Performance and some carcass characteristies of Sudan Baggara bulls fed sugar cane tops and sorghum straw as roughage source

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SUMMARY

Feedlot performance and carcass traits of 24 intact local bulls was conducted to compare sugur cane tops with sorghum straw as main roughage source used for cattle fattening at livestock fattening and meat production department of Animal Production Research Centre-Sudan. Bulls in each group (12 bulls) were fed molasses based diet Sugarcane tops or sorghum straw was given ad libtium. Animals were slaughtered at a target period of 78 days. The eflect of roughage source on live weight, live weight gain, feed intake and feed conversion efficiency was not significant ($P>0.05$). Bulls fed sorghum straw showed a significantly ($P<0.001$) higher daily roughages intake. Using sugar cane tops lowered ($P<0.001$) the total feed cost There were no significant differences ($P>0.05$) on slaughter weight, empty body weight, hot carcass weight, chilled carcass weight, chiller shrinkage percent. all dressing out percentages, gut fills percentage and longissimus dorsi muscle area. Bulls fed on sorghum straw showed higher slaughter weight (247.92 19.64 Vs. 244.17 t 14.90 kg). The study revealed no significant differences ($P > 0.05$) in all parameters concerning carcass and noncarcass components except omentum and kidney fats. The fed sorghum straw had significantly ($P<0.05$)

higher omentum fat (1.78 Vs 1.56 kg) but lower ($P<0.05$) kidney fat (0.67 Vs 0.79 kg) than the group fed sugar cane tops. The study concluded that feeding sugar cane tops revealed the same results in feedlot performance and carcass yield for Baggara bulls, but it lowered the feed cost so it is

highly recommended to use such a source of roughage in cattle fattening feedlot.

INTRODUCTION

Sugar cane tops is a major byproduct of the sugar industry that contain variable amounts of immature cane. Sugar cane tops accounts for 16-18% of total biomass production (Nguyen thr Mur et. al. 1995). Sudan livestock production like other tropical countries is based predominantly on animals grazing natural pastures. Grasses grow rapidly during the rainy summer, but later become fibrous. coarse, and highly lignified which decrease their digestibility. This results in loss of palatability and ineffective utilization of the pastures by the animals, thereby causing nutritional stress (Owen and Jayasuriya, 1989). As a result of these adverse conditions in the dry tropics, animals can lose weight and body condition mainly during the dry season, causing a heavy economic loses for cattle farmers (Tilman et al. 2002). Although, natural pastures are scarce during the dry season, there is usually an abundance of crop residues, which have potential to be used as feeds. One such crop residues are sugarcane tops, which is the immature growing portion of sugarcane and they are cut in the sugarcane cleaning process. Consequently, these materials are generally left in the field where they act as a soil fertilizer. Sugarcane tops are about 25% of the whole plant (Gooding, 1982). Therefore, Sugar cane tops represent a huge source of potential forages for ruminants (Nasceven, 1988). However. Sugar cane tops cannot he offered as a sole source of feed due to its low nitrogen content. Therefore, there is a need for a supplement that correcs the deficiencies of sugar cane tops in cattle.

The objectives of the present study are

- to compare sugar cane tops (SCT) with sorghum straw as the main forage source for cattle fattening.
- To evaluate the economics of using SCT to lower fattening cost on feedlot.

MATERIALS AND METHODS

A total of 24 intact male Baggarn bulls of an average age of 18 months old were used in the experiment. They were purchased from Omdurman local market (Elmoulih). On arrival at Kuku Research centre, they rested, car lagged and kept in a separate pen provided with watering and feeding facilities for a pre-experimental period of two weeks, during which they were treated for internal and external parasites and offered the experimental diet. At the end of the second week they were individually weighed after an overnight fast. except for water. to give initial live weight. The bulls were divided into two groups of equal numbers and weight and each group was subdivided into three subgroup. The six sub-groups were randomly allocated to the two roughage sources sorghum straw (group A) and sugar cane tops (group B). All the groups were fed on a molasses feed composed of 52% molasses, 41% wheat bran, 5 % ground nut cake 1% urea and 1% common salt. Sugarcane tops and sorghum straw were given ad libtium (Tablel and 2). The animals were individually weighed at weekly intervals. Following an overnight fast except for water. The feed intake of each group was recorded daily. Animals were slaughtered at a target period of 78 days. Animals destined for slaughter were offered water but no food for 14 hours before slaughter. After dressing and eviscerating, the internal organs and offals were removed and weighed. The weight of the body components was recorded. The kidney and kidney knob and channel fat were left intact in the carcass. The carcass weight was recorded and the carcass was chilled

at 4°C for 24 hours. After cooling the chilled carcass weight was recorded and the carcass was split into left and right sides by longitudinally sawing along the middle of the vertebral column. The data were examined by the Student t-test for independent samples to reveal the significance of differences between the two treatments. All analyses followed the procedures described by a commercial statistical package (Stat Soft 1995).

Table 1. Ingredients proportion of the experimental diets.

Ingredient	Molasses feed (%)
Molasses	52
Wheat bran	41
Groundnut cake	5
Urea	1
Common salt	1
Total	100

Table 2. Chemical composition of the experimental diets.

Component	Molasses feed	Sorghum straw	Sugarcane Tops
Moisture (%)	9.10	4.30	3.83
Ash (%)	8.68	14.50	6.33
Crude protein (%)	13.78	3.22	2.76
Crude fibers (%)	12.40	41.00	41
Ether extract (%)	2.00	1.20	0.4
Nitrogen free extract (%)	54.04	35.78	48.44
Calculated metabolizable energy[*1] (MJ / Kg.DM)	10.50	6.69[*2]	7.18

RESULT AND DISCUSSION

Feedlot performance:

Student-t-test for live weight, live weight gain, feed intake and feed conversion efficiency are shown in (Table 3). The present finding indicated that there were no significant differences ($P>0.05$) in all parameters studied except roughage feed intake. The live weight gain values for the two groups in this study were the same as that reported by Mohamed (1988) and Gumaa (1996) for the same breed.

The group of bulls fed sorghum straw diet consumed significantly ($P<0.001$) dnoua more roughage than the group fed sugar cane tops (2.89 Vs 2.64 kg/day). Feed intake is an important parameter to measure feed quality and of course the greater intake the better is the response of the animal to the diet fed. The more the animal cats cach day the greater will be its daily production. According to this fact the group of bulls fed sorghum straw showed better results in all parameters than the bulls fed sugar cane tops.

The total feed intake values of the two groups were similar to that reported by El Khidir (2004) who found total dry matter intake of 8.29 and 9.00 kgiday for Baggara bulls fed concentrates ration containing baggase at 10%. Also, similar to Babiker et al , (2009) who found that dry matter intake of 8.7 kg / day for bulls from the same breed fed unplleted diets containing 15% baggase.

The feed conversion efficiency values in this study agreed with that of El Khidir and Ibrahium (-1996) for the same breed.

Regarding the feed cost all producers manage to lower the feed cost as a major component of the enterprise, sugar cáne tops showed a highly significant lower ($P<0.001$) intake which resulted in a significant ($P< 0.001$) lower total feed cost.

Table 3. Performance characteristics of Baggara bulls fed Sugarcane tops and sorghum straw.

Trait	Mean± Standard Deviation		
	Sorghum straw fed group (A)	Sugarcane tops fed group (B)	Significance of difference
Number of experimental animal	12	12	-
Period on feed (days)	78	78	-
Initial live weight (kg)	178.75 ± 7.11	178.75 ± 7.11	NS
Final live weight (kg)	247.92 ± 9.64	244.17 ± 14.90	NS
Total live weight gain (kg)	69.17 ± 9.37	65.41 ± 11.77	NS
Live weight gain (kg/ day)	0.88 ± 0.14	0.84 ± 0.18	NS
Molasses feed intake (kg/ day)	6.07 ± 0.28	6.10 ± 0.28	NS
Roughage feed intake (kg/ day)	2.89 ± 0.17	2.64 ± 0.12	***
Total feed intake (kg/ day)	8.75 ± 0.40	8.96 ± 0.41	NS
Intake as % live weight	2.07 ± 0.05	2.08 ± 0.06	NS
Feed conversion efficiency (kg DM feed/kg live weight gain)	10.36 ± 1.59	10.78 ± 1.88	NS
Rough age feed cost/ head(Sudanese pound)	56.68 ± 1.56	20.72 ± 0.70	***
Molasses feed cost/ head (Sudanese pound)	266.56 ± 10.16	267.93 ± 8.14	NS
Total feed cost (Sudanese pound)	323.65 ± 11.70	288.65 ± 8.01	***

Within a row, means having different superscripts are significantly different.
NS = not significant;
** Significant (P< 0.05); ** Significant (P< 0.01); *** Significant (P< 0.001).*

Table 4, displays slaughter data of treatment groups. There were no significant differences (P>0.05) on slaughter weight, empty body weight, hot carcass weight, chilled carcass weight, and chiller shrinkage percent. All dressing out percentages values, gut fills percentage and longissimus dorsi area was not significant. Bulls fed on sorghum straw diet had higher slaughter weight, hot carcass weight, dressing out percentages of (hot and, chilled carcass weights on empty body weight), fat thickness and longissimus dorsi area; but lower in empty body weight, chiller shrinkage, dressing out percentages of hot carcass on empty body weight and gut fill. The results of noncarcass components are summarized in Table 5. They indicated that no significant differences (P>0.05) in all parameters except omentum and kidney fats. The group fed sorghum straw had significantly higher (P<0.05) omentum fat (1.78 Vs 1.56) but lower (P<0.05) kidney fat (067 Vs 079) than group fed sugar cane tops.

Table 4. Carcass yield and characteristics of Baggara bulls fed Sugar cane tops and Sorghum straw

Trait	Mean Standard Error		Significance of difference
	Sorghum straw fed group	Sugarcane tops fed group	
Number of animals	12	12	-
Slaughter weight (kg)	247.92 ± 9.64	244.17 ± 14.90	NS
Empty body weight (kg)	196.04 ± 12.93	200.28 ± 11.59	NS
Hot carcass weight (kg)	133.11 ± 7.09	129.18 ± 11.59	NS
Chilled carcass weight (kg)	129.20 ± 7.00	125.29 ± 8.67	NS
Chiller shrinkage (%)	2.94 ± 0.61	3.03 ± 0.68	NS
Dressing (%) of hot carcass weight	53.70 ± 2.19	52.91 ± 1.50	NS
Dressing (%) of chilled carcass wt.	52.12 ± 2.07	51.31 ± 1.52	NS
Dressing (%) of hot carcass on EBW bases	65.92 ± 1.60	66.56 ± 3.35	NS
Dressing (%) of chilled carcass on EBW bases	64.60 ± 3.21	63.92± 1.42	NS
Gut fill (%)	37.72 ± 5.51	38.27 ± 5.09	NS
Fat thickness	0.34 ± 0.07	0.33 ± 0.06	NS
Longissimus dorsi area (cm^2)	48.79 ± 5.40	47.98 ± 4.13	NS

*Within a row, means having different superscripts are significantly different. NS = not significant; * Significant ($P < 0.05$); ** Significant ($P < 0.01$); *** Significant ($P < 0.001$).*

Table 5. Non-carcass components of Baggara bulls fed sorghum straw or Sugar cane tops as source of roughage (as % of empty body weight).

Parameter	Mean Standard Error		Significance of difference
	Sorghum straw fed group	Sugarcane tops fed group	
Number of animals	12	12	-
Head	8.40 ± 2.22	7.73 ± 1.20	NS
Hide	9.79 ± 0.87	9.94 ± 0.93	NS
Four feet	2.86 ± 0.87	2.88 ± 0.21	NS
Rumen weight (full)	11.31 ± 2.54	10.64 ± 2.78	NS
Omasum weight (full)	1.75 ± 0.38	1.67 ± 0.28	NS
Abomasum weight (full)	1.23 ± 0.40	0.97 ± 0.17	NS
Intestine weight (full)	5.39 ± 0.72	5.69 ± 0.84	NS
Rumen weight (empty)	3.09 ± 0.33	3.18 ± 0.50	NS
Omasum weight (empty)	1.01 ± 0.29	0.98 ± 0.15	NS
Abomasum weight (empty)	0.72 ± 0.15	0.60 ± 0.15	NS
Intestine weight (empty)	3.09 ± 0.49	3.27 ± 0.54	NS
Mesentric fat	0.48 ± 0.18	0.52 ± 0.24	NS
Omental fat	1.78 ± 0.32	1.56± 0.53	*
Kidney weight	0.17 ± 0.02	0.17 ± 0.02	NS
Kidney fat	0.67 ± 0.06	0.79 ± 0.09	*
Liver	1.87 ± 0.29	1.83 ± 0.11	NS
Heart	0.42± 0.04	0.45± 0.05	NS
Genital organ	1.17± 0.18	1.19± 0.14	NS
Tail	0.46± 0.05	0.44 ± 0.04	NS
Lung and trachea	1.75 ± 0.24	1.77 ± 0.21	NS
Diaphragm	0.70± 0.10	0.71 ± 0.06	NS
Spleen	0.44 ± 0.08	0.42 ± 0.09	NS
Blood	5.05 ± 0.54	4.98 ± 0.64	NS

*Within a row, means having different superscripts are significantly different. NS = significant; * Significant (P<0.05); ** Significant (P<0.01); *** Significant (P < 0.001).*

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مقارنة إداء ثيران البقارة السودانية بالمعطف عند تغذيتها على رؤوس قصب السكر وسيقان الذرة كمصدر للعلف المالىء

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ص الباه ١٣٥٠ الخرطوم بحري

ملخص البحث

أجريت تجربة لتغذية مجموعتين (١٢ رأس لكل مجموعة من ثيران البقارة السودانية للمقارنة بين التغذية على رؤوس قصب السكر وسيقان قصب الذرة كمصدر رئيسي للعلف الماليء بمركز بحوث الانتاج الحيواني السودان . تمت تغذية الحيوانات بكل من المجموعتين على علف المولاس وقدمت رؤوس قصب السكر للمجموعة الأولى وسيقان القصب للاخرى (بحرية حتى الشبع) .

ذبحت جميع الثيران في الفترة المستهدفة (٧٨ يوم) . لم تظهر اي فروقات معنوية ($P > 0.05$) على الوزن الحي ومعدل النموء و العلف المتناول والكفاءة التحويلية للعلف . بينما ظهر فارق معنوى ($P < 0.001$) المتناول اليومي لسيقان قصب الذرة . اظهرت التجربة أن استهلاك رؤوس قصب السكر قد ادى الى خفض ($P = 0.001$) تكاليف التغذية

لم يظهر اي فرق معنوى ($P = 0.05$) في الوزن الفارغ أووزن الذبيحة الحار او البارد او انكماش الذبيحة او نسبة التصافي في حالتي وزن الذبيحة الساخنة أو المبردة .

اظهرت العجول المغذاه على قصب الذرة اعلى وزن ذبح (٢٦٧’٩٢ + ٩ , 64 مقارنة ب ٢44’١٧ + 14,٩٠ كجم) .

لم تظهر الدراسة اى فروقات معنوية ($P > 0.05$) في كل البيانات الخاصة بالذبيحة والسقط عدادهن الكرش ودهن الكليتين ، المجموعة التي تغذت سيقان القصب اظهرت معنويا ($P < 0.05$) وزن اعلى في دهن الكرش

(١’٧٨ مقارنة ب 1.5 كجم) . ولكنها الاقل وزنا معنويا ($P < 0.05$ بالنسبة لدهن الكليتين (١٧ . مقارنة ب ٠ , ٧٩ كجم) من الجموعة التي تغذت على رؤوس قصب السكر .