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## Effect of Mineral Supplementation on Rumen Metabolites and Enzymes in Sheep Fed Sorghum Stover Based Diets

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**Effect of mineral supplementation on rumen metabolites and enzymes in sheep fed sorghum stover based diets**Shweta Singh<sup>1\*</sup>, S.K. Mahanta<sup>1</sup>, Rishi Saxena<sup>2</sup><sup>1</sup>Indian Grassland and Fodder Research Institute, Jhansi, India<sup>2</sup>Bundelkhand university, Jhansi, India

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**Keywords:** Mineral supplementation, Rumen enzymes, Rumen metabolites, Sheep, Sorghum stovers**Introduction**

Supplementation of area specific mineral mixture (ASMM) containing Ca, P, Na, Cu, and Zn to producing animals showed noticeable improvement in growth, milk production and reproductive performances. However, there was paucity of information on rumen metabolites and enzymes in animals supplemented with ASMM. Therefore, the present investigation was conducted to study the effect of mineral supplementation (ASMM) on rumen metabolites and enzymes in sheep fed sorghum stover based diets.

**Materials and Methods**

Sixteen female Jalauni sheep were taken and they were distributed randomly in to 4 groups (T1 to T4) of 4 animals each. These animals were offered required amount of sorghum stover and concentrate mixture fortified with different levels of mineral mixture (ASMM) viz., T1-0%, T2-1%, T3-2% and T4-2% (T4 standard mineral mixture available from market containing all mineral elements). Experimental animals were continued under this feeding regime for 30 days. Rumen liquor sample were then collected and processed for the estimation of rumen metabolites and enzymes.

**Results and Discussion**

There was a significant ( $P<0.01$ ) differences in pH and total volatile fatty acids (TVFA) in rumen liquor of supplemented and un-supplemented groups (T1 to T4) (Table 1). The values for mean concentration of total nitrogen, TCA precipitable nitrogen and ammonia nitrogen were also comparatively higher in SRL of mineral supplemented animals. Ammonia nitrogen and total nitrogen in the present study were in the range of values reported by Pandey *et al.* (2009). Better rumen environment in terms of VFA and nitrogen metabolite products due to mineral supplementation was observed by Tiwari *et al.* (2000). The average cellulose and xylanase activity ( $\mu\text{g}$  sugar/h/day) were significantly higher in ASMM supplemented dietary regimen than control. Upadhye and Kashavamurthy (1982) also found higher enzymatic activity in mineral supplemented animals.

**Table 1.** Rumen metabolites and enzyme activities in sheep supplemented with ASMM

Attributes	Treatment groups			
	T1	T2	T3	T4
pH**	6.54 <sup>a</sup>	6.44 <sup>c</sup>	6.29 <sup>b</sup>	6.48 <sup>a</sup>
TVFA** (meq/dl)	10.98 <sup>b</sup>	11.98 <sup>b</sup>	13.53 <sup>a</sup>	11.33 <sup>b</sup>
Ammonia-N (mg/dl)	12.84	13.48	15.36	13.90
Total N (mg/dl)	87.25	91.50	96.85	88.63
TCA ppt. N (mg/dl)	67.33	70.50	75.95	65.95
CMCase *( $\mu\text{g}$ sugar/h/day)	782 <sup>b</sup>	813 <sup>b</sup>	919 <sup>b</sup>	790 <sup>b</sup>
Xylanase *( $\mu\text{g}$ sugar/h/day)	1209 <sup>b</sup>	1259 <sup>b</sup>	1370 <sup>a</sup>	1182 <sup>b</sup>

\*( $P<0.05$ ); \*\*( $P<0.01$ )**Conclusion**

From the above study it is concluded that supplementation of mineral mixture @ 2% resulted significant improvement in pH and TVFA and other rumen metabolites and enzymatic activity in strained rumen liquor.

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