# Effects of Supplementation of Nitrogen through Urea Molasses Multinutrient Block (UMMB) on the Performance of Dairy Cows Fed with Good Quality Forage Based Diets While Using Rice Straw as Night Feeding

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## Introduction

In Sri Lanka, the dairy industry is not well developed but has huge potential for the development. Among the constraints faced by the dairy industry, poor nutrition status of the animals has been identified as a major obstacle for the development of dairy industry in Sri Lanka. In general, animals are fed with poor quality roughages and concentrate feeding is very limiting thus, animal's genetic potential for the milk production has not been achieved in many cases. Poor quality roughages contain very little energy and protein, which is responsible for the lower production. Several methods have been reported in Sri Lanka to improve the nutritive value of low quality roughages. Among those, UMMB feeding is one of the easier methods.

Hard solid blocks of UMMB provide readily available sources of energy and protein in the form of molasses and urea together with fiber and minerals (Saddul and Boodoo, 2001). Urea-molasses mineral block (UMMB) licks can improve the utilization of low quality roughages by satisfying the requirement of the rumen microorganisms, creating a better environment for the fermentation of fibrous material and increasing production of microbial protein and volatile fatty acids (Wongnen, 2007). Urea, after hydrolyzing into ammonia in the rumen, provides a nitrogen source for the rumen microflora for their microbial protein synthesis. Molasses is a source of readily fermentable energy (Wongnen, 2007), which assists the growth of rumen microorganisms. It has been shown that animal performance has improved tremendously after the introduction of UMMB under field conditions (Kunju, 1986). This improvement was attributed to "supplementary" and "catalytic" effects of UMMB, as UMMB promotes an optimal ammonia level for efficient microbial activity in the rumen (Kunju, 1986).

Several researchers have previously reported on the use of UMMB licks for supplementing the crop residue-based diet of large and small ruminants (Leng, 1983; Sansoucy, 1995) but very few studies have been conducted on the use of UMMB with good quality forage-based diets. Results of one such study by Weerasinghe *et al.* (2010) to evaluate the effects of supplementation of nitrogen through UMMB on the performance of dairy cows fed with good quality forage based diets, highlighted that UMMB supplementation significantly increased milk yield and yields of milk fat, protein, and SNF and UMMB supplemented animals had a significantly higher body weight than those fed with control diets; it suggests that the improvement of production and performance could be due to improved digestibility of the basal diet.

However, no information available on the use of straw as night feeding to replace the amount of grass supplied in the day time. Thus, the objective of this study was to

evaluate the effects of supplementation of UMMB to dairy cows fed with good quality forage based diets while supplying rice straw as night feeding.

**Methodology**

Ten multifarous crossbred dairy cows in their early lactation were randomly allocated to two groups (Supplemented and control) based on their milk yield, breed, parity, body weight, milk fat and protein contents measured in previous three days before feeding the experimental diets. Both groups were fed with chopped CO3 (*Pennisetum purpureum x Pennisetum americanum*; hybrid Napier) *ad-libitum* and dairy cow concentrate feed 1 kg/day during the day time and rice straw (5 kg dry matter) was supplied as night feeding. In addition, the treatment group was supplemented with 300 g/day of crushed urea-molasses multinutrient block at three equal meals (100 g at a time) during the day. The composition of UMMB was similar to that described previously by Weerasinghe *et al.*, (2004). Throughout the experiment, the cows were penned individually and had free access to water.

Cows were milked twice daily at 0700 and 1600 h using a mobile milking machine. Milk yield was recorded and milk samples were collected once a week throughout the experimental period (5 weeks) for laboratory analysis. The contents of milk fat, protein, lactose, and solid non fat were measured using an Ultrasonic Portable Milk analyzer (LACTOSCAN, SA type). Feed samples (mineral block and rice straw) were analysed according to the methods described in A.O.A.C. (2000). In addition, straw intake and weight gain were measured. The data were analyzed as a randomized block design using "Genstat" (Discovery Edition).

**Results and discussion**

Supplementation of urea-molasses multinutrient block had no effect ($P>0.05$) on straw intake. It can be observed that an increase in dry matter intake (DMI) is significant generally in studies where the basal diet consists mainly of poor quality roughages either hay or straw (Badurdeen *et al.*, 1989) and when the quality of the diet improved with the inclusion of concentrate, the effect diminished. In this study, even though night feeding is totally based on poor quality roughage (i.e. rice straw), the supplementation with UMMB had not affected straw intake. This could be due to feeding of concentrate and, good quality fodder grass (i.e. CO3) *ad-libitumly* during the day time. Therefore it can be suggested that those feed might have been adequate in providing optimum nutrition to the animals, thus the cows were not in the need of extra dry matter intake.

Supplementation of urea-molasses multinutrient block had no effect ($P>0.05$) on milk yield. But average milk yield (mean value) had increased numerically in the treatment group compared with the control diet fed animals. Similarly, UMMB supplementation had no effect ($P>0.05$) on contents and yields of milk fat, protein, lactose and solid non fat. But all those values were numerically high in UMMB supplemented animals compared to the control group. In addition, milk urea nitrogen content and weight gain was not affected ($P>0.05$) by UMMB supplementation.

**Conclusions**

It can be concluded that nitrogen (in the form of urea) supplied through UMMB provided with good quality fodder grasses and dairy cow concentrates with provision of rice straw as night feeding has no effect on production performance of dairy cows. As basal diet consisted of good quality roughage source and sufficient amount of

concentrate feed, nutrients provided through UMMB would not be required by the animals for their milk production.

Even though not significant, a numerical increment of milk production and quality with UMMB supplementation suggested that creating low nutrient contents in the diet through reducing concentrate feed and good quality roughage could be fulfilled through provision of UMMB and night feeding of rice straw.

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