

## **MACRO AND MICRO-MINERAL STATUS OF FEEDS AND FODDERS IN VILLAGES OF DATIWADA TALUKA OF NORTH GUJARAT REGION**

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### **ABSTRACT**

A survey was carried out in ten villages of Dantiwada taluka of the Banaskantha district which are adopted by Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, to know the macro and micro-minerals status in feeds and fodders by samples at random. The samples were analysed for macro minerals, calcium and phosphorus with micro minerals copper, manganese and zinc. The concentrate samples were analysed individually and in combination with other ingredients, as per as their practically utility to dairy animals. The results of analysis were compared with the critical level for particular micro minerals level and percentages of samples which contained micro minerals below critical level were calculated.

**Key words :** Macro and Micro minerals, survey, Feeds, Fodders.

Mineral elements are considered to be inevitable for the normal metabolic and physiological processes of animal systems. Mineral imbalances are of commonly occurrences in livestock throughout the world in affecting them in a number of ways (McDowell et al., 1983). The deficiency of certain minerals may not affect crops yields but their availability from such forages may be inadequate for requirement of livestock. It is therefore necessary to generate information on mineral status area wise so as to identify deficiencies or toxicities. A numbers of researches in the world have reported a high incidence of forage samples below critical levels for different mineral elements, especially copper, zinc, phosphorus, magnesium and calcium (Miles and McDowell, 1983; Underwood and Suttle, 1999). It is obligatory to assess feeds and fodders for minerals, which are dietary essentials, with the objective to recommend quantities needed extra in the ration. At the same time, it is advisable not to

recommend excess, so as to avoid the problem of animal waste and toxicity (Garg et al., 2003). Area wise mapping of elements in feed and fodder is relatively a rapid, reliable and cost effective method of providing baseline data on the levels of macro and microelements. The study was undertaken to assess the macro and micro-nutrients status in feeds and fodders of selected villages of Dantiwada Taluka of North Gujarat area.

### **MATERIALS AND METHODS**

The survey was conducted in Sardarkrushinagar Dantiwada Agricultural University adopted villages in Dantiwada Taluka. The names of villages are Vaghrol, Nilpur, Lodapa, Fatepura, Dhaneri, Jegol, Dantiwada, Bhadali, NaniBhakhar, and MotiBhakhar. Random sampling technique was used to select the respondents. In each village, 10 farmers who own dairy cattle producing at least 10 kg or more milk per day were selected. Information regarding the amount and types of feeds and fodders being offered to the animals, approximate

rate of daily feed intake by individual animal were collected with the fair degree of precision on a questionnaire from individual farmer using standard sampling procedure, samples of green fodder, dry roughage, individual concentrate ingredients, compound concentrate mixtures and homemade concentrate mixtures were collected from all the respondents. The Ca content was analyzed by the method of Talapatra et al. (1940) and the Phosphorus content was analyzed colorimetrically by AOAC (1999) method. The contents of Cu, Mn and Zn were analyzed using Atomic Absorption Spectrophotometer (ECIL, AAS 4141). The data were subjected to statistical analysis using methods of Snedecor and Cochran (1980).

## **RESULTS AND DISCUSSION**

Most of the dairy animal owners keep the animals stall-fed either at home or at farm within a limited area. Crop residues, predominantly wheat and bajri straw, were found to be the main source of roughages in the ration of animals in the area. They store dry fodder like straws of bajri, wheat, jowar and groundnut haulms. Most of them grow green fodders like Jowar, 'rajaka-bajari (multicut), Chicory leaves, hybrid Napier and Lucerne. They also feed local mixed grasses. It was found that the dairy animals were fed roughage three times and concentrates offered twice a day at the time of milking. Among the concentrate they feed Banasdan (compound cattle concentrate) manufactured by Banaskantha District Co-operative Milk Producers' Union Limited (Banas Dairy), commercial concentrate mixtures, maize grain, bajri grain, jowar grain, wheat grain, guar grain, cottonseed cake, Isabgul lali etc.

The minerals composition of feeds and fodder collected during the survey is given in Table 1. The data on Ca and P content of the feedstuffs are in agreement with the reports of Anonymous (1983), Desai et al. (1984), Desai et al. (1985), Garg et al. (1999) and Garg et al. (2003). The Cu content seemed to be lower in most

of the feedstuffs collected. The feeds like Wheat straw, jowar straw, bajri straw, groundnut straw, paddy straw, wheat bhoosa, etc. and green roughage like lucerne, rajaka-bajari, chickory leaves, jowar green, Gajaraj, local mixed grass etc., the quantities were under 16.95 ppm. These findings are in agreement with Garg et al. (1999). However, Desai et al. (1985) reported slightly higher values of Cu content in these feedstuffs. Most of the homemade concentrate mixtures contained more than 12 ppm and Banasdan contained  $24.10 \pm 0.63$  ppm Cu, which might have been achieved by using mineral mixture as per BIS specifications during manufacture of compound concentrate.

Most of the green fodders offered to the animals contained reasonable amount of Mn ( $36.24 \pm 1.86$  to  $72.01 \pm 2.35$  ppm). It was apparent that most of the dry roughage was low in Zn content. Jowar straw, groundnut straw, paddy straw, wheat bhoosa etc. showed less than 26.38 ppm Zn. This is in agreement with the findings of Desai et al. (1985) and Sanjeev Kumar (2009).

The perusal of data on Cu, Mn and Zn content of feedstuffs collected during the survey showed variation when compared with the values obtained in the surveys of feeds and fodders in North Gujarat and other part of Gujarat. The possible reason for such variations may be that with the introduction of high yielding crop varieties, intensive crop systems and extensive fertilizer application; the mineral profile in soil, plants or animal feedstuffs are rapidly changing, which in turn affect the mineral status of animals (Singh and Sangwan, 1987; Underwood and Suttle, 1999).

The percentage of the feed samples collected during survey and containing Cu, Mn and Zn below critical levels (Cu < 8ppm, Mn < 40ppm and Zn < 30ppm) has also been worked out for developing a better understanding on the subject and the data is given in Table 2.

Table 1 : Mineral content in of feeds and fodders samples.

Name of the sample	P	Ca	Cu	Mn	Zn
	%		ppm		
<b>Concentrates</b>					
Banasdan + CSC	0.81	0.96	9.01	65.68	67.26
Banasdan + CSC + Bajri	0.78	1.03	6.85	51.30	84.70
CSC + Wheat bhardo+ Guar bhardo	0.73	1.17	8.21	60.43	64.50
Banasdan + Bajri + Isabgul lali	1.01	0.66	11.24	71.58	84.89
Banasdan + CSC+ Tuar chunni	0.53	1.05	12.86	87.43	70.12
Banasdan+ Wheat bhardo + CSC + Isabgul lali	0.82	1.24	11.36	79.57	68.57
Guar bhardo	0.33 ±0.01	0.19±0.02	5.89 ±1.18	16.37 ±1.26	39.87 ±2.87
Wheat bhardo	0.34 ±0.01	0.15 ±0.01	5.66 ±1.02	31.48 ±1.44	36.75 ±3.39
Bajri	0.44 ±0.01	0.19 ±0.01	3.56 ±0.24	15.24 ±1.27	19.27 ±2.34
Jowar	0.37 ±0.01	0.15 ±0.02	3.14 ±0.31	14.85 ±1.02	22.76 ± 2.41
Banasdan	1.12 ±0.11	1.27 ±0.13	24.10 ±0.83	86.65 ±3.32	100.28±3.58
Isabgul Gola	0.37 ±0.01	0.56 ±0.07	14.00 ±0.47	50.68 ±2.26	48.87 ± 2.13
Cotton Seed Cake	0.43 ±0.04	0.39 ±0.03	8.06 ±0.45	34.68 ±1.75	34.00 ±1.53
<b>Green Roughages</b>					
Jowar green	0.32 ±0.10	0.56 ±0.05	7.56 ±0.20	72.01 ±2.35	29.33 ±5.22
Rajka Bajri	0.36 ±0.04	0.94 ±0.06	9.25 ±1.43	64.56 ±3.42	39.67 ±2.29
Chickory leaves	0.70 ±0.05	0.78 ±0.03	8.69 ±1.04	60.24 ±4.26	28.14 ±2.03
Lucerne	0.78 ±0.08	1.37 ±0.05	7.21 ±0.34	36.24 ±1.86	27.46 ±1.46
Local mixed grass	0.35 ±0.01	0.78 ±0.02	9.57 ±0.54	59.74 ±2.52	26.64 ±1.63
<b>Dry Roughages</b>					
Bajra straw	0.16 ±0.05	0.61 ±0.04	3.76 ±0.41	40.36 ±1.87	19.79 ±1.34
Wheat straw	0.14 ±0.03	0.32 ±0.04	4.38 ±1.30	46.65 ±2.14	14.29 ±1.15
Jowar straw	0.32 ±0.04	0.48 ±0.04	6.46 ±0.34	56.83 ±1.13	17.40 ±2.16
Ground nut straw	0.23 ±0.02	0.42 ±0.03	8.56 ±0.28	22.76 ±1.56	18.25 ±0.56
Wheat bhoosa	0.16 ±0.02	0.37 ±0.04	5.65 ±0.30	50.15 ±2.88	16.93±1.67

Table 2 : Percentage of feed samples containing Cu, Mn and Zn below critical levels in surveyed Villages of Dantiwada Taluka of North Gujarat.

Particulars	Cu (<8.0ppm)	Mn (<40.0ppm)	Zn (<30.0ppm)
<b>Concentrates</b> (Guar bhardo, Wheat bhardo, Bajri, Jowar, Banasdan, Isabgul Gola, Cotton Seed Cake)	32.50	25.40	26.80
<b>Green roughages</b> (Jowar green, Rajka Bajri, Chickory leaves, Lucerne, Local mixed grass)	44.20	16.80	60.50
<b>Dry Roughages</b> (Bajra straw, Bajra straw, Jowar straw, Ground nut straw, Wheat bhoosa)	76.40	20.50	100.00

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