Evaluation of macro and micro mineral concentration of some common forages of Dausa district of Rajasthan

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Introduction
The Rajasthan state is blessed with huge livestock population but the fodder availability is limited in this region. To deal with scarcity the locally available tree leaves and forages are provided to the livestock. Fodder tree/shrub legumes have the potential for alleviating some of the feed shortages and nutritional deficiencies experienced in the dry season on small holder farms. Tree leaves are rich in protein, carotene and minerals and contribute a sizable amount of edible biomass and has been considered as a potential source of sustenance since ages for raising livestock, particularly sheep and goat which are principle grazing animals. Green leaves are more palatable and animals relish them better than dry leaves. Green leaves serve as maintenance ration for livestock but dry leaves need supplementation with feed rich in minerals, particularly phosphorus. Farmers are mostly dependent upon locally available grasses and usually practices feeding of little quantity of homemade concentrate mixture without supplementation of mineral mixture as a result animals suffer from various deficiency diseases. There is a need to estimate the macro and micro mineral content of different forage grasses and tree leaves. Therefore, this study was conducted to assess macro and micro mineral profile of different forages of Dausa district of Rajasthan.

Materials and Methods
The study was conducted in Sikrai block of Dausa district. Five villages i.e. Dubbi, Geejgarh, Manpur, Sikrai and Torda of Sikrai tehsil were selected for survey and collection of data. Twelve farmers from each village were indentified for collection of tree leaves and green fodder commonly fed to cattle, buffalo, sheep and goat. A total of 38 samples were collected randomly and dried at 100 ± 5^0C in hot air oven and ground to 1 mm sieve and digested in tri-acid and volume was made to 50 ml. Calcium, magnesium, copper, zinc, manganese and iron in tree leaves and fodder were estimated by atomic absorption spectrophotometer (Shimadzoo AA-6300) using standard procedures. Phosphorus in tree leaves and forages was estimated by UV spectrophotometer (AOAC, 1975).

Results and Discussion
Macro (Ca, P and Mg) and micro (Cu, Zn, Mn and Fe) mineral concentrations of different forages and tree leaves are presented in Table 1. Wheat straw and pearl millet straws are the major sources of roughages for cattle and buffaloes. All micronutrient contents of pearl millet straw were higher as compared to wheat straw. The mineral contents of groundnut straw were higher as compared to wheat, pearl millet and cluster bean straw, except phosphorus. Among the forages, the tree leaves, green mustard leaves and aak leaves are good sources of calcium. Cluster bean straw and mustard leaves are good sources of phosphorus, whereas in wheat straw and pearl millet straw the phosphorus level was below the critical level. The level of phosphorus, copper and zinc in wheat straw was below the critical level. In cluster been straws the level of copper and zinc were below their critical level. Tree leaves of this area were rich sources of calcium. High level of copper was found in peepal leaves (16.32 $\pm$ 0.00 ppm) followed by babool (12.29 + 2.42 ppm) and dub (12.07 + 2.02 ppm). The level of zinc was low in most of the feed and fodder found in this area. The level of iron was found to be high in all the forages.

Mostly the animals are stall fed. In practice livestock owners offer very small quantities of green fodder to their animals, in short period varying from one to four months only. Feeding of growing animals is mostly neglected, which adversely affects their growth rate. Small quantities of concentrate varying from 1 to 2 kg are fed for about 3 to 6 months to milking animals only.

Table 1: Macro (%) and micro (ppm) mineral concentration in forages collected from Sikrai tehsil

	Ca (%)	P (%)	Mg (%)	Cu (ppm)	Zn (ppm)	Mn (ppm)	Fe (ppm)
Critical levels	**0.3**	**0.25**	**0.2**	**8**	**30**	**40**	**50**
Straws / Kadbies							
Wheat (n=7)	0.21±0.06	0.13±0.01	0.41±0.12	7.49±0.57	12.21±0.02	22.11±2.37	1433.74±339.48
Pearl millet (n=7)	0.21±0.01	0.20±0.05	0.49±0.03	8.32±1.10	41.42±7.52	34.89±2.99	1716.86±260.15
Cluster bean (n=2)	0.39±0.02	0.76±0.09	0.42±0.02	6.97±0.58	21.51±0.10	37.93±1.20	661.17±306.46
Groundnut (n=3)	0.97±0.16	0.56±0.06	0.57±0.01	9.07±0.02	26.11±0.61	38.92±7.52	1801.95±86.95

Tree Leaves / Green Fodder / Miscellaneous							
Ardu leaves (n=2)	1.51±0.36	0.37±0.01	0.76±0.03	7.57±1.20	11.77±2.24	179.75±52.54	2211.57±296.67
Babool leaves (n=2)	0.92±0.02	0.19±0.04	0.31±0.01	12.29±2.42	16.91±5.84	58.35±11.75	2138.53±429.95
Neem leaves (n=4)	1.84±0.26	0.20±0.31	0.66±0.12	7.42±0.40	12.73±0.00	49.92±0.17	1925.06±334.02
Ber leaves (n=2)	2.10±0.91	0.24±0.06	0.61±0.91	12.28±2.42	32.59±7.52	64.94±0.00	2357.65±59.42
Peepal leaves (n=1)	2.10±0.00	0.16±0.00	0.28±0.00	16.32±0.00	31.15±0.00	44.88±0.00	925.47±0.00
Kasni (n=3)	0.75±0.04	0.39±0.02	0.34±0.12	9.47±0.55	21.32±0.05	62.03±12.43	2135.74±544.41
Mustard leaves (n=1)	1.24±0.00	0.83±0.00	0.72±0.00	5.63±0.00	3.48±0.00	97.14±0.00	2208.53±0.00
Kasni+ Bathuwa (n=1)	0.48±0.00	0.46±0.00	0.80±0.00	15.12±0.00	26.86±0.00	70.24±0.00	2616.62±0.00
Aak leaves (n=1)	1.07±0.00	0.50±0.00	0.08±0.00	6.42±0.00	28.14±0.00	98.14±0.00	1566.23±0.00
Dub (n=2)	0.41±0.01	0.22±0.02	0.24±0.01	12.07±2.02	18.04±2.51	84.90±6.33	2193.47±91.86

Conclusion

Field survey revealed that in livestock the main problem was pica, milk fever and reproductive problem such as anoestrus. Major deficiency exhibited by the animals of the area was of calcium and phosphorus. This can be overcome by -

➢ Providing mineral supplements with calcium and phosphorus salts.
➢ Providing tree leaves and cultivated fodder grass, which are good calcium and phosphorus sources.
➢ Providing balanced feed in required quantity.

References

AOAC, 1975. *Official methods of analysis*, 12th Association of official Analytical chemist, Washington, D.C.