THE VALUE FOR MILK PRODUCTION OF SUPPLEMENTS OF MIXTURES OF FINAL MOLASSES, BAGASSE PITH AND UREA, WITH AND WITHOUT COMBINATIONS OF MAIZE AND GROUNDNUT CAKE

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Creole cows tied individually in a completely enclosed building received freshly cut grass plus (A) no supplement; (B) a commercial protein concentrate; © a mixture of final molasses, dehydrated bagasse pith, ground nut cake, urea and minerals; (D) similar to C, but with maize instead of groundnut; (E) similar to C, but with maize and groundnut; and (F) groundnut cake alone, Each treatment was replicated 8 times. The experimental period was preceded and succeeded by a standardisation period From day 1 to 30 each cow received the commercial concentrate. From day 41 to 100 the experimental supplements; and from day 111 to 140 the commercial concentrate. Days 31 to 40 and 101 to 110 were for ration changeover. Milk yield was expressed as persistency = $Ye/(YS_1 + YS_2)$ where Ye = total yield of milk in the experimental and S_1 and S_2 the total yield in the two standardization periods. Persistency differed significantly between treatments, mean values being 0.74^{a}, 1.00^{a}, 0.83^{bc}, 0.88^{ab}, 0.8^{ab} and 0.95^{a} for treatments A through F. Corresponding values for 1 live weight gain during the experimental period were $-.72$, $.00^{a}$, $-.31^{ab}$, $-.36^{ab}$, $.00^{a}$, and $+ .13^{a}$ kg/d. It appears that although mixtures based on molasses, bagasse pith and urea give some improvement in production over grass alone, they are not as effective as cereal oilseed by-product based concentrate or groundnut cake.

Key words: cattle, milk production, molasses, bagasse

There have been many reports concerning the use of bagasse pith to absorb liquid molasses as a means of converting the latter into a solid feed. Usually urea had been added to this mixture and occasionally some cereal or protein-rich meal. As far as we aware there are no reports in the scientific literature as to the relative feeding value of such mixtures compared with traditional cereal-based concentrates.

The objective of this experiment was to evaluate the feeding value of such mixtures when fed to milking cows receiving a basal diet of cut grass, which is the traditional system in Mauritius.

Materials and Methods

Treatments and Design: The treatments in a random block design with 8 replications were : A freshly cut grass (mainly Setaria kazangula) given ad libitum (control); B a cereal-protein-rich concentrate given at 500g/kg milk; C a mixture of final molasses, dehydrated bagasse pith,groundnut cake, urea and minerals (MBUg) fed at 600g/kg milk; D similar to C but with maize grain instead of groundnut (MBUm); E with maize and groundnut (MBUgm); groundnut cake alone fed at 200g/kg milk. The exact composition of the different mixtures is given in table 1.

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Table 1:
Composition of the different supplements

	Cereal	MBUg	MBUm	MBUgm
		g/100g		
Molasses	25	73.4	58.4	52
Dehydrated bagasse pith	-	14	12	10
Urea	-	2.5	2.5	2.5
Groundnut cake	10	8	-	8
Wheat bran	27.5	-	-	-
Rice bran	5			
Maize meal	4.9	-	25	25
Rice flour	5	-	-	-
Cottonseed cake	20	-	-	-
Salt	1	1	1	1
Dicalcium phosphate	1.5	1	1	1
Vitamin premix	. 1	.1	.1	.1

The experimental variables were persistency of milk yield and change in live weight. A changeover design was used to measure milk yield persistency. From day 1 to day 30 after calving (S_1) the supplement was the cereal-based concentrate (see table 1);day 31 to 40 (C_1) changeover to the experimental supplement ; day 41 to 100 experimental period (E) when the appropriate treatment (see table 1) was given, day 101 to 110 changeover from the experimental diet to the cereal concentrate supplement (C_2), day 111 to 140 (S2) standard cereal concentrate . Milk yield persistency (P) was defined as $P = Ye/(Y_{S1} + Y_{S2})$ where Y = total yield per cow during the appropriate periods S_1, E and S_2.

Animals: The 48 cows were mostly Creole with some Friesian X Creole crosses. The Creole breed is native to Mauritius and is entirely of Bos taurus origin teeing the outcome of importations from Europe. It is completely white and resembles most, in milk production potential and physical appearance, the Dairy Shorthorn . The animals were allocated to treatments in blocks of 6 taking account of calving date, previous lactation yield and parity. The first animals to start on the experiment calved in June 1973 and the last ones in October 1974.

Procedure: The animals were fed and hand-milked twice daily and were weighed weekly. The level of supplementation was calculated at the beginning of each week based on the average milk yield of the previous week. The cows were confined throughout the experiment in yoke stalls. It was not possible to record individual consumption of grass in view of its bulky nature and the proximity of the animals to each other. The average amount offered was approximately 50 kg/d which usually exceeded voluntary intake. It was cut with a machete and fed long.

Results and Discussion

Mean values for daily milk yield during the standardization and experimental periods and milk yield persistency and daily live weight gain during the experimental period, are given in table 2.

Table 2:
Mean values for milk yield persistency and live weight change (8 cows per treatment)

	No	MBUg	MBUm	MBUgm	CNC	Cereal	SEx
Milk yield, kg/d							
Standard (S_1)	11.4	10.7	10.0	11.6	10.2	10.2	
Experimental	6.1	6.8	6.9	7.6	7.8	7.7	
Standard (S_2)	5.1	5.9	5.8	6.1	6.1	6.6	
Persistency[1]	.74[c]	.83[bc]	.86[ab]	.88[ab]	.95[a]	1.00[a]	±.033
Weight change[2], kg/d	.72[b]	. 31[ab]	_.36[ab]	.00[a]	.13[a]	.00[a]	±.17

[1] $E/S_1 + S_2$, where S_1 = total yield 1-30 days, E=41 -100 days and S_2 =111-140 days
[2] During experimental period [abc] Values in same row without common superscript differ significantly (P <0.58)

Persistency was significantly poorer for cows receiving only cut grass than for all other treatments, except the molasses mixture with ground nut cake(MBUg) . This latter mixture was also significantly poorer than the cereal concentrate and the groundnut cake treatment (GND) but did not differ significantly from the other molasses mixtures which contained maize meal (MBUm and MBUgm) . A similar tendency was noted for change in live weight during the experimental period.

The results support the hypothesis that the main nutritional limitation to milk production in tropical conditions is not digestible energy (the cereal and molasses supplements all provided comparable amounts of digestible energy; while the groundnut cake treatment, which gave best results, provided only one third of the energy of the remainder) but rather the need for a combination of specific nutrients, namely by-pass protein and gluconeogenic precursors (see Leng and Preston 1976; Preston 1977; Kempton et al 1977).

References

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