A NOTE ON THE PRESERVATION OF A SOLUTION OF MOLASSES AND UREA IN WATER

In the drier areas of Queensland, pasture growth is seasonal. In most years the only feed available for 3-6 months is pasture at the standing hay stage on which even non-breeding stock lose weight. Under these conditions a response is obtained to protein supplementation, as shown by Marston (1932) with wool growth of sheep. In cattle, the response has not been so clearly demonstrated (Anon. 1959, p. 79).

A possible method of supplementation is one in which the supplement is added to the drinking water. Although conventional forms of protein cannot be provided in this manner, urea would be suitable because of its high solubility.

If treated water is supplied to cattle which are grazing extensive areas and having only one drink daily, the concentration of urea in the water must be such that urea intake is below the minimum level which could cause acute toxicity. This level, of the order of 0·3 to 0·4 g urea per Kg body-weight (Clark, Oyaert, and Quin 1951—sheep; Dinning *et al.* 1948—bovine; Beames, unpublished data—bovine), is only slightly greater than the amount which would normally be fed to cattle on poor pastures. For optimum utilization and to minimise toxicity it is desirable to supply molasses with the urea (Mills, Lardinois, Rupel, and Hart 1944).

In the preparation of a stable solution of molasses and urea in water, the major difficulty is the prevention of bacterial and fungal growth. A wide range of disinfectants were tested in this laboratory and all were found unsuitable because of either ineffectiveness at economically reasonable levels or toxicity at effective levels.

It was found that an effective way of ensuring the stability of a molasses/urea/water solution was to keep it sufficiently alkaline. This was achieved by first saturating the water with slaked lime and then adding the molasses and urea. To prevent absorption of carbon dioxide and hence a lowering of pH, a protective surface was necessary. This was formed by a float containing cetyl alcohol. Under these conditions the pH of such a solution remained between 10 and 11 for at least 14 days.

Some sedimentation occurred. A solution containing 1 per cent. molasses, 0·2 per cent. urea and 0·15 per cent. calcium oxide in distilled water gave a dry-matter precipitate of 0·183 per cent. by weight. The supernatant liquid contained 0·09 per cent. calcium and all the nitrogen from the added urea

and molasses. No measure was made of the carbohydrate content of the supernatant liquid. (The normal reaction of sucrose and reducing sugars in alkaline solutions is to form other soluble carbohydrates, the exact composition of which is rather ill-defined (Honig 1953).)

Bacterial counts of a molasses/urea/lime solution prepared in this manner showed no growth over a period of four days. Without the addition of lime, the solution after one day contained 105 x 10^7 micro-organisms per ml, consisting of 91 per cent. cocci (mostly diplococci), 4 per cent. bacilli and 5 per cent. yeasts.

In the field this method is applicable where drinking water is supplied by troughing and where alternative surface water is not available. The lime, molasses and urea could be added by first passing the water over a lime bed and then metering a concentrated molasses urea solution into the water by means of one of several machines available on the market in Queensland for adding soluble phosphate to the drinking water. All containers could be provided with a cetyl alcohol float.

Studies on the effect on cattle of this mixture in the drinking water are in progress.

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