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SHORT COMMUNICATION

SODIUM AND POTASSIUM CONTENTS OF SOME COMMON FORAGES

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ABSTRACT

A total of 17 forages including 8 leguminous and 9 non-leguminous forages were analyzed for sodium and potassium contents. Non-leguminous forages were inadequate in sodium while leguminous forages were well above the recommended levels of 0.08-0.10 per cent for ruminants. Most forages studied had adequate levels of potassium. Therefore, it is concluded that sodium needs to be supplemented in the diets of ruminants.

Key words : Sodium, potassium contents, forages

Present study was done to assess the levels of sodium and potassium in different forages at the experimental farm of Indian Grassland and Fodder Research Institute, Jhansi. Sodium deficiency in livestock has been reported in many parts of tropical countries (Underwood, 1981). Therefore, an attempt was made to know the deficiency, if any, from livestock requirement point of view. This approach is one technique which relatively cost effective to provide information for practical field application (Aggett *et al.*, 1988).

At random samples of different forages (leguminous and non-leguminous) were collected, dried at 70°C for 48 h in an hot air oven, ground to pass 2mm sieve and digested with tri-acid mixture (HNO_3 : H_2SO_4 : $HClO_4$ in the ratio of 15 : 2 : 4) in triplicate. The extractable aliquot were subjected to the estimation of sodium and potassium using Inductively Coupled Plasma-Optical Emission Spectrometer (Perkins Elmer, optima-3300 RL).

The sodium content was usually low in all the forages ranging from 0.03 to 0.24 per cent. Only urd straw and berseem I cut contained sodium as high as 0.24 per cent. Non-leguminous forages were substantially lower in sodium as compared to leguminous forages (Table 1). This difference in sodium content in both types of forages might be due to the genetic nature (Reid and Horvath, 1980). Almost all non-leguminous forages contained below

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recommended levels (0.08-0.10%) of sodium for livestock (NRC, 1989) except oat and *P. maximum*, while leguminous forages were well above the recommended levels. Similar findings has also been reported earlier by Singh *et al.*, (1997) and Garg *et al.*, (1999).

Table 1 Sodium and potassium content of various forages (% DM)

Forages	Sodium Range (Mean)	Potassium Range (Mean)
Non-leguminous		
Cenchrus ciliaris	0.06-0.10 (0.08)	0.40-0.58 (0.49)
Dicanthium annulatum	0.04-0.08 (0.06)	0.48-0.58 (0.53)
Sehima nervosum	0.05-0.09 (0.07)	0.40-0.52 (0.46)
Heteropogon contortus	0.03-0.07 (0.05)	0.52-0.64 (0.58)
Crysopogon fulvus	0.04-0.08 (0.06)	0.60-0.70 (0.65)
Pennicum maximum	0.10-0.16 (0.13)	0.72-0.84 (0.78)
Sorghum kadbi	0.04-0.08 (0.06)	0.64-0.70 (0.67)
Mixed grass	0.03-0.07 (0.05)	0.48-0.52 (0.50)
Oat I cut	0.12-0.22 (0.12)	0.65-0.75 (0.70)
Oat II cut	0.08-0.12 (0.10)	0.50-0.60 (0.55)
Leguminous		
Lecerne	0.12-0.20 (0.16)	0.88-1.04 (0.96)
Stylosanthes hamata	0.10-0.12 (0.11)	0.85-0.93 (0.89)
Stylosanthes scabra	0.08-0.12 (0.10)	0.75-0.81 (0.78)
Leucaena leaf dried	0.08-0.12 (0.10)	0.84-0.96 (0.90)
Urd straw	0.20-0.24 (0.21)	0.68-0.72 (0.70)
Groundnut haulm	0.08-0.16 (0.12)	0.60-0.66 (0.63)
Cowpea	0.14-0.20 (0.17)	0.74-0.82 (0.78)
Berseem I cut	0.16-0.24 (0.20)	1.28-1.92 (1.60)
Berseem II cut	0.14-0.18 (0.16)	0.90-1.02 (0.96)
Berseem III cut	0.09-0.11 (0.10)	0.55-0.63 (0.59)

The potassium content of all forages ranged from 0.40 to 1.92 per cent, which seemed to be selective uptake from the soil and was many fold higher than the sodium. Legumes were richer in potassium than non-leguminous forages. The highest potassium concentration (1.60%) was observed in berseem I cut and the lowest (0.40%) in *S. nervosum* and *C. ciliaris.* Almost all forages screened had adequate levels of potassium as compared to its requirement

of 0.60 to 0.80 per cent (Underwood, 1981). Potassium seemed to be another element which did not require supplementation in the diet, because of its abundance in different feeds and forages.

Adequacy of sodium in diet is more important than potassium not only due to its important role in sodium pump and its concentration being more in extracellular compartment but also due to its inadequate levels in various forages (Garg *et al.,* 1999). Further, its kinetic features, the stoichiometry of Na^{++} and H^{+} is 1:1 which maintains pH at approximately 7.2 intracellularly by the distribution of H^{+} ions, on the basis of electro-chemical gradients (Noel and Pouyssegur 1995). Though sodium is conserved by the body in a number of ways, such as its retrivement from urinary tract, urinary bladder and from the ducts of salivary glands (Chen *et al.,* 1991), but it is not stored in the body tissues. Potassium is mostly located in the intracellular compartments, playing a synergistic role with sodium, in cellular activity. Consequently, sodium needs to be supplemented in the diets of ruminant due to its inadequate levels whereas, potassium is in abundance in forages and thus there is no need for its extra supplementation in diets of animals.

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