

EFFECT OF DIFFERENT COMBINATIONS OF UREA TREATED SUGARCANE TOP SILAGE ON ITS OXALATE CONTENT AND BLOOD MINERAL PROFILE IN MURRAH BUFFALOES

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ABSTRACT

The present experimental study was undertaken in eighteen Murrah buffaloes for a period of thirteen weeks. The selected Murrah buffaloes were allotted randomly to three groups, with six buffaloes in each. The control group (T_0) was maintained without replacement of green maize by sugarcane top silage (SCT), while in treatment groups, the green Maize fodder was replaced with sugarcane top silage on DMB @ 50 and 75 %, for T_1 and T_2 groups, respectively. The experimental buffaloes were offered pelleted concentrate feed and jowar kadbi (jowar dry fodder) during experiment. The Untreated Sugarcane top (UCT) and treated sugarcane top silage (TCT) samples were evaluated for its oxalate content. The oxalate content was observed higher (0.27%) in fresh sugarcane top and lower (0.19%) in sugarcane top silage. Therefore, we can state that, the oxalate content of SCT was reduced by ensiling with 1 per cent of urea on dry matter basis. The blood collection of each experimental animal was done monthly for analysis. Feeding of sugarcane tops silage (SCT) by replacing of the green Maize at 50 and 75 % level did not significantly affect the concentration of minerals in blood of Murrah buffaloes.

Keywords: Minerals, Murrah buffaloes, Oxalate, Silage, Sugarcane top

India has the world's largest animal population standing at around 16% of world Population. India contributes to more than 50% to the world buffalo population. As per an estimate, there is a shortage of about 10% dry fodder, 33% green fodder and 35% concentrates, respectively (GOI, 2015).

In order to mitigate the shortage of feed and fodder and to make animal production viable and profitable, ruminants receive most of their dietary needs from native grasses, crop residues and industrial by-products. The sugarcane top is a major by-product of the sugar industry. It is generally highly palatable and its voluntary consumption is good when they are chaffed and fed. The sugarcane tops are poor quality roughage, lacking in protein and minerals and low energy value (Leng and Preston, 1985). The sugarcane top, however, acquires some importance in view of their availability at low cost during the period when other green fodders are not available. The sugarcane top contains oxalate as a deleterious factor which is also called as 'anti-nutritional' factor. However, urea supplementation increases the digestibility of dry matter and total digestible nutrients intake of sugarcane forage. Thus, the main objective of this work was to increase the nutritive value of sugarcane top and determine the right quantity of treated sugarcane top silage needed to replace maize fodder in feed of Murrah buffaloes under field condition.

MATERIALS AND METHODS

The present experimental study was undertaken

from February to April months (summer season) on eighteen (18) Murrah buffaloes for a period of thirteen weeks (ninety days) at Krishi Vigyan Kendra (KVK), Baramati, District-Pune. All the analysis was conducted at department of Animal Nutrition, Kranatisinh Nana Patil College of Veterinary Science, Shirwal (District-Satara). The selected Murrah buffaloes were allotted randomly to three groups, with six animals in each group. The control group (T_0) was maintained without replacement of green maize by sugarcane top silage, while in treatment group the green Maize was replaced with sugarcane top silage on dry matter basis @ 50 and 75 %, for T_1 and T_2 groups, respectively. The experimental animals were scientifically housed in well-organized (comfortable) sheds with proper ventilation, flooring, lighting and locking arrangements. Normal routine practices of hygienic management like scheduled feeding, vaccination and deworming programmes were undertaken in all the experimental Murrah buffaloes throughout the experimental period. The experimental buffaloes were offered pelleted concentrate feed and jowar kadbi (jowar dry fodder) as routine practice of farm. The sugarcane top silage was prepared by chopping sugarcane top and ensiling in silage bags as per Puga (2001) with 1.0% urea, 0.5% of common salt and 1% of mineral mixture on dry matter (DM) basis. The silage bags were opened 60 days after ensiling, and silage was fed to experimental animals. The experimental animals were fed different quantities of sugarcane tops silage in substitution of maize at the rate of 50 and 75% in T_1 and T_2 groups,

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Table 1**The details of feeding schedule of experimental Murrah buffaloes**

Groups	Experimental Diet
T ₀	Concentrate mixture + Green Maize + Dry fodder (jowar kadbi) (As per the requirement of maintenance and production)
T ₁	Concentrate mixture + 50% Green Maize + 50% sugarcane top silage + Dry fodder (jowar kadbi)
T ₂	Concentrate mixture + 25% Green Maize + 75% sugarcane top silage + Dry fodder (jowar kadbi)

respectively. All the buffaloes were fed concentrate mixture to meet 1/3rd of dry matter requirement. The detail of feeding schedule of experimental murrah buffaloes is presented in Table 1.

The untreated Sugarcane top (UCT) and treated sugarcane top silage (TCT) samples were collected and evaluated for its oxalate content by chemical method stated by Abaza *et al.* (1968). The blood collection of each experimental animal was done monthly and the estimation of blood mineral profiling was carried out. The blood samples were estimated for minerals like Calcium, Magnesium, Copper and Zinc by using Atomic Absorption Spectrophotometer (AAS) (Chemito Spectrascan AA 203) by following the standard procedures outlined in the operation manual. The data collected were subjected to statistical analysis as per completely randomized design (CRD) designed by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

The oxalate content of fresh sugarcane top was observed higher (0.27 %) and lower in sugarcane top silage (0.19 %). Therefore, we can state that the oxalate content of SCT was reduced by ensiling with 1 per cent of urea on dry matter basis.

The reduction in oxalate content of SCT in present study is attributed to ensiling process using urea, enhanced fermentation activity and acidification. The oxalate content of untreated sugarcane top sample was in accordance with the finding reported by Andrade *et al.* (2001) in which the oxalate content of sugarcane top was in

the range of 0.13 to 0.58 per cent. In the present study, the reduction of oxalate content after ensiling with urea treatment was in agreement with the findings of Ahuja *et al.* (1998) who reported that, ensiling of hybrid Napier Bajara variety of PBN-231 and PBN-83 considerably reduced the oxalate content by 80 per cent. Similarly, Pham *et al.* (2006) stated that by ensiling of *Alocasiama crorrhiza* leaves with 7% rice bran and 2% molasses reduced the calcium oxalate content by 78.8 per cent. Gadhe (2017) analyzed and reported the oxalate content of sugarcane top and sugar cane top silage as 0.28% to 0.20%, respectively. The results of blood mineral profile are presented in Table 2. For Murrah buffaloes in T₀ group (control group), the values of macro minerals viz. Ca, P, Mg and micro minerals viz. Cu, Zn are 9.21 ± 0.032 %, 5.79±0.003 %, 1.46±0.034 % and 0.84±0.025, 0.63±0.008 ppm, respectively. T₁ Treatment group fed sugarcane tops silage at 50% replacement of maize silage, the macro minerals viz. Ca, p, Mg and micro minerals viz. Cu, Zn are 9.15 ± 0.035 %, 5.74 ± 0.024 %, 1.40 ± 0.020 % and 0.80 ± 0.008, 0.60 ± 0.003 ppm, respectively. T₂ treatment group fed sugarcane top silage at 75% replacement of maize silage, the macro minerals viz. Ca, p, Mg and micro minerals viz. Cu, Zn are 9.12 ± 0.008 %, 5.72 ± 0.004 %, 1.38±0.011 % and 0.78±0.012, 0.54±0.003 ppm, respectively. Feeding of sugarcane tops silage (SCT) replacing green Maize at 50 per cent (T₁) and 75 per cent (T₂) level did not significantly affect the concentration of major or minor minerals which are essential for reproduction and normal physiological process in the blood serum of the experimental Murrah buffaloes. Pund *et al.* (2007) reported same interpretation of feeding of sugarcane tops silage replacing the green grass at 50 (T₂) or 100 per cent (T₃) in the blood serum of the bull calves.

CONCLUSION

The feeding of sugarcane tops silage (SCT) by replacing green Maize at 50 and 75 % level did not significantly affect the concentration of minerals in blood. Therefore, it is concluded that we can reduce the oxalate content of SCT by ensiling without any adverse effect on

Table 2**Blood Mineral Profile of Experimental Murrah Buffaloes**

Details	Macro minerals (%)			Micro minerals (ppm)	
	Ca	P	Mg	Cu	Zn
T0	9.21±0.032	5.79±0.003	1.46±0.034	0.84±0.025	0.63±0.008
T1	9.15±0.035	5.74±0.024	1.40±0.020	0.80±0.008	0.60±0.003
T2	9.12±0.008	5.72±0.004	1.38±0.011	0.78±0.012	0.54±0.003

blood mineral profile of Murrah buffaloes.

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