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RESEARCH ARTICLE

EFFECT OF UREA MOLASSES MULTI-NUTRIENT BLOCK (UMMB) ON MILK AND GASTRO INTESTINAL PARASITES IN BUFFALO

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ABSTRACT

Livestock plays important role in household incomes especially on rural area of Nepal. During dry winter season, animal feed is in shortage by 36% in Nepal. Crop residue mainly rice straw, corn stover, wheat straw, millet straw, and other similar types of residues are used to feed these ruminant. These feed resources are very poor in nutrient contents. However, these feedstuffs can be improved in quality and utilized by supplementing with certain feed supplements such as urea molasses mineral block (UMMB). Objective of research is to find out the effect of UMMB supplement on milk yield, SNF%, fat%, lactose%, protein% and effect of *Azadirachtaindica* ("neem") medicated UMMB supplementary feeding against nematode parasite performance in dairy buffaloes. The experimental trial was conducted in the livestock farm of Agriculture and Forestry University (AFU) and "Dhakal Dairy farm" from February, 2015 to April, 2015. 45 lactating crossbred buffaloes were selected for the experiment. Each animal were ear tagged for identification of animal. The research was conducted by using randomized complete block design in which three different treatments namely, T_1= normal feeding + 500g UMMB + "neem" powder,T_2= normal feeding + 500 g UMMB/day ,T_3= on normal feeding (control). Based on milk production 45 lactating buffaloes were divided into 15 blocks. 3 treatments allocated in each block (RCBD). Mean milk yield (kg) and mean milk lactose of buffalo supplemented diet with UMMB was significantly effectiveness ($P<0.05$) was observed. Accordingly, higher milk production was recorded in diet supplement with UMMB (503.44 kg) treatment group. During 90 days of experimental period, there was an increment in milk production by 8.54% in medicated UMMB fed animal as compared to control group, which was statistically similar to non-medicated UMMB supplemented group, where increment was by 8.53 % as compared to control group. Dietary supplementation with UMMB of dairy buffaloes with medicated and non-medicated UMMB in two definite group increased milk yield and lactose significantly. On our study, Medicated UMMB blocks resulted in substantial reductions in fecal worm egg counts and increased milk yield in dairy buffaloes. The result indicated that the use of UMMB as a strategic feed supplement will be economically beneficial.

Key words: Buffalo, Milk, UMMB

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INTRODUCTION

Cattle and buffalo have significant contribution on national milk production. But these ruminants demand more feed due to their larger body size. During winter season, animal feed is in shortage by 36% in Nepal (Pande, 1997). Crop residue mainly rice straw, corn stover, wheat straw, millet straw, and other similar types of residues are used to feed these ruminant. These feed resources are very poor in nutrient contents which are even not able to supply the nutrients required for maintaining the animals. However, these feedstuffs can be improved in quality and utilized by supplementing with certain feed supplements such as urea molasses mineral block (UMMB).

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UMMB blocks can be prepared in desired size (generally of 2 kg in brick size) and offered for licking by the animals which provide them energy and protein for the rumen microbes. It has become important to mechanize its production, improve the comosition, and increase the production to cover wide areas of distribution to benefit many dairy farmers in the country (Avilla 2006). UMMB contains urea, molasses, rice bran, and binding agents. Different ingredients used in UMMB have major roles in ruminant feeding such as (1) Urea: provides small amount of extra nitrogen required for utilization of the dry matter. Nitrogen must be sufficient to maintain the ammonia level in the rumen, at a constant and sufficient amount for better development of the rumen microbes leading to better degradation of the cellulosic components. (2) Molasses: a good source of energy, being a concentrated plant juice, provides a range of minerals (except phosphorus) and a complete mixture of vitamins.

Fig. 1. Dhakal Dairy Farm

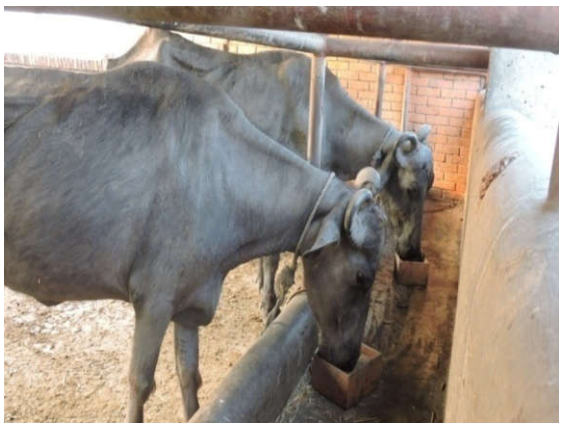

Fig 2. Livestock Farm, AFU

It should have more than 800 Brix. (3) Minerals: they correct the macro and trace minerals deficiency in animal diet (4) Cement or quick limes: it is used as binding agent. The use of UMMB feed as supplement is to improve on the nutrient contents and straw utilization. The blocks are easy to handle, transport, and commercially feasible to manufacture (Avilla 2006). Sharma *et al*. (1971) reported that, goat treated with ethanol extract of "neem" (*Azadirachtaindica*) leaves at the dose rate of 100 mg/kg body weight showed 81% efficacy against nematode on 9th day. Neem has got good anthelmintic property because "neem" leaf powder contains Azadirachtin. In toxicological test, the Environmental Protection Agency (1985) was unable to establish the LD_{50} for major component found in "neem", the side effect or symptoms couldn't be recorded even in highest possible dosage. As a result no residual or withdrawal period is necessary following treatment with "neem". Feeding of UMMB to cattle usually results in increasing in feed intake by 25-30% and its digestibility (Aarts *et al*. 1990; Upreti, 2008). It is because small farmers have limited feed resources, which are generally low in essential nutrients and thus unable to support efficient rumen fermentation. Low-ammonia concentration in rumen fluid is a major limiting factor for achieving optimum microbial growth and digestibility. A solidified UMMB provides critical nutrients namely nitrogen as urea, readily available energy as molasses, and minerals for efficient microbial fermentation in the rumen. UMMB supplementation in animal feed increases microbial protein in the animal body which saves the expensive concentrates. It has also been documented that feeding UMMB increases or maintains body condition, and production of ruminant animals during winter on straw based diet. Therefore, UMMB is nearly a complete diet for ruminants as it contains most of nutrients. Supplementation of deficient nutrients in the form of urea-molasses multi nutrient block has been shown to be very effective in ruminant production system (Khanum *et al*, 2006). The main aim of the study is to know the effect of medicated and non-medicated UMMB against gastrointestinal parasites and on milk production and composition in buffalo.

MATERIALS AND METHODS

Experimental site and time period: The experimental trial was conducted in the livestock farm of Agriculture and Forestry University, and "Dhakal Dairy farm" Chitwan, Nepal from February, 2015 to April, 2015.

Animals and management: 45 lactating crossbred buffaloes were selected for the experiment. Each animal were ear tagged for identification of animal. All the animals were normal management condition in the farm. Fresh drinking waters were given to the animals throughout the experimental period. Rice straw was offered *ad libitum*. The animals were taken to the grazing as usual like other animals.

Experimental design: The research was conducted using randomized complete block design (RCBD) in three different treatment groups.

T_1 = normal feeding + 500g UMMB + "neem" powder
T_2 = normal feeding + 500 g UMMB/day
T_3 = on normal feeding (control)

Based on milk production 45 lactating buffaloes were divided into 15 blocks. 3 treatments allocated in each block in Randomized complete block design (RCBD).

- The observation was taken in 30 days interval at 0, 30th and 60th days by using EPG technique for egg count
- Daily milk yield will be recorded from January to March, 2015.
- Chemical composition of milk (Total solid, SNF, protein, lactose, conductivity, fat %) will be recorded fortnightly.
- Proximate composition of UMMB block was tested.

UMMB preparation and block composition: The preparation of UMMB has of four stages: Preparation of feed ingredients; as per the formula presented below.

- Mixing the feed ingredients: Small amounts were mixed first and added to the bulk and then thoroughly mixed.
- Molding: Mixed materials were packed in metal container (capacity of 2 kg) and pressed with blocker for 3 minutes.
- Drying: Blocks were dried under shed for 7 days.

RESULTS

The ingredients composition of 2 formulated UMMB blocks, as formulated by Animal Nutrition Division, NARC, whereas analytical result is presented in Table 2.

Milk production: Mean milk yield (kg) of buffalo supplemented diet with or without UMMB is presented in Table 4. Significantly effectiveness ($P<0.05$) of UMMB was observed on milk production of buffalo fed with supplemented UMMB.

Table 1. Randomized complete block design (RCBD)

B_1T_1	B_2T_2	B_3T_3	B_4T_1	B_5T_1	B_6T_2	B_7T_3	B_8T_1	B_9T_2	$B_{10}T_3$	$B_{11}T_1$	$B_{12}T_1$	$B_{13}T_2$	$B_{14}T_3$	$B_{15}T_2$
B_2T_2	B_2T_3	B_3T_2	B_4T_3	B_5T_2	B_6T_3	B_7T_2	B_8T_3	B_9T_3	$B_{10}T_2$	$B_{11}T_3$	$B_{12}T_2$	$B_{13}T_3$	$B_{14}T_2$	$B_{15}T_3$
B_1T_3	B_2T_1	B_3T_1	B_4T_2	B_5T_3	B_6T_1	B_7T_1	B_8T_2	B_9T_1	$B_{10}T_1$	$B_{11}T_2$	$B_{12}T_3$	$B_{13}T_1$	$B_{14}T_1$	$B_{15}T_1$

Note: Experimental layout in RCBD with three treatment replicated 15 times each., B = Block, T= Treatment

Table 2. Block composition

Ingredients	Percentage
Urea	10%
Molasses	32%
Rice bran	36%
Minerals	6%
Common salt	5%
Cement	5%
Powder"neem" leaves*	300mg/kg body wt

*only in medicated UMMB

Table 3. Nutrient analysis of UMMB blocks

	Medicated UMMB	Non-Medicated UMMB
Dry Matter	92%	92.8%
Ether Extract	3.4%	2.9%
Crude Fiber	9.2%	8.1%
Crude Protein	21.74%	19.90%
Ash (minerals)	7.8%	8.2%

Table 4. Mean milk yield (kg) of buffalo supplements diet with medicated UMMB , UMMB and control group

Treatment	Total 90 days(kg)	Daily(kg)	% increment
Medicated UMMB	503.44	5.59A	8.54
UMMB	503.40	5.59A	8.53
Control	463.80	5.15B	
F-Value	39.48	39.48	
Prob	< 0.01	< 0.01	
CV %	2.88	2.88	
Lsd	10.55	0.12	

Means in column with different superscript differ significantly by L.S.D(P<0.05)

Table 5. Mean milk lactose of buffalo supplements diet with medicated UMMB, UMMB and control group

Treatment	Lactose (%)	Increment (%)
Medicated UMMB	4.92A	4.46
UMMB	4.94A	4.88
Control	4.71B	
F-Value	4.42	
Prob	< 0.05	
CV %	4.93	
LSD	0.18	

Means in column with different superscript differ significantly by L.S.D (P<0.05)

Table 6. Mean milk protein of buffalo supplements diet with medicated-UMMB , UMMB and control group

Treatment	Protein (%)	Increment (%)
Medicated UMMB	4.11	0.24
Control	4.10	
F-Value	0.04	
Prob	> 0.05	
CV %	8.17	
LSD	-	

Table 7. Mean milk SNF of buffalo supplements diet with medicated-UMMB, UMMB and control group

Treatment	SNF (%)	Increment (%)
Medicated UMMB	9.92	3.12
UMMB	9.82	2.08
Control	9.62	
F-Value	2.19	
Prob	> 0.05	
CV %	4.07	
LSD	-	

Table 8. Mean milk fat of buffalo supplements diet with medicated-UMMB, UMMB and control group control group

Treatment	Fat (%)	% increment
Medicated UMMB	8.07	3.73
UMMB	8.42	8.23
Control	7.78	
F-Value	1.10	
Prob	> 0.05	
CV %	14.62	
Lsd	-	

Table 9. Egg per Gram (EPG) of buffalo supplements diet with medicated UMMB, UMMB and control group

Treatment	Day 0	Day 30	Day 60	Day 90
T1	853.3 A	633.3 B	640.0 B	600.0 B
T2	840.0 A	793.3 AB	800.0 AB	806.7 A
T3	860.0 A	853.3 A	886.7 A	933.3 A
F-value	0.02	3.03	3.66	7.51
Probability	>0.05	>0.05	<0.05	<0.01
CV%	31.22	33.29	32.66	30.49
LSD	198.7	189.2	189.5	177.9

Means in column with different superscript differ significantly by L.S.D (P<0.05)

Accordingly, higher milk production was recorded in diet supplement with medicated UMMB (503.44 kg) treatment group. During 90 days of experimental period, there was increment in milk production by 8.54% in medicated UMMB fed animal as compared to control group, which is statistically similar to non medicated UMMB supplemented group, where increment was by 8.53 % as compared to control group. However, lower milk production was recorded in buffaloes without UMMB supplement (control group).

Milk Lactose: Mean milk lactose of buffalo supplemented diet with or without UMMB is presented in Table 5. Significantly effectiveness (P<0.05) of UMMB was observed on milk lactose of buffalo supplemented diet with UMMB. Higher milk lactose was recorded in diet supplement with medicated UMMB (4.92%) treatment group. During 90 days of experimental period, there was increment in milk lactose by 4.46% in medicated UMMB fed animal as compared to control group, which is statistically similar to non-medicated UMMB supplemented group, where increment was by 4.88% as compared to control group. However, lower milk lactose was recorded in control group without UMMB supplement group.

Milk Protein: Mean milk protein of buffalo supplemented diet with or without UMMB is presented in Table 6. Significantly effectiveness of UMMB was not observed on milk protein of buffalo supplemented diet with UMMB. However, higher milk protein was recorded in diet supplement with medicated UMMB (4.11%) treatment group. During 90 days of experimental period, there was increment in milk lactose by 0.24% in medicated UMMB fed animal as compared to control groups. However, lower milk lactose was recorded in group with UMMB supplemented group, which is lower by 0.49% as compared to control group.

Milk SNF: Mean milk SNF of buffalo supplement diet with or without UMMB is presented in Table 7. Significantly effectiveness of UMMB was not observed on milk SNF of buffalo supplemented diet with UMMB. Higher milk SNF was recorded in diet supplement with medicated UMMB (9.92%) treatment group. During 90 days of experimental period, there was increment in milk SNF by 3.12% in medicated UMMB fed animal as compared to control group, which is statistically similar to non-medicated UMMB supplemented group, where increment was by 2.08% as compared to control group. However, lower milk SNF was recorded in control group.

Milk Fat: Mean milk fat of buffalo Supplement diet with or without UMMB is presented in Table 8. Significantly effectiveness ($P>0.05$) of UMMB was not observed on Milk SNF of buffalo supplemented diet with UMMB. Higher milk fat was recorded in diet supplement with non-medicated UMMB (8.42%) treatment group. During 90 days of experimental period, there was increment in milk fat by 8.23% in non-medicated UMMB feded animal as compared to control group, which is statistically similar to medicated UMMB supplemented group, where increment was by 3.73% as compared to control group. However, lower milk fat was recorded in control group.

Egg per Gram: Mean egg per gram (EPG) of buffalo supplemented diet with medicated-UMMB, UMMB and without UMMB is presented in the above table. Before start of the experimental trial the mean EPG count was non-significantly different with each other. After one month of the trial, EPG count of buffalo fed with medicated-UMMB was significantly ($P<0.05$) different with control group. Similar result was also observed after 60 days. However after 90 days of experimental trial, the EPG count of buffalo fed with medicated UMMB was remarkably ($P<0.01$) different with EPG count of buffalo fed with non-medicated UMMB and control group.

DISCUSSION

In this study increase in milk production and milk lactose by supplementation ummb was observed significantly. However, milk protein, SNF and fat were only slightly increased but did not differed significantly. Improvement in the milk yield due to UMMB supplement to paddy straw in low yielding cattle was reported (Kunju, 1998). Similarly, Mandal *et al*. (2001) reported that there is positive correlation between gradually increased UMMB intake and level of milk yield. Generally, protein intakes around normal level had little effect on protein content of milk conversely, extra protein or nitrogen intake may increase NPN content in milk (Roffler and Satter, 1975). Crude protein (21.74%) was similar as 23% reported by Avilla (2006). UMMB supplemented buffaloes recorded higher level of milk production in both treatments compared to the control groups. A higher milk production level low recorded in medicated-UMMB group. Increment in average milk yield by 8.54% was found in UMMB fed animals as compared to control group. An average increment of 8% milk yield was recorded following UMMB supplementation during postpartum (Brar and Nanda, 2002). Similarly, earlier study Makkar and Saijpaul (1996) also reported 6-8% increase in milk production in cows consuming 400-500g UMMB daily. Parera and Parera (2000) reported that Nilli-Ravi buffaloes under field conditions gave 11% more milk daily when supplemented with UMMB as compared to commercial concentrate. This increment production level is lower as reported by Avilla (2006) where he reported 21% milk increment. Similar result was reported by Upreti *et al.* (2010). They reported 17.7% increment in milk production. Indonesian work has shown that the potential of milk increment is 14% per lactation (Makkar, 2001). There was lactose increment of 4.46% and 4.88% on two treatment of UMMB feeding which is statistically higher than the control group. There was increment of milk fat 3.73% and 8.23% in medicated UMMB and UMMB fed group. Study in Indonesia sowed that increase in fat was 11% with UMMB supplementation (Makkar 2001). Upreti *et al*., 2010 reported UMMB supplemented group had higher fat increment level of 0.68 % compared to control group. Increment in 0.5% milk fat was recorded following UMMB supplementation postpartum (Brar and Nanda, 2002).
In this study there was increment of 3.12% and 2.08% of milk SNF in medicated UMMB and UMMB fed group. Makkar (2001) reported 3% increase in SNF by UMMB treatment. Accordingly, Upreti *et al*. (2010) reported increment of SNF by 5%. Yield of milk fat, milk protein and milk protein percentage were unaffected by treatment (Inostroza *et al*., 2010) which is similar to result of this study. From the finding, it reveals that there was positive effect of "neem"on the control of parasites. The results of present study agree with the work of Githiori *et al* (2003). He concluded that the use of embelin, R. melanophloeos and A. indica reduced Fecal Egg Count. The work of Gathuma *et al* (2004) reveals that herbal remedies had some efficacy against both nematodes and Monezia species of helminths.

Conclusion

Dietary supplementation with UMMB of dairy buffalo with UMMB increased milk yield and lactose. In our study, medicated-UMMB blocks resulted in drastic reductions in faecal worm egg counts and increased milk yield in dairy buffaloes. Even though supplementation of UMMB had an overall positive effect for the traits studied, the response of buffaloes in two groups varies from traits to traits. All results indicated that the use of UMMB as a strategic feed supplement will be economically beneficial for the rural farmers to increase their daily income.

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REFRENCES

Aarts, G., R. Sansoucy and G.P. Levieux,1990. Guideline for the manufacture and utilization of molasses – urea blocks. Animal Production and Health Division, FAO, Rome, Italy. 7pp.

Anonymous. 2009. Urea molasses minaral block (UMMB) in lactating dairy animals. In: Annual report, 2008/2009.Animal Nutrition Division, NASRI, Khumaltar, Lalitpur. Nepal. 11p.

AOAC. 1999. Official methods of analysis. Association of Official Analysis Chemists, Washington, D.,C.

Avilla, H. F. 2006. Production and utilization of urea molasses mineral block (UMMB). FAO/ Ag./AGP/ doc/publicat/VIET95, Pp. 199-204.

Avilla, H. F. 2006. Production and utilization of urea molasses mineral block (UMMB). FAO/ Ag./AGP/ doc/publicat/VIET95, Pp. 199-204.

Brar, P.S. and Nanda, A.S. 2002. Effect of supplementary feeding in improving reproductive performance in buffaloes. p. 271, in: 9th International Congress on Biotechnology in Animal Reproduction (Management of Farm Animal Reproduction - Fertility Improvement and Advanced Technologies), 2–4 December 2002, Chenni, India.

Gathuma, J. M, Mbaria, J. M, Wanyama, J, Kaburia, H. F. A,Mpoke, L and Mwangi, J. N. 2004. Efficacy of Myrsineafricana, Albiziaanthelmintica and Hilderbrantiasepalosa herbal remedies against mixed natural sheep helminthosis in Samburu district, Kenya. Journal of Ethnopharmacology; 91(1): 7-12

Githiori, J. B, Hoglund, J., Waller, P. J and Baker, R. L. 2003. Evaluation of anthelmintic properties of extracts from some plants used as livestock dewormers by pastoralist and smallholder farmers in Kenya against Heligmosomoidespolygyrus infections in mice. Veterinary Parasitology; 118(3/4): 215-226.

Inostroza, J.F., Shaver, R.D., Cabrera, V.E., Tricarico, J.M. 2010. Effect of diets containing a controlled-release urea product on milk yield, milk composition, and milk component yiels din commercial Wisconsin dairy herds and economic implication. The professional Animal Scientist 26:175-180.

Khanum, S.A., M. Hussain, R. Kausar, A.J. Makhdoom, T. Yaqoob, S. Sadaf, R. Ahmad, S. Rehman and M. Abbas. 2006. Sustainable improvement of livestock production through strategic supplementation with urea-molasses multi-nutrient block (UMMB) and other feed resources available in Pakistan. In: Joint FAO/IAEA (eds.) Improving animal productivity by supplementary feeding of multi-nutrient blocks, controlling internal parasites and enhancing utilization of alternate feed resources. International Atomic Energy Agency.IAEA-TECDOC-1495, Vienna. Energy Agency (IAEA) Vienna, Austria. Pp. 1-16.

Kunju, P. J. G. 1998. Urea molasses block lick: A future animal feed supplement. Asian-Austra. J. Anim. Sci. 1:233-239.

Makkar, G.S. and Saijpaul, S. 1996. Uromin-Lick – A success story.Progressive Farming, May: 22–23.

Makkar, H. 2001. Frequently asked questions on urea molasses-multinutrient block technology (UMMB).Report on review meeting - International Atomic

Mandal, P., B. S. Kunwar, H. R. Shrestha and M. S. Thapa. 2001. Technology from bovine research program. Bovine Research Program, Khumaltar, Lalitpur, Nepal.Pp. 41- 46.

Pande, R. S. 1997. Fodder and pasture development in Nepal. Udaya Research and Development Service (P) Ltd. publisher, Kathmandu, 5 pp.

Perera, E.R.K. and Perera, A.N.F. 2000.Response to multinutrient supplementation in Nilli-Ravi buffalo and Sahiwal cattle under semi-intensive management in the dry zone of Sri Lanka. pp. 183–190, in: Proceedings of the 3rd Asian Buffalo Congress. Changing role of the buffalo in the new millennium in Asia, Kandy, Sri Lanka. 21–31 March 2000.

Roffler, R. E., C. G. Schwarb and L. D. Satter. 1976. Relationship between ruminal ammonia and non-protein nitrogen utilization by ruminants. II. Influence of intraruminal urea infusion on ruminal ammonia concentration. J. Dairy Sci. 59:80-84.

Sharma, L.D., Rhaga, H.S. and Shristava, P.S. 1971.In vitro anthelmintic screening of indigenous medicinal plants against Haemonchuscontortus (Rudolphi, 1803) cobbold., 1898 of sheep and goats. Indian Journal of Animal Research 5: 33-38

Upreti, C, Kumar B, Ghimire B.2010. Effect of UMMB Supplementation during Winter on the Milk Production and its Composition and Infertility in Dairy Cattle in Hill Management Production System. Nepal Journal of Science and Technology 11 71-78.

Upreti, C. R. 2008. Buffalo. In: Livestock poultry and fish nutrition in Nepal. B. Upreti publisher, Kathmandu. Pp. 117-120.

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