# SUNFLOWER OR COTTONSEED MEAL AS SUPPLEMENTS FOR STEERS ON MOLASSES/UREA BASED DIETS

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Thirty three-and-a half year old Exotic x Boran and Boran steers, weighing on average 405kg, were used in a randomised block design to study the effect of one level of sunflower meal (0.7kg/animal/day), and two levels of cottonseed meal (1.4kg or 2.1kg/animal/day), as sources of true protein in a basal diet of ad libitum molasses with 3% urea, 500g rice polishings and 3-4 hours restricted grazing of mainly mature Chloris gayana per animal per day together with an ad libitum mineral/salt mix.

There were no significant differences in terms of liveweight gain between the treatments. Performance averaged .880± .09kg/day for the sunflower real,
.950± .14kg/day for the low level of cottonseed veal and .870±.08kg/day for the high level of cottonseed meal. Two cases of molasses toxicity occurred resulting in the deaths of the affected animals.

The overall results are encouraging far the adoption of the molasses/urea fattening system in Tanzania.

Key Words: Cattle, fattening, sunflower meal, cottonseed meal, molasses/urea

Tanzania has a large herd of extensively raised cattle but no means of finishing such cattle for quality meat markets within and potentially outside the country. At the same time the sugar industry is expanding rapidly and marketing and transport difficulties often lead to under utilisation of by-products such as molasses. The adoption of the molasses/urea fattening system would thus be a potential means of solving both these problems, However, the molasses/urea system as described by Preston (1972) is reported as likely to give best results only with supplementary animal protein and good quality grazing. Neither of these feed resources are available in Tanzania for the fattening of beef cattle. Available proteins for animal feeding include cottonseed and increasingly sunflower meal.

The objective of the present experiment was thus to determine the performance levels that could be obtained using locally available cottonseed and sunflower meal and dry season grazing.

## Materials and Methods

Experimental Animals: The animals used in the experiment were part of a large national breed investigation programme. They consisted of 4 pure Boran and 26 Exotic x Boran steers, weighing on average 405kg, of approximately 3 and a half years old. The exotic breeds represented in the crosses were Charolais (3) South Devon (4) Hereford (4) Aberdeen Angus (4) Friesian (4) Chianina (2) Limousin (5).

The animals had been vaccinated against foot and mouth disease, anthrax and blackwater prior to transfer to the experimental site. They were screened, and if necessary treated, for intestinal and blood parasites at the beginning of the experiment. They were routinely sprayed against ticks and given prophylactic treatment against trypanosomiasis during the experiment. The animals came from rainy season range grazing to the experiment. They were allocated to three treatment groups on the basis of liveweight using a randomised block design.

*Treatments*: The three treatments on a per animal per day basis were:

A 0.7kg sunflower meal

B 1.4kg cottonseed meal

C 2.1kg cottonseed meal

The basal diet was ad libitum molasses with 3% urea and 0.5% rock salt and 500g rice polishings. The animals were allowed restricted grazing of 3-4 hours per day on mainly mature Chloris gayana pasture. Vitamin A supplementation at the level of 30,000IU per animal per day was only possible for the first 14 days of the experiment. The animals had constant access to a 1:1 mixture of steamed bone meal and rock salt.

*Procedure and Measurements*: The animals were housed in partly roofed earth floored pens with a space allowance of 9 square metres per animal. The molasses/urea was replenished on a daily basis. The urea and rock salt were mixed directly into the molasses in the crystalline form without first dissolving in water and amounts used were thus recorded daily. The rice polishings and supplementary treatment proteins were fed together following the morning grazing. There was a 23 day introductory period and the experiment ran for 70 days. The animals were weighed at 14 day intervals.

## Results and Discussion

The mean values for animal performance and feed intake are shown in Table 1.

Table 1:
Values (X±SEx) for animal performance and feed intake

| Protein meal kg/d | Sunflower | Cottonseed | |
|---|---|---|---|
| | 0.7 | 1.4 | 2.1 |
| Number of steers | 10 | 30 | 10 |
| Liveweight, kg | | | |
| Initial | 389,7 + 16,3 | 420.0 + 19.9 | 405,7 + 19.2 |
| Final | 451.3 + 20.0 | 486.5 + 44.2 | 466.9 + 22.5 |
| Gain/day | .880 + .09 | .950 + .14 | .870 + .08 |
| Steers removed during experiment[1] | 0 | 1 | 0 |
| Mortality | 1 | 1 | 0 |
| Feed consumption, kg/d[2] | | | |
| Sunflower meal | 0.7 | - | - |
| Cottonseed meal | - | 1.4 | 2.1 |
| Rice polishings | 0.5 | 0.5 | 0.5 |
| Molasses | 7.38 | 8.13 | 7.06 |
| Urea | .166 | .182 | .158 |

[1] Removed because of refusal to eat molasses/urea or supplement
[2] Plus 3-5 hr/d grazing on mature Chloris gayana pasture

*General*: There were no significant differences between the treatments. Overall performance was satisfactory despite the inclusion of early maturing crosses and the absence of Vitamin A supplementation after the first 14 days. The steers came from rainy season grazing where no supplements including minerals were fed and there was a noticeably high consumption of the mineral/ salt mixture in the first half of the experiment. The satisfactory level of performance may thus have been partly a result of compensatory growth arising from mineral realimentation.

Protein levels (N x 6.25) were set according to recommendations of Preston and Willis (1974). As the animals were part of a breed investigation programme Treatment C true protein level was set at a higher level than Treatment A or B to encourage fuller expression of any genetic growth potential. The absence of any response to Treatment C suggests that this true protein level was unnecessarily high.

Given the high degradability of plant protein such as sunflower and cottonseed meal it is possible that the performance obtained was a response mainly to the basal diet and not to the protein supplements. Further work is to be based on a diet of molasses/urea and rice polishings only together with restricted grazing.

Table 2 shows the composition of the feed components used. The direct incorporation of crystalline urea into the molasses considerably simplified the preparation of the molasses/urea mix as compared to the method of first dissolving in water.

Table 2:
Composition of feed components used

| Feed | Dry matter (%) | N x 6.25 (% air dry) |
|---|---|---|
| Grazing[1] | - | - |
| Molasses | (Brix 91.6) | 1.9 |
| Urea | - | 287.5 |
| Rice polishings | 89 | 13.3 |
| Sunflower meal | 90 | 39.9 |
| Cottonseed meal | 86 | 20.1 |

[1]Not measured as lack of available grazing necessitated use of several areas

*Health*: Two cases of molasses toxicity occurred after approximately one month of experimental feeding. Both cases developed so quickly that there was no opportunity to withdraw the molasses and feed only forage as recommended (Preston 1972). Despite symptomatic treatment both animals died, one as a direct result of the molasses toxicity and the other with secondary complications. Following the above two cases of molasses toxicity the length of the grazing period was increased to 5 hours per day and additional fibre in the form of 600g of rice husks per animal per day was provided in the feedlot pens. No further cases of molasses toxicity occurred.

## Conclusions

Within the circumstances of the experiment, plant protein supplements such as sunflower and cottonseed meal gave equally satisfactory liveweight gain performance. Where dry season grazing of presumably low palatability is utilised the results also indicate that a grazing period of 5 hours per day may be required to ensure adequate forage dry matter intake.

This first experience of Molasses/urea fattening in Tanzania is encouraging for further work and the eventual adoption of the technique on a commercial scale.

## References

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