International Research Journal of Agricultural Science and Soil Science (ISSN: 2251-0044) Vol. 3(4) pp. 147-151, April 2013
Available online http://www.interesjournals.org/IRJAS

Full Length Research Paper

Sugarcane tops as Animal Feed

A.G. Mahala, A.M.S. Mokhtar, E.O. Amasiab and B.A. AttaElmnan

University of Khartoum-Sudan, Faculty of Animal Production, Dept. of Animal Nutrition

Corresponding Author E-mail: ahmedgofoon9@yahoo.com

ABSTRACT

To highlight the possibility of introducing the sugarcane tops as part of a fattening ration for ruminant, sugarcane tops at levels of 20% and 30% were added to conventional fattening rations and fed to four groups of calves of deferent Friesian and Kanana blood levels 1/2, 5/8 and 3/4 (Friesian x Kenana) and pure local Kenana ecotype. Each blood group was divided into equal two subgroups. The average initial live body weights were 77.5, 90.3, 12.5 and 156 kg for the four subgroups respectively that fed ration A (20% sugarcane tops) and 77.5, 95, 129 and 156 kg for the second four subgroups that fed ration B (30% sugarcane tops) respectively. Dry matter intake, live weight gain and feed conversion ratios were carried out for the two rations and carcass weight in all animal groups were detected. The average dry matter intake as percentage of body weight for ration A and ration B was 3.04 and 2.17, 2.84 and 2.54, 2.78 and 3.18 and 3.5 and 3.24 for the four experimental animal groups respectively. Low values were observed in 50% blood group particularly in ration B and 5/8 blood group in both ration A and B. There were no significant differences between the two rations A and B in term of average daily gain for 1/2, 3/4 and local groups. Those gained 0.36, 0.73, and 0.71 and 0.70 kg/day respectively when fed ration A, and gained 0.44, 0.66 and 0.70 kg/day when fed ration B. In group 5/8 (Friesian x Kenana) there was a significant ($P<0.05$) higher 0.62 kg/day gain in ration B than 0.36 kg/day in ration A. Similarly there were no significant difference between the two rations A and B in term of feed conversion ratio for 1/2, 3/4 (Friesian x Kenana) and the local groups, 8.33,6.45 and 7.45 and 8.00 and 9.90 and 9.06 respectively while there were significant difference in the blood group 62.5% ($P<0.05$).9.29 kg DM/kg gain for ration A and 5.33 kg DM/kg gain for ration B. Also there were no significant differences due to rations in term of carcass weight, 86.0 and 88.5, 47.7 and 48.3, 54.0 and 56.5 and 67.3 and 58.0kg for the local 1/2, 5/8 and 3/4 (Friesian x Kenana) calves groups in ration A and B respectively. Sugar cane tops effectively constituted the large proportion of total mixed ration for fattening calves. This large contribution in diet will reduce the production cost and increase the benefit.

Keywords: Cross bred, fattening, zebu.

INTRODUCTION

Sudan is one of the main sugar growing countries in Africa possessing five factories that produce sugar. Through this industry many byproducts are available, namely, sugarcane tops, bagasse, molasses, press mud and condensed molasses soluble. Sugarcane tops are available in abundance in all the sugar growing countries. One hectare of sugarcane yields 30 tons of tops. But only a limited fraction of the total produce is utilized as feed for livestock. Cane tops are palatable and cattle can be maintained entirely on can tops with little supplement of protein either as concentrates mixture or leguminous feeds Preston and Leng (1976). The sugarcane leaves must be taken in consideration, since it is a part of the sugarcane tops. This part have a high crude fiber content (40-42%of dry matter), and the leaves are also rich in soluble carbohydrates. Therefore they are a potential feed resource for ruminant in the dry season Pate (1981).

Furtherly an advantage of integrating ruminant production with sugarcane growing is the opportunity to recycle organic fertilizers (manure) to the soil and thus improve its fertility. For most animal systems, the actual value of feed, either purchased or produced, constitutes 50% to 80% of the total cost of production, thus any reduction in the cost of the ration or of individual ingre-

dients could improve economic efficiency. On the other hand Sudan has large population of animals, one of the hypothetical ways for Sudan to keep on it's natural grazing resources is to utilize agro-industrial byproduct specially the sugar industry byproducts.

The objective of this study is to highlight the possibility of introducing the sugarcane tops as part of a fattening ration for ruminant, at levels of 20% and 30% in terms of feed intake. Live body weight gain, feed conversion ratio, carcass weight and dressing percentage.

MATERIALS AND METHODS

Site

This study was conducted at Kenana production farm, Kenana Sugar Company Ltd, located in White Nile State. The farm was established in 1979, using pure Kenana cattle, and then introduced Friesian blood in ranges from 50-75%.

Animals

Crossbred calves (Kenana x Friesian) were grouped according to the foreign blood percentage into three categories. 1/2, 5/8 and 3/4 (Friesian x Kenana) and pure local (Kenana cattle).

The age of calves ranged from 10-18 months and the initial live body weights for the four categories was as follows:

		Ration A		Ration B	
		No.	Initial wt	No.	Initial wt
I	1/2	4	77.5	4	77.5
II	5/8	4	96.3	4	95.0
III	3/4	4	125	4	129
IV	Pure local	5	156	5	156

All of the experimental animals were treated against ecto and endo parasites, and branded at the hind quarter.

Two rations were formulated to have the following ingredient productions:

	Ration A (%)	Ration B (%)
Sugarcane tops	20	30
Molasses	40	30
Wheat bran	26	26
Cottonseed cake	12	12
Salt	01	01
Urea	01	01

These two ration A and B had calculated CP% 10 and 9.78% and ME Mj/kg 11.0 and 10.9 respectively and had actual CP % 13.2 and 11.8 and ME Mj/kg 10.4 and 10.3 respectively.

Animals:

Thirty four calves were divided into four groups according to the foreign blood percentage 3/4, 10 calves, 5/8, 8 calves 1/2, 8 calves and pure local 8 calves. Each blood group was subdivided into two halves of similar body weight. Half of each group had consumed ration A and the other half consumed ration B.

The experiment lasted for 56 days in addition to 7 days for adaptation; during the experimental period animals were weighted every two weeks. Animals had adequate amounts of feed with free access to water. Residual amount from the previous day were weighed to determine the amount consumed. Food intake was calculated by subtracting food residue from that offered in the previous day, and was averaged for the whole period. The live weight gain was calculated by subtracting the initial live body weight from the final one and divided by the experimental days. Then the feed conversion ratio was calculated by dividing the daily dry matter intake by the daily live weight gain (kg DM/kg gain). The experimental calves were slaughtered and the carcasses weighed, and the dressing percentage was calculated by dividing the carcass weighted by the live weight x 100.

Statistical analysis

The data were analyzed by student T-test (Snedecor and Cochran 1980).

RESULTS

Data related to feedlot performance as initial weight, final weight, average daily, dry matter intake, dry matter intake per 100kg, body weight, average daily gain, feed conversion ratio, carcass weight and dressing percentage for the local, 1/2, 5/8 and 3/4 (Friesian x Kenana) calves group are shown in Tables (1, 2, 3 and 4) respectively.

The average daily live weight gain (ADG) and feed conversion ratio (FCR) for the local calves groups that consumed the two experimental rations A and B are summarized in Table (1). The ADG was slightly higher in animal groups that consumed ration A compared with ration B, but the FCR was best for ration B, although difference was not significant.

The average daily live weight gain and feed conversion ratio for the 1/2 Friesian calves groups are shown in Table (2) and it can be seen clearly that calves fed ration B was better in both ADG and FCR than those on ration A but the differences were not significant.

Concerning the 5/8 (Friesian x Kenana) calves groups the ADG and FCR are shown in Table (3) and it can be seen that the ADG and FCR were significantly ($P<0.5$) higher for experimental animal group that consumed

Table 1. Feedlot performance and carcass characteristics of (local calves) groups on the two experimental rations.

	Ration A		Ration B		Level of signi-ficance.
	Mean	Std. dev.	Mean	Std. dev.	
No. of animals	4	-	4	-	-
Initial weight (kg)	156	-	156	-	-
Final weight (kg)	196	32.7	195	32.5	NS
Average daily DM intake (kg/head/day)	6.94	-	6.35	-	-
DM intake kg/100kg body weight	3.50	-	3.25	-	-
Average daily gain (kg)	0.71	0.13	0.70	0.60	N.S.
Feed conversion ratio kg DM/kg gain	9.97	2.42	9.06	0.79	N.S.
Carcass weight (kg)	86.0	16.1	88.5	17.9	N.S.
Dressing percentage	44.5	1.54	45.2	1.24	N.S

Ration A contain 20% sugar cane tops
Ration B contain 30% sugar cane tops
In this and in subsequent tables, N.S. stands for not significant
* P<0.05 **P<0.01 ***P<0.001

Table 2. Feedlot performance and carcass characteristics of 1/2 (Friesian x Kenana) calves groups on the two experimental rations.

	Ration A		Ration B		Level of signi-ficance.
	Mean	Std. dev.	Mean	Std. dev.	
No. of animals	4	-	4	-	-
Initial weight (kg)	77.5	-	77.5	-	-
Final weight (kg)	97.5	19.1	102	22.6	NS
Average daily DM intake (kg/head/day)	2.97	-	2.23	-	-
DM intake kg/100kg body weight	3.4	-	2.17	-	-
Average daily gain (kg)	0.36	0.04	0.44	0.07	N.S.
Feed conversion ratio kgDM/kg gain	8.33	0.86	6.45	1.84	N.S.
Carcass weight (kg)	47.7	10.1	48.3	5.13	N.S.
Dressing percentage	45.9	2.13	43.0	1.89	N.S

Ration A contain 20% sugar cane tops
Ration B contain 30% sugar cane tops
N.S. stands for not significant

Table 3. Feedlot performance and carcass characteristics of 5/8 (Friesian x Kenana) calves group on the two experimental rations.

	Ration A		Ration B		Level of signi-ficance.
	Mean	Std. dev.	Mean	Std. dev.	
No. of animals	4	-	4	-	-
Initial weight (kg)	96.3	-	95.0	-	-
Final weight (kg)	116	27.5	129	37.5	NS
Average daily DM intake (kg/head/day)	3.31	-	3.30	-	-
DM intake kg/100kg body weight	2.84	-	2.54	-	-
Average daily gain (kg)	0.36	0.04	0.62	0.01	*
Feed conversion ratio kg DM/kg gain	9.29	0.99	5.33	1.06	*
Carcass weight (kg)	54.0	11.5	56.5	14.5	N.S.
Dressing percentage	46.6	1.20	43.9	3.00	N.S

Ration A contain 20% sugar cane tops
Ration B contain 30% sugar cane tops
N.S. stands for not significant
* P<0.05

Table 4. Feedlot performance and carcass characteristics of 3/4 (Friesian x Kenana) calves group on the two experimental rations

	Ration A		Ration B		Level of signi-ficance.
	Mean	Std. dev.	Mean	Std. dev.	
No. of animals	5	-	5	-	-
Initial weight (kg)	125	-	1290	-	-
Final weight (kg)	159	40.0	166	72.5	NS
Average daily DM intake (kg/head/day)	4.62	-	5.30	-	-
DM intake kg/100kg body weight	2.78	-	3.18	-	-
Average daily gain (kg)	0.62	0.03	0.66	0.13	N.S.
Feed conversion ratio kg DM/kg gain	7.45	0.24	8.00	1.54	N.S.
Carcass weight (kg)	67.3	12.5	58.0	10.0	N.S.
Dressing percentage	47.1	3.31	44.3	3.65	N.S

Ration A contain 20% sugar cane tops
Ration B contain 30% sugar cane tops
N.S. stands for not significant

ration B than those that consumed ration A. The average daily weight gain and feed conversion ratio for 3/4 (Friesian x Kenana) calves groups are shown in Table (4) and it can be noticed that the ADG was better in ration B than ration A but the differences were not significant however, feed conversion ratio was lower in ration B.

DISCUSSION

Average daily live weight gain for local calves group were 0.71 and 0.7 kg/day for the two rations that included either 20 or 30% sugarcane tops respectively. Regardless of the ration this observation was supported by Donovan (1979) who reported that the live weight gain for zebu bulls and steers was 0.79 kg/day. Also Ferreiro and Preston (1976) obtained average daily gain of 0.84 kg when Zebu bulls were fed sugarcane tops supplemented with rice polishing.

But these values seem to be low when compared with finding of Lanan and Boin (1990) 0.91, 0.87 and 1.01 kg for three rations that contained, first basal diet contained grass-hay as he source of fibre, in the second and third diets grass hay was replaced by crude sugarcane baggase and crude sugarcane baggase with sodium bicarbonate, respectively, and Eltahir (1994 who found 1.36 kg/day.

The average daily live weight gain for the crossbred calves were higher than the finding of Pate *et al*. (1971) who obtained 0.52 kg/day particularly for 5/8 and 3/4 (Friesian x Kenana) calves. Magalhaes et al (1999) found 0.52and 0.45 kg gain per day for 20 and 30% S.C.T. respectively. This might be due to large proportion of sugarcane tops which may increase the feed intake (yuangklank etal 2005). These finding were slightly superior to the observation of the 1/2 (Friesian x Kenana) calves which gained 0.36 to 0.44 kg/day respectively. The overall finding of the crossbred calves (Tables 2, 3 and 4) can be supported by Ozbeyaz et al (1997) who found that the crossbred calves from jersey dam gain of 0.64, 0.59 and 0.54 kg respectively. On the other hand, Katmakov and Zabirrov (1990) found daily gain of 0.92kg for crossbred calves which was higher than the findings in this study.

Feed conversion ratio for zebu calves in this study was found to be 9.90 and 9.06 kgDM/kg gain for 20 and 30% sugarcane tops respectively, these findings when compared with Magalhaes et al (1999) findings 8.79 and 12.7 kgDM/kg gain for 20 and 30% sugar-cane tops, feed conversion efficiency was high in 20% and low in 30% sugarcane tops.

Elkhider et al. (1995) and Moore (1991) found feed conversion efficiency of 7.29, 11.3 and 9.25, 8.27 kgDM/kg gain. While this result disagreed with Elfadil (1995) who found the feed conversion ratio ranged from 13.87 to 20.2 kgDM/kg gain and Lanna and Boin (1990) who found 7.41, 7.24 and 7.03 kgDM/kg gain.

Implications

Sugar cane tops effectively constituted the large proportion of total mixed ration for fattening calves. This large contribution in diet will reduce the production cost and increase the benefit. Small holders can use sugar cane tops as basal diet or total diet for maintenance during dry season.

REFERENCES

Donovan OPB (1979). Fattening crossbred and zebu cattle on local feeds and byproducts in Ethiopia World animal Review, 30: 23-29.

Elfadil AS (1995). Effects of varying protein sources with high molasses/urea rations on fattening zebu calves. M.Sc. Thesis, University of Khartoum, Animal Production.

Elkhider OA, Elkhidier A, Babiker A, Ibrahim SE, Elnazeir AE (1995). Report fattening of cattle in Sudan Baggara cattle meat production and fattening department. Animal Production Research, Kuku, p. 17 (in Arabic).

Elthair IC (1994). Beef production potential of western Baggara and Friesian crossbred cattle. M.Sc. Thesis, Faculty of Animal Production, University of Khartoum.

Ferreiro HM, Preston TR (1976). Fattening cattle with sugarcane: The effect of different proportions of stalk and tops. Trop. Anim. Prod. 1: 178-185.

Katmokov P, Zabirov A (1990). Fattening quality of crossbred young bulls. Molochnoe – I – Myasnoe – skotovodstvo. No. 5: 24-25.

Lanna DPD Boin C (1990). Effect of sodium bicarbonate, grass hay and untreated bagasse on the performance of growing zebu cattle fed on sugarcane bagasse treated with steam. Anaisde Escola superior de Agricultura Luizde Queiroz, 47: 2: 417-434.

Magalhaes LRG, Vasquez HM, da Silva JFC (1999). Hydrolyzed sugarcane (*Sacharum officinarum*) bagasse and sugarcane tops associated with two protein sources in the fattening of feedlot steers. Revista-Brasileira-de-zootecnia, 28: 4, 822-830.

Moore CP (1991). Dried cassava chips versus sugarcane as energy sources for fattening zebu cattle. World Review of animal Production, 26: 3: 65-68.

Ozebeyaz C, Yagci T, Bagci C, Alpan O (1997). Commercial crossbreeding of jersey cows for beef production using Brangus, Limousin and Simmental sires. II fattening slaughter and carcass characteristics. J. Lalahan-Hayvancilik-Arastirma-Enstitusu-Dergisi, 37: 2: 1-22.

Pate FM, Beardsley DW, Jayes BW (1971). Chopped sugarcane tops as feedstuff for cattle and horses. Everglades Station Mimeo Report EES 71-5 Pate FM (1981). Fresh chpped sugar cane in growing steer diets. J. Anim.Sci. 53: 881 – 888.

PrestonTR, Leng RA (1976). Sugar cane for cattle production: present constrains, perspectives and priorities. Trpical Animal Production

Snedecor GW, Cochran WG (1980). Statistical methods. 7the edition. Iowa State university Press Ames, I.A.

Yuanangklang C, Wanapat M, Wachirapakorn C (2005). Effects of pelleted sugarcane tops on voluntary feed intake, digestibility and rumen fermentation in beef cattle Asian-australasian journal of animal sciences 18:(1) pp. 22-26