A MOLASSES BASED PRODUCTION FEEDING SYSTEM FOR BRAHMAN CATTLE

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SUMMARY

High grade Brahman steers were assembled from two breeders and grazed on dry season native pastures (predominantly *Heteropogon contortus*). Two groups were supplemented with a mixture of molasses, urea, minerals and cottonseed meal. One of these groups had 20% cracked sorghum added to the mixture. The supplements were fed *ad libitum* for 92 days and the supplemented cattle were then slaughtered. The unsupplemented cattle continued to graze into the next wet season and were slaughtered when they achieved the same mean liveweight as the other two groups. The steers on the production ration grew at 0.7 kg/day and achieved turn-off weight four months earlier than the grass only group. All steers produced meat of acceptable fat and meat colour.

Keywords: beef cattle, pastures, molasses supplementation, Brahmans

INTRODUCTION

Market requirements for beef are increasingly demanding a younger, more consistent product at a standard carcass weight. Several options are available to northern beef producers to increase annual growth rates of beef cattle. These include sown and fertilized perennial legume pastures or finishing in a feedlot using grain based high energy rations. A new alternative is to use a production feeding system based on locally produced molasses. This has several advantages: because the cattle are fed in the paddock, capital costs are significantly lower; environmental concerns are minimal; the cattle do not have to be relocated; and dry season liveweight loss is eliminated. This paper describes the system and presents results from an experiment using high grade Brahman steers.

MATERIALS AND METHODS

Two commercial co-operators supplied a total of sixty-two high grade Brahman steers (average weight 475 kg). The cattle were about 2.5 years of age and in forward store condition. They were acclimatised as one group for 21 days in August 1994 at Swan's Lagoon Research Station where the mean annual rainfall is 860mm and falls predominantly in the period December to March. The steers were then allocated to one of three treatments using full liveweight:

(i) Native spear grass, no supplement (NP);
(ii) NP plus *ad libitum* molasses, production ration (MUC); and
(iii) As for 2 plus 20% cracked sorghum (MUC+G)

All steers grazed native spear grass pastures at a stocking rate of one per five hectares, with nine steers per paddock (total of six paddocks). The steers on treatments (i) and (ii) were implanted with the hormonal growth promotant, oestradiol 17B (Compudose[200]) at the beginning of the experiment in August 1994 (ie at the start of the dry season), and those on treatment (i) were implanted in December 1994 (at the start of the wet season). These times were chosen to coincide with the commencement of a period when the steers were expected to be gaining liveweight. The production supplement was fed *ad libitum* in open troughs for 92 days.

The composition of the two production supplements is shown in Table 1. These were mechanically mixed. The molasses was added first then prilled urea followed later by the other ingredients. Mixing continued until all the prilled urea was dissolved.

The steers were transported 450 km to a meatworks for slaughter on 15 December 1994 (supplemented) and on 3 April 1995 (unsupplemented). Chiller assessment of meat and fat colour was done using Ausmeat standards, and az laboratory colour meter was used to measure the meat and fat samples. The data were analysed by analysis of variance (Steel and Torrie 1960)

Table 1. Ingredients (% by weight) of the production feeding mixtures

	MUC	MUC + Grain
Molasses	87	73.5
Prilled urea	2.6	2.2
Cottonseed meal	9	7.6
Dicalcium phosphate (DCP=18%P)	1.3	1.1
Cracked sorghum	0	14.7
Rumensin 100®	0.05	0.05
Flossy fine salt	0.9	0.8

®Rumensin 100 contains 100 mg/kg monensin, a product of Elanco Animal Health Pty Ltd

RESULTS

Liveweight Gain

The results for the 92 day feeding period are given in Table 2. Despite the severe dry season conditions the supplemented steers gained at 0.70 kg/d. With added grain the steers gained 0.77 kg/d. This difference was not significant. The results show that the molasses, urea, cottonseed meal supplement is very effective in promoting liveweight gain.

Carcass and meat attributes

The carcass data are given in Table 3. Each treatment group was killed at the same carcass weight. Differences in marbling score and fat depth were not significant. All carcasses fell within the range of 6 to 22 mm of fat which is within the optimum range. Dentition (number of permanent teeth) reflected the age of the cattle. Meat colour was acceptable in all carcasses and there were no dark cutters. Bruising was minimal. The fat colour from the cattle fed MUC plus grain was slightly whiter than the other groups and there were no samples with yellow fat from any of the treatments.

Table 2. Liveweight gain (kg/d) of high grade Brahman steers on two paddock finishing rations over 92 days

Treatment	Initial weight (kg) 6.8.94	Weight (kg) 12.12.94	Liveweight gain
No supplement (spear grass only)	473[a]	439[a]	-0.37[a]
MUC*	474[a]	538[b]	0.70[b]
MUC+Grain**	477[a]	548[b]	0.77[b]
s.e.m.	9.8	14.1	0.05

Within column values followed by different letters are significantly different at P<0.05
* MUC: Molasses(100), Urea(3), Cottonseed meal(10), DCP(1.8), Salt(1) + Rumensin (see Table 1)
** MUC+Grain As for MUC plus 20% cracked sorghum

Table 3. Carcass data from high grade Brahman steers fed the finishing rations for 92 days or grazing native pasture alone

	Treatment			
	MUC	MUC+Grain	Native pasture alone	s.e.m.
Carcass weight (kg)	275	286	282	5.9
Dressing %	51.2	52.3	51.2	0.4
Marbling Score*	1.1	1.3	1.1	0.1
Fat depth (mm) at P8 site	12	14	14	0.9
Dentition**	6.5	6.9	7.3	0.3

Differences between treatments were not significantly different at P=0.05
* Ausmeat assessment on scale 1-12 (12= very fat)
** Number of permanent teeth

In Table 4 data on various meat attributes are shown. The ultimate pH was in the ideal range, also indicating no dark cutters. There was some cold shortening due to low chiller temperatures as seen in the sarcomere lengths. Meat tenderness measurements indicated that the native pasture group had a significantly lower amount of connective tissue (instron compression value) but there were no significant differences in initial yield which was acceptable for all groups.

Table 4. Meat attributes of the striploin samples from high-grade Brahman steers

Treatment	Ultimate[A] pH	Sarcomere[B] length (μm)	Initial[C] yield (kg)	Instron[D] compression (kg)
Native pasture	5.57[b]	1.80[a]	5.01[a]	1.67[a]
MUC	5.51[a]	1.85[a]	4.50[a]	2.28[b]
MUC+grain	5.52[a]	1.83[a]	4.71[a]	2.27[b]
s.e.m.	0.01	0.02	0.21	0.06

Within column values followed by different letters are significantly different at P=0.05

[A] ultimate pH: 5.6 ideal, 5.6-5.7 acceptable, >5.7 unacceptable

[B] Sarcomere length: <1.9 μm indicates muscle shortening

[C] Initial yield: <4 kg tender meat, 4-8 kg acceptable tenderness, >8 kg tough meat

[D] Instron compression: values <2 kg indicate acceptable level of connective tissue toughness

DISCUSSION

It is noteworthy that the cattle on this experiment showed no signs of metabolic disorders on the high molasses diet. Preston and Leng (1987) reported on molasses toxicity and bloat when diets containing more than 50% molasses were fed. They postulated that hypoglycaemia and a mucilagenous rumen micro organism respectively were causal agents. The inclusion of monensin and salt in the supplement and the availability of pasture prevented such sickness in our cattle. The growth rate of steers in this experiment is lower than that reported by Sundstrom and Palmer (1977). They fed *Bos taurus* steers a high molasses diet in pens with access to hay or limited grazing. The lower growth rate in our experiment is likely to be due to our cattle consuming more low quality pasture than in the latter experiment.

The objective measurements showed that the meat from these cattle was acceptable for meat and fat colour. It is difficult to explain the disparity between connective tissue toughness measurements in the group slaughtered four months after the other groups. The overall meat tenderness was acceptable in all groups (as measured by initial yield).

This system is an useful alternative to conventional feedlotting and has the scope for adoption in large areas of eastern New South Wales and Queensland.

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