SUGAR CANE FOR BEEF PRODUCTION: DERINDED SUGAR CANE AND CHOPPED CANE COMPARED WITH HAY AND CITRUS PULP

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In two separate experiments yearling bulls were given (Expt 1) derinded cane supplemented at 20% of DM with 8 protein concentrate beset on rapeseed meal (A), and B C & D as A, but with 20% of the derinded cane replaced by cane tops, pangola hay, or citrus pulp. In Expt 2, chopped case stalk was substituted for the derinded cane, and wheat middlings for the citrus pulp in treatment D, otherwise the treatments were identical. liveweight gains were (expt 1): 0.94, 0.89, 0.95 and 1.00, and (Expt 2) 0.92, 0.93, 0.95 and 1.11 kg/d for treatments A, B, C & D respectively. With the reservation that the comparison is between experiments, it is concluded that when the capital and running costs of derinding and chopping are compared, the lower coat of chopping makes it more applicable to commercial systems.

The Jamaican farmer is being encouraged to practice a policy of "selfsufficiency" largely because it seems sensible that a climate favourable for the growth of grass should be used to full advantage, thus enabling the amounts of imported food-stuffs to be considerably diminished or alternatively the livestock population to be increased.

Roughage has always been the most important ingredient in Jamaican cattle rations. Grass is abundant during the rainy season but a large part of this crop is lost for feeding purposes due to the fact that the weather conditions make hay making difficult, while labour costs and lack of equipment keep silage making at a minimum. The long dry span which frequently lasts from November to May is marked by greatly reduced forage growth and is a major factor in limiting annual stocking rate. Fortunately, the sugar cane harvest coincides with the dry season and small farmers have for many decades relied on this crop to help feed their livestock during periods of drought. Despite the crucial role of sugar cane as a pasture supplement, efforts to evaluate its feeding value for livestock have come about only in recent years. This paper describes two feeding trials recently conducted in Jamaica.

Experimental

Animals and Diets: The animals used in the two trials were yearling bulls of the Indian, Jamaica Red Poll and Jamaica Black breeds. Forty eight animals were used in each experiment and were divided into 4 groups of 12. The groups (2 replicates of 6 each) and of approximately the same weight were assigned the rations shown in Table 1. In Expt 1 derinded cane was used, and in Expt 2, chopped cane stalk.

Derinded cane was prepared daily from cane harvested no more than 3 days prior to feeding. Hay was made from pangola grass cut at the late flowering stage.

Table 1: Composition of Diets (% of DM)

Experiment 1(derinded cane):

Ingredient (% DM)	Derinded cane	Cane tops	Hay	Citrus pulp	Supplement*
Diet:					
A	80	-	-	-	20
B	60	20	-	-	20
C	60	-	20	-	20
D	60	-	-	20	20

Experiment 2 (chopped cane):

Ingredient (% DM)	Chopped cane stalk	Chopped cane tops	Hay	Wheat middlings	Supplement*
Diet:					
E	80	-	-	-	20
F	60	20	-	-	-
G	60	-	20	-	-
H	60	-	-	20	-

*Rapeseed meal 80%, urea 7%, dehydrated alfalfa 5%, dicalcium Phosphate 5% salt 1.57 sulphur (elemental) 0.25%, fat 0.25%, magnesium oxide 0.5%, premix 0.5%, Premix included vitamins A, D and E and traces of magnesium, zinc, iron, cobalt, iodine and selenium. Total nitrogen 7.2%.

Management: A preliminary feeding period of 8 days was allowed to accustom animals to rations. All groups received the protein-mineral-vitamin supplement in which urea contributed 40% of the crude protein. Feed was offered once daily in the mornings, the supplement first and roughage after the former was consumed. On a dry matter basis the forage component averaged 80% of the total ration. Daily feed intake was recorded. Animals were weighed fortnightly at which time levels of roughage and supplement were adjusted so that total dry matter offered was approximately 3.3% of body weight.

Samples of derinded cane, cane top, hay and citrus pulp from all batches used in the trial were pooled for subsequent analyses.

Results and Discussion

Composition of Diets: Proximate analysis of the four roughages are given in Table 2. Derinded cane includes the sugar storage cells and the fibrovascular bundles of cane stalk. It is relatively low in dry matter and crude fibre and high in nitrogen free extractives which consist mostly of sucrose. Cane tops consist of green leaves and the upper young portion of the stalk, the rind of which is somewhat lignified. The relatively high protein content of the leaves and lignin of the rind account for protein and crude fibre levels being higher in tops that in derinded cane.

Table 2: Proximate analysis of derinded cane, cane tops, hay and citrus pulp

	Derinded cane	Cane tops	Hay*	Citrus pulp
Composition of DM (%)				
Dry matter (%)	28.6	31.3	90.1	94.2
Crude protein	1.4	4.0	7.0	6.6
Crude fibre	24.0	36.3	34.9	12.8
Ether extract	0.4	1.5	1.9	3.2
Ash	5.0	9.2	8.6	7.3
Nitrogen free extract	69.2	49.0	47.6	70.1

* As used in both experiments

High fibre and low protein content are characteristic of grass cut at the late flowering stage. These features tend to be even more pronounced during the period of slow growth i.e. November to May when the hay was prepared. The crude fibre levels encountered in the batches of citrus pulp used in this trial ranged from 11.4 to 13.6 per cent.

Table 3: Animal Performance and feed intake data (expt 1)

Diets	Derinded cane			
	-	Cane tops	Hay	Citrus pulp
Duration (d)	140	140	140	140
Live weight (kg)				
Initial	210	209	209	207
Final	344	334	346	349
Daily gain	0.96	0.89	0.98	1.01
Daily DM intake (kg)				
Derinded cane	5.99	5.46	4.85	4.89
Cane tops	-	0.86	-	-
Hay	-	-	1.80	-
Citrus pulp	-	-	-	1.80
Supplement	1.61	1.60	1.61	1.61
Total	7.60	7.92	8.26	8.30
Consumption Index[1]	2.75	2.92	2.98	2.99
Feed conversion[2]	7.92	8.90	8.44	8.18
Feed cost, kg gain[3]	1.09	1.10	1.17	1.08

[1] Food intake /100 kg live-weight
[2] kg food / kg gain
[3] $ Jamaican / kg gain

Animal Performance (Expt 1): Weight gain and feed intakes from Expt 1 are presented in Table 3 which shows that the total dry matter intake of animals fed derinded cane as the only roughage (Diet A) was the lowest of all groups, This was perhaps the due to the high moisture content. Daily gains in this group were identical to those of the derinded cane/hay treatment (Diet C) despite the fact that the latter had greater DM intake, This suggests that of the two roughages derinded cane was more efficient than poor quality pangola hay in providing the nutrient requirements for fattening. Peed cost per pound gain was also highest when hay was fed.

Substitution of derinded cane by cane tops (Diet A) was approximately 16% instead of the 20% indicated by Table 1. This relatively low level of derinded cane to tops (84:16) may be the reason why there was no response to the inclusion of tops into the diet, in contrast with the results of Donefer et al (1973) who observed significantly greater gains with a combination of derinded cane and cane tops in the ration 70:30 than with derinded cane alone,

The improved growth rate observed for the derinded cane/citrus pulp combination is predictable on the basis of the high digestible energy content of citrus pulp.

Table 4: Animal performance and feed intake data (expt 2)

Diets	Derinded cane			
	-	Chopped cane tops	Hay	Wheat middlings
Duration (d)	98	98	98	98
Initial wt (kg)	232	230	290	232
Final wt (kg)	322	321	323	341
Daily gain (kg)	0.92	0.93	0.95	1.11
Daily DM intake (kg)				
Stalk	5.43	-	3.80	4.70
Chopped whole cane	-	6.03	-	-
Hay	-	-	2.18	-
Wheat Middlings	-	-	-	1.50
Supplement	1.66	1.69	1.67	1.64
Total	7.09	7.72	7.65	7.84
Consumption Index[1]	2.56	2.80	2.77	2.74
Feed Conversion[2]	7.72	8.32	8.06	7.05
Feed cost[3]	0.72	0.75	0.89	0.67

[1] Food intake / 100 kg live-weight

[2] kg food/kg gain

[3] $Jamaican/kg

Experiment 2: Weight gain and feed intakes from Expt 2 are presented in table 4. Again there was no response to the inclusion of cane tops (as chopped whole cane) in which the tops could be expected to contribute 20-30% of DM. The fact that growth was identical with whole cane (Diet F) or stalk alone (Diet E) argues in favour of feeding whole cane in a commercial operation since this is usually easier. The best growth response with wheat middlings (Diet H), 1.5 kg producing a growth response of about 0.2 kg/d above that produced by the other diets. there was a tendency for the intake of cane stalk to be reduced with this diet.

Conclusions

The results show that gains of 0.9-1.0 kg/d can be obtained with derinded cane or chopped cane when supplemented with a protein concentrate. Although no direct comparison was made, the animals performed very similarly whether given derinded cane stalk or chopped whole cane. The higher capital cost and energy consumption of the derinder compared with a simple chopper, means that considerable savings can be affected by using chopped whole cane rather than derinded cane in sugar cane based rations for fattening cattle in dry lot.

References

Donefer E, James L A & Laurie C K 1973 Use of a sugar cane Derived feedstuff for livestock III World Conference on Animal Production Melbourne Australia May 1973

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