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Mineral content of coarse cereals roughages as well as their requirement in dairy animals

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Introduction

The necessity of mineral for growth, reproduction and production as well as normal physiological functions of animal body is well documented. In most of the tropical countries coarse cereal *stovers* are second major feed resource after wheat and paddy straw used in the livestock feeding. The concentration of macro and trace minerals in crop residues depends on various factors including species (Singh *et al.*, 2005). Further, limited information is available on coarse cereals *stovers* mineral content. Therefore, the present study was under taken to see the macro and micro mineral content of some coarse cereal *stovers* in relation to animal requirement.

Materials and Methods

Samples of maize (*Zea mays*), sorghum (*Sorghum bicolor*) and Bajra (*Pennisetum glaucum*) *stover* were collected from major growing states *viz.*, Andhra Pradesh, Bihar, Gujrat, Haryana, Karnataka, Maharashtra, Uttar Pradesh, Rajasthan and Uttarakhand. After drying to a constant weight samples were ground and required quantity (1-1.25g) were digested in tri-acid mixture (HNO₃:H₂SO₄:HClO₄ in the ratio of 15:2:4) and extractable aliquot were subjected to estimation of Calcium (Ca), Magnesium (Mg), Copper (Cu), Zinc (Zn), Manganese (Mn), Cobalt (Co) and Iron (Fe) using Atomic Absorption Spectroscopy model Varian AA240. Phosphorus (P) was analyzed using ammonium molybdate (AOAC, 1980). The data were analyzed statistically (Snedecor and Cochran, 1967).

Results and Discussion

The calcium content was sufficient (0.45 to 0.64%) to meet the requirements of dairy animals in all the three course roughages. However, phosphorus (0.06-0.13%) and magnesium (0.05- 0.14%) were deficient invariably in all the *stover* samples of maize, sorghum and bajra as compared to the required level of 0.22 and 0.20% (McDowell, 1985), respectively (Table 1). There was a wide variation in Cu (6.49 to 8.25 ppm) and Zn (17.25 to 22.01 ppm) contents of maize, sorghum and bajra *stover* samples. Similar findings have also been reported by Garg *et al.* (2003). However, the concentration of iron in course roughage samples was many folds higher than its required levels of 50 ppm. Cobalt content was adequate in all samples while manganese was low in most of the coarse cereal roughage samples.

Table 1: Macro and micro mineral status of coarse cereal roughages

Minerals	Maize <i>stover</i> (n=30)	Sorghum <i>stover</i> (n=38)	Bajra <i>stover</i> (n=29)	SEM
Calcium (%)	0.45	0.64	0.49	0.02
Phosphorus (%)	0.07	0.06	0.13	0.01
Magnesium (%)	0.14	0.05	0.10	0.01
Copper (ppm)	8.25	6.66	6.49	0.37
Zinc (ppm)	17.83	17.25	22.01	0.65
Manganese (ppm)	46.66	46.80	40.88	3.30
Cobalt (ppm)	0.58	0.12	0.68	0.01
Iron (ppm)	370.40	418.29	160.79	38.20

Conclusion

From the results it is evident that only Ca and Co content were adequate in meeting the dietary need whereas P, Mg, Cu and Zn were deficient thus necessitate dietary supplementation and higher levels of Fe also require suitable counteractive mineral supplementation strategies in *stover* based feeding systems.

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