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Research Article

Effects of different types of cakes in rations on the performance of culled Cyprus Shami does in Halfa Elgageda, Kassala State, Sudan

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Abstract

Keywords

Cyprus Shami,
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Groundnut cakes,
Daily weight gain.

Fifteen culled Cyprus Shami does were used to study effects of some cakes in rations on their performance in Halfa Elgageda, Kassala State, Sudan. The goats were divided into three groups and allocated at random to three iso-nitrogenous and iso-caloric rations containing groundnut cakes, sesame cakes or sunflower cakes. They were fed the rations for 4 weeks *ad lib.* in two equal meals at 8am and 4pm and water was offered *ad lib.* They were fastened for 12 hrs and weighed weekly before the morning meal. The data was statistically analyzed using the completely randomized design. Final BW, total weight gain and daily weight gain varied among rations, but not significantly ($P>0.05$). Final BW and total weight gain (kg) were 55.9 and 5.9, respectively for the groundnut cakes ration, 56.2 and 6.7, respectively for the sesame cakes ration and 54 and 5.1, respectively for the sunflower cakes ration. Daily weight gain (g) was 306, 318 and 279, respectively for rations containing groundnut cakes, sesame cakes and sunflower cakes, respectively. Daily feed intake varied significantly ($P<0.05$) among rations and was 1.63kg, 1.48kg and 1.34kg, respectively. Feed conversion ratio varied among rations, but not significantly ($P>0.05$). It was 5.33, 4.65 and 1.34, respectively. Feed intake and FCR were highest in animals fed the groundnut cakes ration and least in animals fed the sunflower cakes ration. Final BW and total and daily weight gains were highest in animals fed the sesame ration, All parameters, except FCR were least in animals fed sunflower.

Introduction

Meat demand and prices increased substantially in the Sudan due to increased local and foreign demands (Ahmed, 2014). Per capita meat consumption was 41kg (AOAD, 2011). It is important to produce cheap and high quality meat and exploit less utilized types of meat to meet demands and reduce prices. Sheep meat is the most preferred and expensive in the Sudan and Arab countries and goat meat is the least preferred in the Sudan (MAWF, 2011) and mainly consumed in rural areas as kids meat. Goat meat is preferred in Arabia, Gulf countries, Asia, Africa and south Europe (Devendra and Mc Leroy, 1982). The demand for goat meat is increasing in developed countries mainly due to immigrants and the disputed correlation between cholesterol and saturated fatty acids and cardiovascular diseases. Goat meat has high nutritive value

and muscles and low fat and cholesterol (Elimam and Ombabi, 2007; Elimam *et al.*, 2010).

Goat production is important in the Sudan due to high goat population, wide distribution and production of high quantities of high quality milk, meat and skin (MAWF, 2011). Sudan ranked 6th in world goat population and 5th in world goat meat production, but is not among the main world goat meat exporters (FAOSTAT, 2011). Goat meat production is mainly traditional in the Sudan based on rangeland and are generally neglected with low inputs and outputs (Devendra and Mc Leroy, 1982). Improving goat meat production will make it competitive locally and abroad and increase demands, exports and national income. There are many goat breeds and

Nubian is the main dairy breed and other breeds are considered meat producers (Devendra and Mc Leroy, 1982). Many exotic breeds are imported to improve goat milk production including Saanen and Shami (Damascus). Cyprus Shami goats were recently imported to improve animal production in Kassala State and culled males and females are used for meat production due to the large size. Carcass characteristics are improved by improving the nutrition of culled animals before slaughter.

Nutrition is one of the main constraints for goat production in Halfa Elgageda area due to rangeland deterioration for many reasons (Yagoub, 1998; Abusuwar and Darrag, 2002) and seasonal variations in feeds quantity and quality associated with seasonal rainfall leading to serious shortages and effects on animals health and performance, especially in the dry season (Elhag, 1992). Crop residues are important in filling the nutritional gap, but generally have low nutritive value due to low CP and high CF limiting feeds dry matter intake and animals performance (Hamed, 2007). Concentrates are not commonly used and improved animals performance (Anyanwu, 2008; Sahu, 2013). Different cakes are used in concentrates with variations in feeds nutritive value. Groundnut cakes DM and CP degradation were higher than cottonseed cakes and sunflower cakes and the latter had the least values (Turki and Atcham, 2011). Sunflower cakes had higher molecular weight amino acids concentration followed by cotton seed cakes and then groundnut cakes and it was postulated that is why groundnut cakes was unstable protein and the other two cakes were stable. There is no available information on effects of different cakes in rations on the performance of culled Shami goats in Halfa Elgageda area. Consequently, an experiment was conducted to study effects of groundnut, sesame and sunflower cakes in rations on the performance of culled Cyprus Shami goat in Halfa Elgageda area.

Materials and Methods

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 Elgageda, Kassala State, Sudan in February and March 2013.

Animals

Fifteen culled Cyprus Shami does at 4 years old were used in this experiment. They were housed in individual pens and treated against external and internal parasites. They were divided into three groups according to body weight and then allocated at random to three experimental rations.

Feeds and feeding

Three isonitrogenous and isocaloric rations containing groundnut cakes, sesame cakes or sunflower cakes were used

in this experiment. Table 1 shows the ingredients and calculated CP and ME of the rations fed to culled Shami does. The animals were fed the rations *ad lib.* for a 10 days preliminary period and then the experimental rations for 4 weeks. The rations were fed in two equal meals at 8am and 4pm. Fifty grams Clitoria hay were fed daily before the morning meal to maintain normal gut functions and for vitamins. Clean drinking water was available all time.

Daily feed intake was determined by offering preweighed rations and collecting and weighing the refusals before the morning meal in the following day. Weight gain was determined by weighing the animals before the morning meal after fasting for 12 hrs to avoid variations in gut contents, at the beginning of the experiment and then weekly to the experiment end.

Calculations and statistical analysis

Feed intake was calculated as the difference between offered rations and the refusals. Total weight gain was calculated as the difference between initial and final BW. Daily weight gain was calculated as the difference between successive BW divided by the days between them. Feed conversion ratio was calculated by dividing the total feed intake by total weight gain.

The data was statistically analyzed according to Snedecor and Cochran (1980) using the completely randomized design and Duncans Test was used to split means differences.

Results and Discussion

Table 2 shows effects of different types of cakes in rations on the performance of culled Shami does.

Final BW, total weight gain and daily weight gain varied among animals fed different rations, but not significantly ($P>0.05$). They were highest in animals fed the sesame ration and least in animals fed the sunflower ration.

Feed intake varied significantly ($P<0.05$) among rations and was highest in animals fed the groundnut cakes ration and least in animals fed the sunflower cakes ration. Feed conversion ratio varied among rations, but not significantly ($P>0.05$). It was highest in animals fed the groundnut ration and least in animals fed the sesame ration.

The increased final body weight was due to weight gain. Similar results were found In Tagger goats (Elimam *et al.*, 2010) and Nubian kids (Yagoub and Babikir, 2008). Culled Shami goats BW was within the breed range in Cyprus (Keskin, 2002) and lighter than the breed males and females above 3 years old in Kassala State (Musa, 2013). They were generally heavier than endogenous Sudanese breeds including Nubian (Elnaim, 1979; Gall, 1986), Desert (Ombabi, 2006),

Table 1. The ingredients of rations with different cakes fed to culled Cyprus Shami does in Halfa Elgageda, Kassala State, Sudan.

Ingredients(%)/ Rations	A	B	C
Sorghum grains	52.0	52.0	39.0
Sesame cakes	17.0	00.0	00.0
Groundnut cakes	00.0	16.0	00.0
Sunflower cakes	00.0	00.0	49.0
Groundnut hulls	19.0	15.00	05.0
Wheat bran	10.0	15.0	05.0
Dicalcium phosphate	01.0	01.0	01.0
Salt	00.4	00.4	00.4
Lime stones	00.5	00.5	00.5
Vitamins	00.1	00.1	00.1
Calculated CP	17.56	17.49	17.57
Calculated ME (Mj/ kg DM)	11.30	11.0	11.30

A= Groundnut cakes ration; B= Sesame cakes ration; C= Sunflower cakes ration.

Table 2. Effects of different types of cakes on the performance of culled Shami does in Halfa Elgageda, Kassala State, Sudan.

Parameters	Rations			SE	Significance
	A	B	C		
Initial BW (kg)	50.00	49.50	48.90	0.85	NS
Final BW (kg)	55.90	56.20	54.00	0.44	NS
Total weight gain (kg)	05.90	06.70	05.10	0.89	NS
Daily weight gain (kg)	306	318	279	0.046	NS
Daily feed intake (kg)	1.63 ^a	1.48 ^{ab}	1.34 ^b	0.053	*
FCR	5.33	4.65	4.80	0.00	NS

A= Groundnut cakes ration; B= Sesame cakes ration; C= Sunflower cakes ration.

BW= Body weight; FCR (kg feed/kg weight gain)

NS= Non significant differences at $P < 0.05$; *= Significant differences at $P < 0.05$; Different letters within a row denote significant differences at $P < 0.05$.

Nilotic (Gall, 1996), Ingessana (Abdalla, 2004) and Tagger (Elbukhary, 1998; Ombabi and Elimam, 2011).

The variations among rations in weight gain and daily weight gain in culled Shami goats were also found in young West African goats (Anyanwu, 2008) and Nubian kids (Yagoub and Babikir, 2008). This was mainly due to variations in elements and vitamins in different cakes and hence associated effects and feeds nutritive value. Turki and Atcham (2011) found variations among cakes in composition, rumen degradation and molecular weight amino acids concentrations. Culled Shami goats daily weight gain was higher than Nubian goats (Khalifa, 2002).

The significant variations in feeds intake among rations were mainly due to the variations in cakes composition and effects on rations nutritive value. The highest feed intake in animals fed the groundnut cakes ration was due to the high CP and improved feeds nutritive value, digestibility and rates of outflow through the alimentary tract. It also had higher degradation than sunflower cakes (Turki and Atcham, 2011). The least feed intake in animals fed the

sunflower cakes ration was mainly due to the least CP among cakes in this study and hence the least nutritive value and performance. The variations in feed intake among rations were reported in young West African goats (Anyanwu, 2008) and Nubian kids in Sudan (Yagoub and Babikir, 2008).

The variations in FCR among rations with different cakes were mainly due to variations in feeds nutritive value, feed intake and weight gain. The highest FCR in animals fed the groundnut cakes ration reflected that it was poorly utilized for weight gain although it had the highest feed intake and ranked second in weight gain. The least FCR in animals fed the sesame cakes ration was mainly due to elements and vitamins enhancing feeds nutritive value. The sesame cakes ration had the highest final BW and the highest weight gain and ranked second in feed intake and had beneficial effects. The highest performance in animals fed the sesame cakes ration was similar to that for wheat offal ration in West African goat (Anyanwu, 2008). The least parameters, except FCR, in animals fed the sunflower cakes ration indicated that sunflower cakes were inferior to groundnut and sesame

cakes in composition and degradation as found by Turki and Atcham (2011). Similar effects were reported in West African goats fed grasses (Anyanwu, 2008). Shami goats feed conversion ratio was better than Nubian female kids fed different energy rations (Yagoub and Babikir, 2008).

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