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THE ROLE OF POULTRY LITTER IN MOLASSES/UREA DIETS FOR THE FATTENING OF CATTLE[1]

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32 young Zebu bulls with an initial liveweight of 208.4 ± 5.57 kg were fed a basal diet of sugarcane tops, molasses and wheat bran. Using a 2 x 2 factorial design with 4 replicates the following supplements to the basal diet were compared: 1) None (control); 2) poultry litter; 3) urea and, 4) poultry litter plus urea. The poultry litter from broilers reared on a bed of rice hulls was offered separately from the molasses. In the diets that included molasses this was mixed with the molasses and the cane tops and the cane tops were chopped and offered ad libitum. The experiment lasted 81 days. Animals receiving the urea supplement grew faster than those receiving poultry litter (0.52 vs 0.73 kg/d), however the maximum liveweight gain was obtained with a combination of urea and poultry litter supplements (1.01 kg/d). It was concluded that the poultry litter supplied unknown factors that increased the efficiency of rumen fermentation and that even though it supplies non-protein nitrogen, the addition of urea is required in order to obtain maximum animal performance.

Key words: young bulls, sugarcane tops, molasses, wheat bran, poultry litter, urea, liveweight gain

The first trial with poultry litter in the fattening of cattle in the Dominican Republic had as its principal objective the substitution of part of the concentrate ration, thus providing a use for a product which until that moment was considered practically a waste material Meyreles (1975). From that time, poultry litter began to be considered as a feed and its economic value increased markedly.

The principal objective of the present experiment was to determine the role of poultry litter as a supplement in molasses based diets in order to obtain data on which to base its present economic value. A level of 1.5 kg/d was employed on the basis of previous findings (Meyreles & Preston, 1980).

The second objective was to establish the necessity, or not, of also including urea in the diets since poultry litter is considered to be basically a source or non-protein nitrogen.

Materials and Methods

Animals, treatments and design: Thirty Two Zebu-type bulls of a mean initial liveweight of 208 kg ± 5.57 were used. They were housed in groups of two in 3 x 3 m pens with concrete slatted floors in an open sided building. Molasses and sugarcane tops were given free choice as their basic diet together with 1kg/d wheat bran and 60 g/d minerals. The treatments consisted of the following combinations of poultry litter and urea, arranged according to a 2 x 2 factorial with 4 replicates:

(A) Control diet without additional supplement
(B) Control diet plus 1.5 kg/d poultry litter
(C) Control diet plus 2.5% urea in the molasses
(D) Control diet plus 1.5 kg poultry litter and 2.5% urea in the molasses.

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Procedure: The poultry litter came from a broiler farm where rice hulls were used as bedding. The content of nitrogen (N) in dry matter (DM) was 2.3 ± 1.1% and the DM content was 84 ± 4.2%. Poultry litter was offered separately from the molasses as it has been shown in a previous experiment (Meyreles and Preston 1981) that this system permited an ad - equate intake as well as being less laborious than mixing the two comon- ents together.

The sugarcane tops were harvested daily and were offered to the ani mals chopped, the following day. Residues were collected daily before offering the new feed. The composition of the cane tops was: 26 ± 2.3 % DM and °Brix 9. The wheat bran contained 87 ± 2.1% DM and 2.4 ± 0.3 % N in DM. In the treatment which included urea, this was mixed with the molasses after being first dissolved in water. The final mixture (w/w) was 2.5% urea, 2.5% water and 95% molasses (85°Brix).

The molasses (or molasses/urea) was offered on a free choice basis in open troughs adding fresh quantities according to the needs of the an imals.

Measurementes: The animals were weighed every 14 days, calculating rate of gain by regression of liveweight on time. The intake of cane tops was recorded daily as the difference between the amount offered and ref- used. The intake of molasses was calculated on the basis of the quantit ies added to the feed trough, subtracting the residues which remained at the end of the experiment, which lasted 81 days.

Results

The animals adapted rapidly to the diet and after two weeks had reached the intended intake of poultry litter. There were no metabolic upsets throughout the experiment.

Data on feed intake, change in liveweight and feed conversion are given in Table 1. Figure 1 shows the comparative performance for rate

Table 1:

Performance of Zebu steers fed a molasses based diet and supplements of urea and/ or poultry litter

	Control	Poultry litter	Urea	Urea + poultry litter	SE
Feed Intake, kg/d					
Cane tops	4.79	5.07	5.25	7.13	± .41
Molasses	2.99	3.27	4.78	4.46	± .29
Urea	-	-	0.12	0.11	
Poultry litter	-	1.49	-	1.47	
Wheat bran	1.0	1.0	1.0	2.0	
Minerals	0.07	0.07	0.07	0.07	
Total DM	4.76	6.31	6.52	8.04	± .24
Feed conversion [1]	26.5	13.1	9.11	8.14	± 1.67

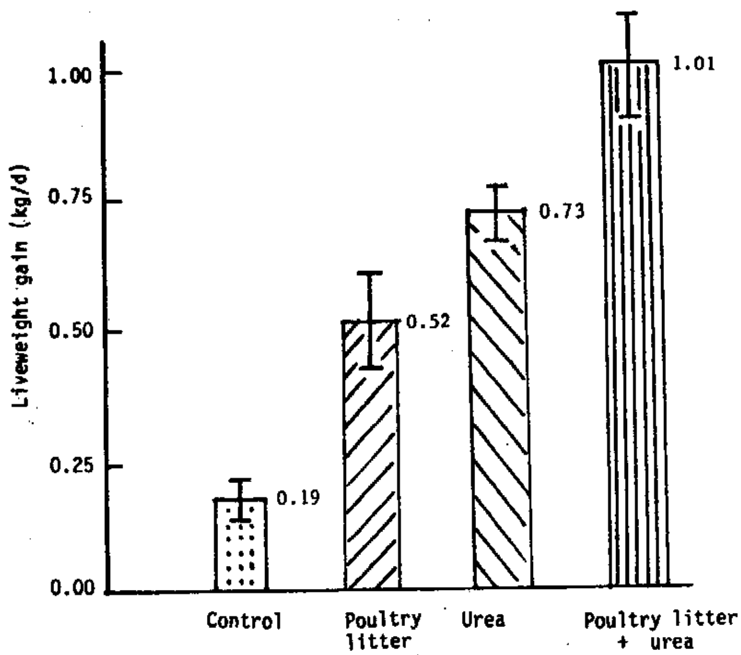
[1] Kg DM/kg LWG

of liveweight gain for the four treatments.

There were highly significant differences between treatments for in- take of sugarcane tops, of molasses and of the total DM. It seems that the urea alone was more effective than the poultry litter alone from the point of view of liveweight gain and feed conversion. However the com - bination of urea and poultry litter was superior to either supplement given alone.

Figure 1:

Effect of urea and/or poultry litter on liveweight gain of Zebu-type steers fed molasses and sugarcane tops



Discussion

The results of the experiment indicate that when the principal ener getic component of the diet is highly soluble (e.g. molasses) then it is better to give a source of nitrogen which is also highly fermentable. This would account for most of the advantage of the urea over the poultry litter when either was given alone. However, there was a very obvious improvement in performance when the poultry litter was added to the diet which already contained urea. Moreover, the better performance due to combining the supplements was obtained with a slightly reduced intake of molasses but a higher intake of forage.

The concentration of digestible energy obviously is lower in cane tops than in molasses which implies that the diet containing poultry litter and urea was being used more efficiently for fattening than the diet which contained only urea. It would seem that the poultry litter was providing the diet with certain factors which, in one way or another, were improving the efficiency of the rumen fermentation.

Conclusions

In order to use poultry litter efficiently as a supplement in molasses based diets it is not necessary to give more than a limited quantity of the order of 0.6% liveweight per day.

Although poultry litter provides non-protein nitrogen it appears to be essential in molasses based diets to provide urea also, to ensure the maximum animal response.

Poultry litter provides a source of factors which, in molasses based diets, help the animal to improve performance. Neither the nature nor the mode of the action of these factors is known, but they probably act at the level of the rumen, affecting the nature of the rumen fermentation.

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