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EFFECTS OF COTTON GIN TRASH LEVEL ON THE PERFORMANCE OF DESERT LAMBS IN NEW HALFA AREA, KASSALA STATE, SUDAN

Asma H.M.Hamed[1]† --- Amani A. B. Osman[2] --- Mohmed E. Elimam[3]

[1]*Department of Animal Production, Faculty of Agricultural and Environmental Sciences, University of Gadarif, Gadarif, Sudan*

[2]*Department of Animal Production, Faculty of Agriculture and Natural Resources, Kassala University, HalfaElgadida, Sudan*

[3]*Goat Research Centre, Faculty of Agricultural Sciences, University of Gezira, Wad Medani, Sudan*

ABSTRACT

An experiment was conducted to evaluate cotton gin trash(CGT) as a feed for Shugor Desert lambs in New Halfa area in the Butana plain, Kassala State, Sudan. Cotton gin trash has high EE and CP and the proximate analysis (%) is 98.67, 18.25, 22.70, 38.35, 8.20 and 12.50 for DM, EE, CF, CP, ash and NFE, respectively. These residues cause environmental problem when it is not well exploited. Fifteen Shugor Desert lambs about 8-10 month old weighing 26.5 kg in average were divided to three groups and fed isocaloric and isonitrogenous rations with 0, 10% and 20% CGT for 6 weeks. Daily feed intake increased significantly (P≤0.05) with increasing CGT in rations (1.12, 1.30 and 1.37 kg at 0, 10 and 20% CGT, respectively).Final body weight increased with CGT in rations, but not significantly (P≥ 0.05) and were 34.66,34.76 and 36.90 kg , respectively. Weight gain increased with increasing CGT in rations, but not significantly(P≥ 0.05).They were 7.72, 7.78 and 9.98 kg at 0,10 and 20%CGT, respectively. Feed conversion ratio improved with increasing CGT in rations and were 7.80, 6.54 and 6.03 at 0,10 and 20%CGT, respectively. The results showed that CGT had good nutritive value and improved sheep feed intake, performance and feed conversion ratio and should be promoted.

Keywords: Cotton gin trash, Residues, Desert lambs, Performance, Nutritive value, Sudan.

Contribution/ Originality

This study is one of very few studies which have investigated the effect of different levels of cotton gin trash on the performance of Sudanese desert lambs.The papers primary contribution is finding that cotton cotton gin trash had good nutritive value and improved sheep feed intake, performance and feed conversion ratio.

† Corresponding author

1. INTRODUCTION

The demand for sheep meat increases substantially in the Sudan due to increased local consumption because of urbanization and improved living standards. In addition it was increased due to increased exports due to superior meat quality, reputed breeds and animals rely mainly on rangelands. Furthermore, no growth promoters or feed additives, especially of animal origin, are used as they affect human and animal health. Sheep production is very important in New Halfa area in the Butana plain in Kassala State, Sudan due to high population, reputed breeds and socio-economic contribution [1]. New Halfa Scheme is 68880 ha in area where cotton, wheat, sorghum and sugar cane are grown with abundant crop residues for animal feedings.

Nutrition is among the main constraints for sheep production in New Halfa area which is located in the poor Savanna because of rangeland deterioration for many reasons [1, 2]. Furthermore, seasonal rainfall led to seasonal variations in feeds quantity and quality with serious shortages in the dry season and serious effects on animals health and performance [3]. Agro-industrial by products, especially crop residues, are used to fill the nutritional gap, but generally have low nutritive value due to low CP and high CF limiting animals intake and performance. Furthermore, concentrates are not generally fed to improve sheep performance [3]. High costs of high quality conventional feeds are limiting factors to improve sheep production in New Halfa area and it is vital to exploit low cost unconventional feeds to reduce costs and enhance profits and market competition. Recently Mesquite(Prosopis juliflora) pods were fed to Desert sheep in New Halfa area [1].Cotton is an important crop in New Halfa area, and cotton gin trash (CGT) is a byproduct of cotton ginning. Cotton gin trashes composed of fragments of burs and stems, immature cotton seed, lint, leaf fragments and dirt [4]. It has serious environmental impacts such as setting fires [5] and is used for energy, soap, plastics and pesticides [6] and as animal feed [4]. It is palatable as sorghum silage for feedlot cattle [7].

Cotton gin trash composition varies greatly [4] and the nutritive value is affected with many factors including variety, region and harvest methods Bader, et al. [8]. Whole cotton seed is a good source for protein and energy and may reach 25.4% CP and 90% TDN [9]. The proximate analysis in the Sudan was 29.9% CP, 15.6% EE, 24.9% CF, 22.7% ash and 21.8% lignin [5]. It had 12.4 CP, 60.8 ADF and 69.2 % NDF in USA [10]. Myer [4] stated that CGT low feed value was due to high lignin and ash and low CP and energy (TDN) and the feeding value was similar relative to low quality Bahia grass or Bermuda grass hay. Some trials showed that rations with 70% CGT had accepted gains in lambs and steers [11]. It improved weight gain in grazing steers, but the performance was lower than a commercial supplement [12]. In steers, DMI and weight gain were significantly higher when fed CGT compared to groundnut hulls [10]. It was considered best for mature and pregnant beef cows [4]. Residues in CGT are not likely to affect animals health or products [13].

Cotton gin trash is used traditionally in feeding ruminants in the Sudan with limited available information [5]. This worker used different levels of CGT in fattening Desert lambs (0, 25, 40 and 55%) for 10 weeks and found that feed intake, weight gain and feed conversion ratio were improved up to feeding 40% CGT with no negative effects. It is important to exploit the

huge amounts of CGT in New Halfa area in sheep feeding to avoid environmental hazards and improve animals nutrition and performance. However, there is no available information on using CGT in fattening Shugor Desert lambs in New Halfa area, and consequently this experiment was launched to furnish this vital information.

2. MATERIALS AND METHODS

The experiment described below was conducted in the Animal Production Farm, Faculty of Agriculture and Natural Resources, Kassala University in New Halfa, Kassala State, Sudan from May to July2011. It is located at latitude 15° 19'N and longitude 35°36'E and is about 560km from Khartoum. The mean temperature and annual rainfall was 30° and 250-300mm, respectively.

2.1. Animals

Fifteen Shugor Desert lambs of about 8-10 month old and weighing 26.5 kg in average were bought from New Halfa livestock market and used to study the effects of different levels of CGT in rations on their performance. They were transported by car to the farm in New Halfa. The animals were rested, watered, ear tagged and housed in individual pens with water and feed troughs. They were vaccinated against prevalent diseases and treated with Bendazol against internal parasites and Gamatox against external parasites. They were injected with Oxyteracyline20%. The animals were weighed using a 100kg weighing machine and divided according to body weight into three groups. The range of body weights was 24.6-28.4kg and its average was 26.5kg.The animals groups were allocated at random to the three experimental rations.

2.2. Feeds and Feeding

The animals were fed dried Abu Sabeen (Sorghum bicolor) ad libitum and changed gradually to the experimental rations in 15 days. They were then fed rations A, B and C with different levels of CGT (0, 10 and 20%, respectively). Table1 shows the ingredients of the isocaloric and isonitrogenous rations fed to lambs with different levels of CGT. Preweighed amounts of the rations (2kg/animal/day) were offered in one meal at 8.00am for 6 weeks. In addition they were offered fresh green Barseem once weekly as a source of vitamin A. The refusals were collected for each animal before the morning meal and weighed. Samples of CGT were collected, stored in polyethylene bags and used for proximate analysis.

The animals were weighed weekly early in the morning after 12 hrs fasting to reduce the variations in gutfill. Daily feed intake and feed conversion ratio were calculated.

2.3. Laboratory Analysis

Samples of CGT were grinded and analyzed in triplicates for dry matter (DM), ether extract (EE), crude fibres (CF), crude protein (CP) and ash as described by AOAC [14].

2.4. Statistical Analysis

The data was statistically analyzed using completely randomized design and Duncan's multiple range test was used to test differences among means as described by Snedecor and Cochran [15].

3. RESULTS AND DISCUSSION

Table 2 shows the proximate analysis of CGT in New Halfa area. It had high EE and CP and moderate CF and was similarly a good source for protein and energy [9]. Ether extract, CP and ash were higher and CF was lower than that reported in the Sudan by Khalafalla [5]. It had higher CP, EE and ash and lower CF than that in USA [4]. Crude protein was higher than that in USA [9, 10]. The high variations in CGT proximate analysis among workers were also reported by Myer [4] and could be due to variations in cotton varieties, soils and soil and leaves contamination. In addition Bader, et al. [8] stated variety, region and harvest methods as reasons for the variations in CGT composition.

Feed intake varied significantly ($P \leq 0.05$) among rations and was highest in diet C (Table 3). The increased feed intake with increasing CGT level in feeds was also found up to 40% CGT in Desert sheep in the Sudan [5] and may be due to CGT palatability.

Weight gain tended to increase with increasing CGT in rations, but not significantly ($P \geq 0.05$). This may be attributed to increased feed intake with increasing CGT level. Similar results were found by Khalafalla [5]. Feed conversion ratio was improved with increasing CGT in rations, but not significantly ($P \geq 0.05$). This could be attributed to increased feed intake and weight gain with increasing CGT level. Similar results were reported in Desert sheep [5].

The results showed that CGT up to 20% in rations had good nutritive value and improved lambs performance and should be promoted in New Halfa area.

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Table-1. The ingredients and calculated energy and crude protein of rations with different levels of cotton gin trash (CGT)fed to Shugor Desert lambs in New Halfa, Kassala State, Sudan.

Ingredients	Rations		
	A	B	C
CGT (%)	0	10	20
Sorghum grains	25	24	20.5
Groundnut cakes	18	11	03.5
Molasses	25	25	25
Wheat bran	16	13	13
Groundnut shells	14	15	16
Salt	01	01	10
Lime stone	01	01	01
Metabolizable energy (MJ\ kg DM)	11.34	11.43	11.40
CP (%)	16.48	16.50	16.50

Table-2. The proximate analysis (%) of cotton gin trash in New Halfa area, Kassala State, Sudan.

Dry matter	98.67
Ether extract	18.25
Crude fibres	22.70
Crude protein	38.35
Ash	08.20
Nitrogen free extract	12.50

Table-3. The performance of Shugor Desert sheep fed ratios with different levels of Cotton Gin Trash in New Halfa, Kassala State, Sudan

Parameters		**Rations**			
	A	B	C	SE	Significance
CGT (%)	0	10	20		
Initial BW (kg)	9426.	26.98	26.92	1.20	NS
Final BW (kg)	34.66	34.76	36.90	1.73	NS
Feed intake (kg|day)	1.12^{a}	1.30^{b}	1.37^{c}	0.06	*
Weight gain (kg\head)	7.72	7.78	9.98	0.94	NS
FCR	7.80	6.54	6.03	1.12	NS

CGT= Cotton Gin Trash; BW= Body weight;FCR= Feed conversion ratio (kg feed|kg weight gain);NS= Non significant differences at P>0.5; *= Significant differences at P<0.05; different letters denote significant differences among means at P<0.05.