidence that dried rumen contents had no negative effects on diets acceptability [\[13\]](#). Shugor lambs DMI was within the range for lambs fed different levels of Mesquite pods in Halfa Elgadeda [\[1\]](#). Shugor lambs daily DMI was higher than in Desert sheep fed Rabaa ash alkali treated sorghum stover supplemented with 300 and 600g concentrates and within the range in animals fed 900g in the Gezira State, Sudan [\[15\]](#). Shugor lambs daily weight gain was within the range for lambs fed different levels of Mesquite pods in Halfa Elgadida.

Daily weight gain in Shugor lambs fed rumen contents in rations was higher than in animals fed 300 g concentrates and Rabaa ash alkali treated sorghum stover [\[15\]](#). It was generally within the range in animals fed 600 and 900g. The improved Shugor feed conversion ratio with increased levels of rumen contents in rations was mainly due to rumen contents high nutritive value [\[10, 12\]](#). This boosted feeds nutritive value and exploitation. The improved FCR in Shugor sheep with increasing rumen contents in rations was also found when rations with different Mesquite levels [\[1\]](#).

4. CONCLUSION

The results suggested that 10% rumen contents in rations were adequate for optimum Shugor sheep performance in this study.

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Table-1. The ingredients of rations fed to Shugor desert lambs in Halfa Elgadida, kassala State, Sudan.

Ingredients	Rations		
	A (0% rumen contents)	B (5% rumen contents)	C (10% rumen contents)
Groundnut cakes	19	19	20
Sorghum grains	25	30	34
Molasses	24	24	25
Wheat bran	20	13	5
Groundnut shells	10	7	4
Rumen contents	0	5	10
Salt	1	1	1
Lime stone	1	1	1
Calculated CP (%)	17.25	17.26	17.36
Calculated ME (MJ/kg DM)	11.48	11.47	11.48

Table-2. Effects of different levels of rumen contents in rations on the performance of Shugor Desert lambs in Halfa Elgadida, kassala State, Sudan.

Parameters	Rations			SE	Significance
	A	B	C		
Initial BW (kg)	26.0	26.5	26.0	2.96	NS
Final BW (kg)	30.27	31.25	31.75	3.11	NS
Daily feed intake (kg/day)	01.20	01.27	01.28	16.0	NS
Total weight gain (kg)	04.25	04.63	05.75	65.0	NS
Daily weight gain (g)	150	165	207	1.52	NS
FCR	8.81	7.87	7.61	3.77	NS

A= A ration with 0% dried rumen contents; B= A ration with 5% dried rumen contents; C= A ration with 10% dried rumen contents; FCR= Feed conversion ratio (Kg feed intake/kg weight gain).
 NS= Not significantly different at $P \geq 0.05$

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