

UREA-MOLASSES -MINERAL (UMM) MULTINUTRIENT FEED SUPPLEMENT

*A Farmers' Guide to Feed
Supplements for Adult
Buffaloes and Cattle*



**SAREC/NARESA Buffalo Research
and Development Programme,
Peradeniya, Sri Lanka.**

Information Leaflet No. 2 (1998)

Feeding dairy buffaloes and cattle

Buffaloes and cattle, producing milk require a higher nutrient intake than dry animals, depending on the level of milk production. High producing cows require more feed of better quality than low producing cows, to enable them to express their full milk production potential. Otherwise, the milk yield will be low and reproductive processes become inefficient resulting in a lower income from the livestock enterprise (Fig. 1)

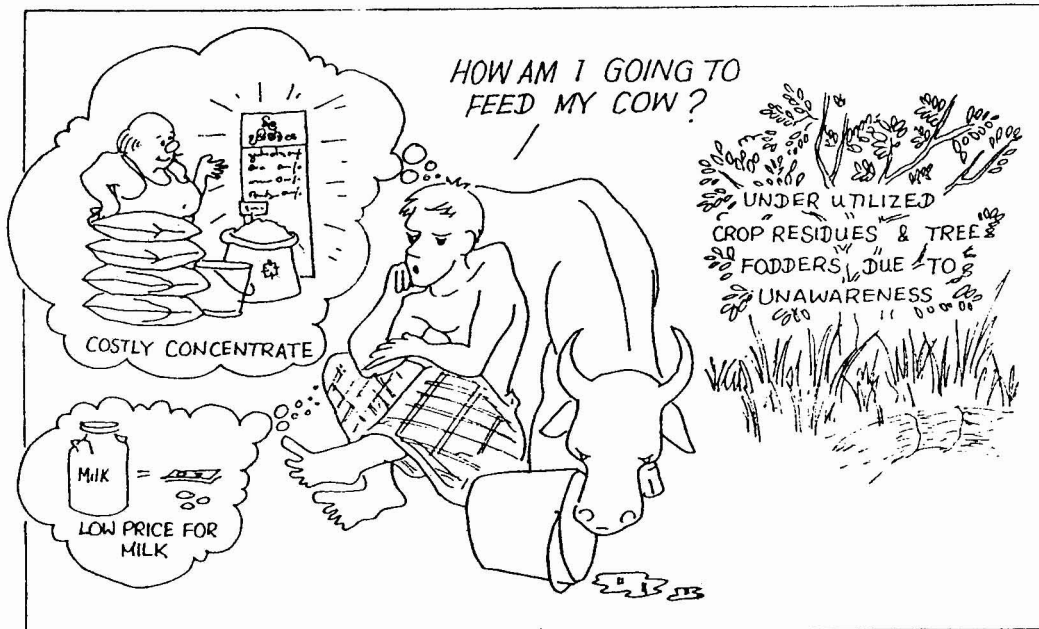


Your operation has become uneconomical.
Fig: 01

Dairy buffaloes and cattle in Sri Lanka have traditionally been reared on natural pasture and tree fodder, that is available in the locality. The quality of these grasses and fodder varies widely from season to season depending largely on the rainfall pattern. During dry periods, both the quality and quantity of forages decline resulting in gross deficiencies of energy, protein and minerals. In such situations, the immediate effect that is evident is a decline in milk yield. Farmers with good milking animals have, under such circumstances, learnt to supplement the forage based feed with a mixture of coconut poonac and rice bran, to prevent a decline in milk yield. But generally these concentrate feeds are fed in limited quantities, because of the high cost. What then can farmers do in such situations (Fig. 2)

How can you correct the deficiencies in feed economically?

The use of concentrate feeds to supplement nutrient deficiencies in forage based feed is usually not economical. One of the potential feed resources which is often available, but not used by farmers is fibrous crop residues like rice straw.



What is the solution for your problem ?

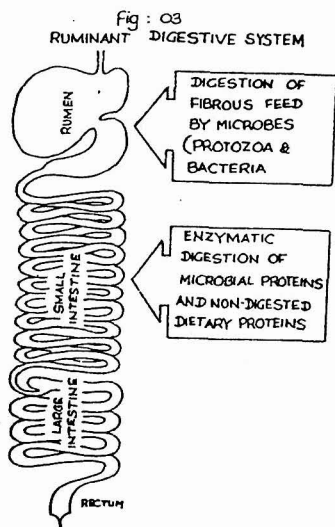
Fig- 02

The reason for this is that they are low in digestibility and palatability. Therefore, these feeds are normally consumed by animals in very limited quantities.

Scientists working in the SAREC/NARESA Buffalo Research and Development Programme have developed methods for using these crop residues as ruminant feed in combination with low cost urea-molasses-mineral (UMM) feed supplements. UMM supplements provides the nutrients deficient in crop residues and thereby improve the digestibility and intake of the forage and crop residues.

How do buffaloes and cattle use fibrous feeds?

Ruminant animals like buffaloes and cattle have a complex stomach, with a large sac-like compartment called the rumen.



When fibrous feeds are consumed, the feed first goes into the rumen, where it is broken down by micro-organisms through a fermentation process. The breakdown products are used by the microbes as nutrients for their growth and multiplication. When these microbes eventually pass down into the intestine, they are digested and constitute a substantial source of nutrients, particularly protein. A simplified schematic diagram of digestive utilization of fibrous feed by ruminants is given in Fig. 4.

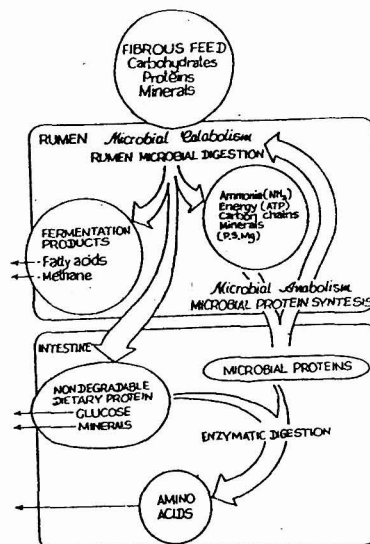
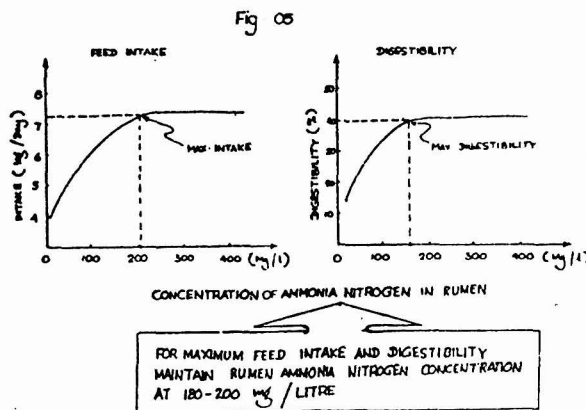


Fig. 04

What happens when low quality fibrous feeds are consumed?

The effect on the efficiency of rumen digestion when low quality fibrous feed is consumed is explained in Figure 5.



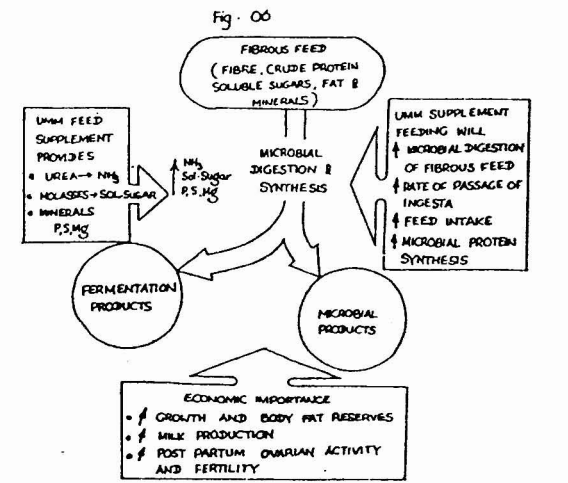
One of the important limiting factors that effect rumen microbial digestion in the rumen is the ammonia nitrogen concentration. As shown in figure 5, an optimum concentration of rumen ammonia nitrogen of between 180-200 mg/l is required, to ensure maximum intake and digestion of fibrous feed.

However, when the animal eats poor quality pasture, fodder and crop residues like rice straw, which are poor in protein, energy and minerals, they are of little use to the microbes and therefore cannot grow and multiply. The population of microbes in the rumen then declines. When this happens digestion slows down and the feed remains longer in the rumen. But when the rate of microbial growth and population is high, the rate of fermentation is high and the feed consumed disappears faster from the rumen, creating room for the animal to eat more feed. The animal benefits in two ways. It obtains more nutrients, firstly through more efficient fermentation of the feed and secondly, by increasing the intake of feed. Increasing the microbial population in the rumen, therefore results in an increase both in the rate of breakdown of feed and the intake of feed.

How can you overcome the deficiencies in poor quality roughage and improve the nutrition of your animals?

Research scientists have found a unique way of optimizing the rumen environment, to increase rumen microbial activity and thus improve the digestibility of poor quality fibrous feed. The most limiting nutrients in fibrous feeds are soluble nitrogen and readily fermentable carbohydrate, both of which are required for optimum microbial activity. These two limiting nutrients and other essential trace minerals can now be provided to ruminants, through a urea-molasses-mineral (UMM) feed supplement.

The beneficial effects of UMM feeding in ruminants is diagrammatically shown in Fig. 6.



Urea (which is commonly used as a fertilizer) is converted in the rumen into ammonia. Molasses (which is a by-product of the sugar industry) and rice polish provide rapidly fermentable energy which microbes can use along with ammonia for cell growth and multiplication. Molasses also improves palatability and thus increases the intake of low quality fibrous feed. Furthermore, molasses is rich in minerals like sulphur and these provide additional benefits. This UMM mixture can also be enriched by adding deficient minerals such as calcium, phosphorus, cobalt, copper, zinc, magnesium and selenium. Research done by the scientists under SAREC/NARESA Buffalo Research and Development Programme has shown that UMM feed supplements can be used for feeding dairy buffaloes and cattle in any part of the country as a supplementary feed, at relatively low cost, to improve the digestibility of low quality fibrous feed and thus overcome nutritional limitations. The percentages of feed ingredients used in UMM formulations are given in the box below.

Ingredient	Proportion
Urea	10-12%
Molasses	35-45%
Rice Polish	40-50%
Mineral mixture	3-5%

for UMM blocks cement is used at 10-12% in place of rice polish

UMM feed supplement production at Girandurukotte Mahaweli Livestock Farm



Plate 1 - Ingredients used in UMM production

How should you use UMM feed supplements for optimum benefits?

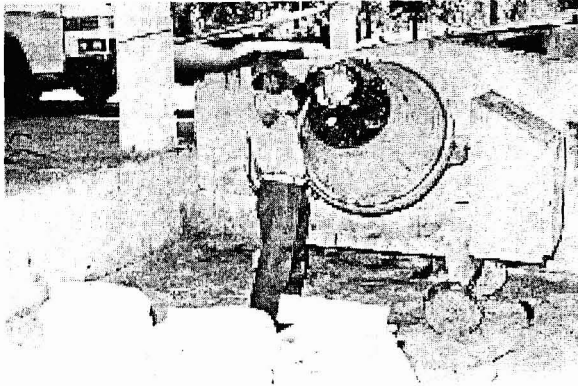


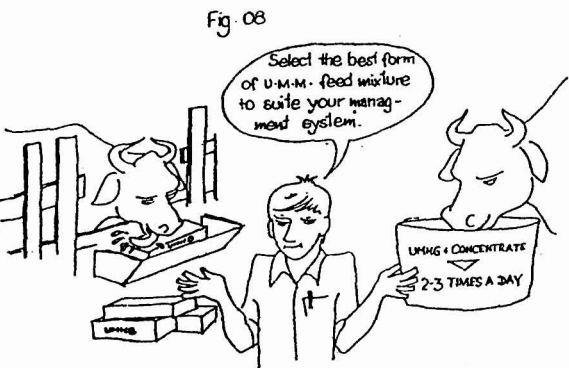
Plate 2 - UMM Mixer



Plate 3 - UMM block making

From where can you buy UMM feed supplements?

The SAREC/NARESA Buffalo Research and Development Programme has set up three units to produce UMM feed supplements, at the Mahaweli Livestock Farm Girandurukotte, Mahaweli Niraviya Livestock Farm at Thambuttegama and SAREC/NARESA/NLDB Buffalo Research Farm at Narangalla, Kuliyaipitiya. In addition, UMM feed supplements will also be available through co-operative societies and private sector manufacturers very soon. These feed supplements are available in two forms: as a block (UMMB) and granules (UMMG).

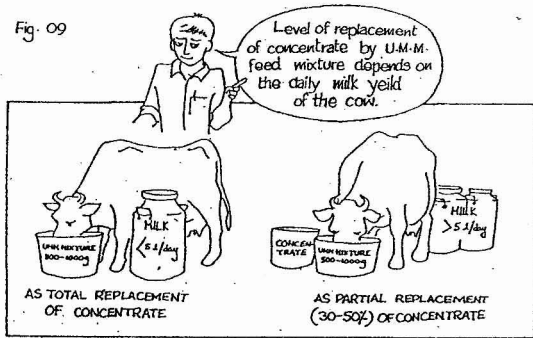


In situations where the provision of UMM supplements as a lick is not feasible, the granular form (UMMG) can be fed mixed with concentrates, two or three times a day. Although not the best method, this feeding practice can maintain the rumen ammonia concentration at an adequate level, but only for limited periods, after UMMG is fed. In the event that UMMG is not available, UMMB can be chopped into small pieces and up to 1 kg/day can be fed to animals, mixed with concentrates.

UMM feed formulations can be used in two ways

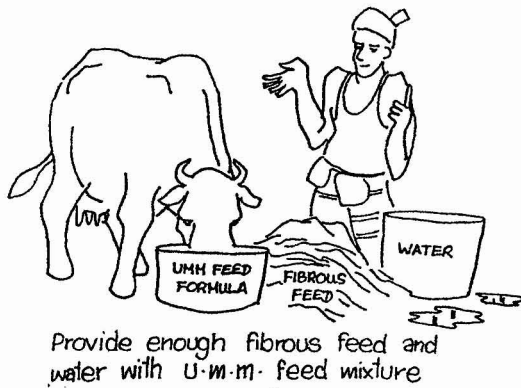
1. For cows yielding less than 5 litres of milk per day: up to 1 kg of UMM can be fed together with forage and/or crop residues, in place of costly concentrate feed.
2. For cows yielding more than 5 litres per day: 1 kg of UMM can be used as a supplement, to replace 30-50 percent of concentrate feed in the daily ration.

Fig. 09



In both the above situations, rumen digestion of fibrous feed is enhanced as described earlier and hence the intake of fibrous feed will be increased. Therefore, it is important to remember that animals must be given more than their usual requirement of fibrous feed to obtain optimum benefits from UMM feeding. Remember that UMM is not a replacement for fibrous feeds.

Fig. 10



4. If the granular form (UMMG) or chopped UMMB is used, give no more than 1 kg / cow / day in divided quantities at milking time, mixed with concentrate.
5. Whatever the form of UMM feed supplement that is used, provide more than adequate quantities of fibrous feed and water. Ensure that fibrous feed is available at all times in the feed trough or in the grazing area and that animals have easy access to water.

Some important points to remember

1. Do not feed UMM feed supplements to animals below 3 months of age.
2. Do not dissolve UMM feed supplements in water for feeding animals
3. UMM feed supplements, whether UMMB or UMMG, must be protected from rain and contamination with dust, dung and urine.

This information leaflet was prepared by Drs. H. Abeygunawardena, J.A.de S. Siriwardene and B.M.A.O. Perera with technical advice from Drs. Nimal Perera and Nawaz Ibrahim for the SAREC/NARESA Buffalo Research and Development Programme in collaboration with the Department of Animal Production and Health and the University of Peredeaniya.
