

A Note on Trace Element Content in Cattle Feeds of Panchmahals

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Animal Nutrition Survey was carried out in Panchmahals district during August-78 to May-79 to study the trace element contents of feeds and fodders available in the district. Following villages were selected for survey from different talukas of Panchmahals.

Taluka	Villages
Devgadhi Baria	Ghoghamba, Gollav, Ankli, Palla, Dungaria.
Godhra	Mehlol, Mora.
Santrampur	Limbhola, Hadmat.
Lunawada	Kothamba, Moti-charel.
Dahod	Abhalod, Katwara, Jesa-wada.
Limkheda	Limkheda.
Zalod	Mahudi, Hadmatkhuta, Limbadi.

Animal Nutrition study will certainly be helpful—particularly trace element status of the feeds—when dairy and live-

stock development projects would be taken up. Hence this department has taken up this survey. All care was taken to select atleast one village in most of talukas representing true *adivasi* villages.

The samples collected during the survey were analysed on atomic absorption spectrophotometer using wet digestion technique. The data are presented in Table-1.

The results indicated that most of the concentrates and roughages are deficient in zinc (less than 40 ppm). However *tandaljo* (156.6 ppm), wheat bran (81.6 ppm), *chil* (92.0 ppm) and cotton boll (green) (154.4 ppm) had very high zinc content.

Concentrates like *chunies*, *bhardo* and concentrate mixtures are rich in manganese. Most of the green grasses, *bavto* straw, paddy straw and some tree leaves are also rich sources of manganese. Copper content in maize, milo, paddy, barley *bhardo*, mix *bhardo*, polish, *kuski*, bran, hulls, *chhala* some green grasses straws and few *gotars* were deficient. Some concentrates and most of the tree leaves were adequate in copper.

From the over all results it was observed that elements viz. zinc and copper were deficient at varying levels.

TABLE 1

Trace element content of feeds and fodders samples collected during different seasons from Panchmahal district.

Name of sample		Zn ppm	Mn ppm	Cu ppm	Fe mg/100g
Seeds and Grains		CONCENTRATES			
Cotton (<i>Gossypium herbaceum</i> Linn.)	(7)	28.67 ±2.84	14.97 ±1.47	10.13 ±0.77	27.4 ±3.0
Dhandhan (<i>Sesbania</i> spp.)	(2)	34.40	75.00	18.34	136.3
Gram (<i>Cicer arietinum</i>)	(1)	23.22	45.00	7.78	44.7
Kodra (<i>Paspalum scrobiculatum</i> Linn.)	(1)	20.64	57.50	8.33	70.7
Maize (<i>Zea mays</i> Linn.)	(6)	23.62 ±3.31	11.06 ±1.22	4.06 ±0.48	11.8 ±2.0
Milo (<i>Sorghum vulgare</i> Pers)	(1)	12.47	15.00	3.88	15.9
Paddy (<i>Oryza sativa</i> Linn.)	(1)	18.73	18.99	4.79	54.6
Paddy (Black)	(3)	24.57 ±6.75	57.94 ±8.90	5.10 ±0.21	41.5 ±14.4
Puwad (<i>Cassia tora</i>)	(5)	36.77 ±3.20	25.25 ±1.70	7.62 ±0.52	52.6 ±4.6
Sheria (<i>Hibiscus cannabinus</i> Linn.)	(3)	59.24 ±6.82	30.83 —	15.36 ±1.22	75.9 ±24.6
Tulsa (<i>Ocimum canum</i> Sims.)	(2)	26.32	60.00	13.06	131.3
Udid (crushed) (<i>Phaseolus mungo</i> Goth.)	(1)	25.37	25.00	6.11	13.0
Wal (<i>Dolichos lablab</i> Linn.)	(2)	20.64	31.25	8.06	17.4
Oil Cakes					
Groundnut (<i>Arachis hypogaea</i> Linn.)	(4)	39.42 ±5.13	58.82 ±14.76	16.85 ±2.40	115.2 ±38.5
Mahuda (Expeller) (<i>Madhuca indica</i> J.F. Gmel.)	(9)	24.03 ±1.27	13.59 ±1.92	4.92 ±1.30	43.4 ±7.1
Mahuda (bullock ghani)	(1)	23.84	9.50	4.79	36.4
Til (Iron ghani) (<i>Sesamum indicum</i> Linn.)	(3)	90.81 ±9.10	33.91 ±3.34	27.41 ±2.61	48.4 ±0.8
Chunies					
Gram	(6)	32.24 ±3.45	90.56 ±0.96	7.41 ±1.62	73.5 ±15.9
Guar (<i>Cyamopsis tetragonoloba</i> (L.) Taub.)	(1)	24.51	27.50	13.33	50.5
Tur (<i>Cajanus cajan</i>)	(5)	32.60 ±3.47	59.15 ±12.03	12.11 ±0.90	108.9 ±23.9
Udid	(4)	34.04 ±5.04	112.14 ±18.53	15.11 ±2.08	177.6 ±22.0
Bhardo					
Barley (<i>Hordeum vulgare</i> Linn.)	(1)	38.59	14.24	2.66	20.5
Guar	(7)	31.24 ±2.03	22.10 ±2.87	8.36 ±0.73	49.9 ±6.02
Kulthi (<i>Dolichos biflorus</i>)	(1)	24.40	63.30	—	23.9
Vari (<i>Panicum miliare</i> , Lam.)	(1)	37.36	28.49	9.05	65.9
Wheat (<i>Triticum aestivum</i> Linn.)	(4)	43.53 ±1.76	47.57 ±7.62	7.13 ±0.83	24.4 ±5.7

Name of sample		Zn ppm	Mn ppm	Cu ppm	Fe mg/100g
Polish, Kuski and Brans					
Rice polish	(1)	26.66	142.50	7.78	88.0
Rice kuski	(7)	30.98	143.37	7.18	63.4
		± 10.45	± 23.98	± 1.39	± 8.4
Rice bran (par boiled)	(2)	21.72	103.75	10.00	78.6
Vari bran	(1)	31.78	121.85	4.79	44.3
Wheat bran	(2)	81.63	135.30	8.69	22.7
Wheat flour	(1)	33.48	41.15	3.20	73.9
Hulls and Chhala					
Bajri (<i>Pennisetum typhoides</i> Burmf.)	(2)	22.79	61.25	8.61	44.0
Rajagira (<i>Amaranthus hybridus</i> L.)	(1)	27.52	112.50	14.44	251.0
Tur	(2)	17.85	21.25	7.50	28.8
Concentrate Mixtures					
Comp. con. mixture (A)	(3)	36.81	91.18	22.12	86.6
		± 7.15	± 7.74	± 5.46	± 2.8
Comp. Con. Mixture (N)	(4)	47.11	177.44	15.57	199.2
		± 6.48	± 14.21	± 2.08	± 19.9
Comp. con. mixture (R)	(1)	31.78	126.60	20.77	196.6
Home-made Conc. Mixtures					
Con. mixture (puvad)	(9)	25.51	100.28	7.78	65.7
		± 1.02	± 14.55	± 0.33	± 7.9
Con. mix. (puvad bafnu)	(3)	32.73	60.14	6.04	60.6
		± 0.95	± 12.70	± 0.35	± 6.3
Con. mix. (boiled puvad bafnu)	(2)	21.72	76.25	6.38	49.8
Con. mixture	(24)	27.87	76.59	8.84	62.1
		± 1.47	± 9.80	± 0.48	± 6.6
Bhardo mixture	(3)	35.00	83.34	3.20	68.2
		± 2.93	± 9.15	± 0.31	± 3.3
Con. mix. (Poultry feed)	(1)	29.24	117.50	13.33	70.7
Green Fodder					
Green grasses Shedha grasses, weeds and forest grasses)					
Aroutaro (<i>Digitaria adscendens</i> , Henrard)	(3)	29.89	43.78	5.51	36.0
		± 4.59	± 3.80	± 0.18	± 3.0
Akalu baklu (<i>Commelina bengalensis</i> L.)	(1)	38.59	206.31	6.92	111.4
Anghedo (<i>Achyranthes aspera</i> L.)	(1)	31.78	66.47	6.39	37.5
Athimathi (<i>Alysicarpus</i> spp.)	(1)	34.05	50.54	7.99	35.2
Bhatadi (<i>Themeda tiandra</i> Forsk)	(4)	28.40	54.21	3.73	39.5
		± 6.40	± 13.80	± 1.21	± 12.8

ROUGHAGES

Name of sample		Zn ppm	Mn ppm	Cu ppm	Fe mg/100g
Chil (<i>Chenopodium album</i> L.)	(1)	92.02	147.50	13.33	70.7
Dharo (<i>Cynodon dactylon</i> (L) Pers.)	(2)	32.90	57.50	9.73	49.1
Ganthiu (<i>Barreria ariticularis</i> L.F.)	(1)	44.27	85.46	10.65	190.9
Gharko (<i>Celosia argentea</i> L.)	(1)	28.38	194.65	5.33	92.1
Gugari (<i>Capillipedium filiculme</i>)	(1)	30.65	58.55	3.73	36.4
Kagada grass (<i>Panicum</i> spp.)	(1)	22.70	71.21	7.99	33.0
Kanajaro (<i>Digera muricata</i> L.)	(2)	35.33	126.66	11.19	109.0
Karkariu (<i>Capillipedium hugelli</i>)	(1)	31.78	68.05	3.73	28.4
Koobabul (<i>Leucaena leucocephala</i>)	(1)	22.70	39.56	7.46	46.6
Kutri (<i>setaria Serticillate</i>)	(1)	34.62	90.20	8.52	200.0
Leparvy (<i>Alysicarpus hamosus</i>)	(1)	30.08	74.38	13.85	169.3
Samo (<i>Echinochloa colonum</i>)	(4)	31.78	140.85	7.19	74.7
		± 2.27	± 28.32	± 1.45	± 24.3
Sheran (<i>Ischaemum laxum</i>)	(2)	21.85	41.79	2.40	9.7
Sukali (<i>Heteropogon controtus</i>)	(2)	22.43	64.10	4.0	17.9
Sukari (<i>Pluda mutica</i>)	(1)	31.21	82.29	6.39	17.0
Tandaljo plant (<i>Amaranthus lividus</i>)	(1)	156.62	67.50	8.89	31.7
Vakumbo (<i>Orobancha aegyptiaca</i>)	(1)	32.25	15.00	10.56	46.2
Wild chicory					
(<i>Cichorium intybus</i> Linn. Wild spp.) Linn.)	(2)	27.31	51.25	13.89	59.2
		± 3.17	± 8.25	± 1.82	± 9.2
Zari (<i>Echinochloa crusgalli</i> (L.) P. Beauv)	(6)	30.74	83.88	5.89	45.1
Zinzvo (<i>Dichanthium anulatnum</i> Forsk)	(6)	34.51	70.90	5.96	78.7
		± 3.43	± 13.37	± 1.35	± 27.4
Mixed green grasses	(17)	28.29	92.37	9.00	64.8
		± 2.51	± 18.63	± 0.63	± 8.6
Cultivated Green Fodder					
Bajri	(1)	11.61	35.00	5.00	24.5
Jowar (<i>Sorghum vulgaris</i> Pers)	(1)	30.96	40.00	7.22	34.6
Lucerne (<i>Medicago sativa</i> Linn.)	(3)	20.50	45.83	11.85	29.8
		± 2.49	± 9.93	± 0.80	± 1.7
Maize	(5)	23.56	24.50	4.96	19.3
		± 4.57	± 2.67	± 1.13	± 2.7
Mustard plant (<i>Brassica juncea</i>)	(1)	27.95	65.00	8.33	160.1
Rajagira plant	(1)	16.34	30.00	3.88	14.4
Sugarcane tops (<i>Saccharum officinarum</i>)	(1)	10.75	55.00	3.33	13.0
Wal plant	(2)	14.35	42.50	5.56	21.6
Dry Fodders					
Dry Grasses					
Bhatadi	(8)	12.68	62.19	4.17	15.0
		± 1.36	± 6.64	± 0.64	± 2.2

Name of sample		Zn ppm	Mn ppm	Cu ppm	Fe mg/100g
Forest grasses (<i>Bhatadi</i>)	(4)	15.05 ±1.69	44.38 ±5.63	1.38 ±0.48	11.6 ±2.6
Roza (<i>Cymbopogon martinii</i> Roxb.)	(1)	22.79	100.00	5.56	27.4
Sukali	(1)	8.60	40.00	3.88	13.0
Mixed grasses	(1)	17.20	55.00	6.67	18.8
Straws					
Bajri	(5)	15.48 ±3.21	29.50 ±5.15	4.33 ±0.51	20.2 ±6.6
Bant (<i>Echinochloa frumentacea</i>)	(3)	12.47 ±1.99	49.83 ±7.67	4.07 ±0.37	11.1 ±1.9
Bawo (<i>Eleusine coracana</i>)	(2)	21.26	20.00	2.78	10.1
Jowar	(5)	26.43 ±2.53	37.50 4.87	4.55 0.67	22.8 4.2
Kodra (<i>Paspalum scrobiculatum</i>)	(1)	20.64	132.50	6.67	15.9
Maize	(8)	16.22 ±1.93	35.94 ±5.39	3.88 ±0.26	13.3 ±2.5
Paddy	(15)	21.95 ±1.63	400.14 ±38.50	4.74 ±0.38	21.1 ±1.9
Wheat	(6)	9.39 ±0.99	55.83 ±22.46	4.53 ±1.00	39.0 ±12.3
Gotars					
Gram	(3)	12.47 ±0.86	85.83 ±24.59	8.89 ±0.64	116.4 ±22.6
Groundnut plant	(1)	12.04	100.00	8.33	37.5
Groundnut	(6)	15.74 ±1.43	132.92 ±24.79	8.43 ±1.56	114.2 ±33.8
Groundnut stem (<i>Kathu</i>)	(6)	12.40 ±0.84	79.58 ±22.52	5.56 ±1.16	46.2 ±12.2
Pea (<i>Pisum sativum</i> L.)	(1)	18.06	47.50	6.67	34.6
Tur	(6)	15.27 ±1.67	75.83 ±11.08	8.33 ±0.20	103.8 ±21.2
Udid	(1)	18.92	52.50	7.22	44.7
Wal pods cover	(1)	12.90	75.00	12.78	178.9
Tree Leaves and Creepers (Green)					
Castor (<i>Ricinus communis</i> Linn)	(1)	30.10	315.00	12.78	38.9
Dhamas (<i>Fagonia cretica</i> L.)	(1)	30.53	140.00	14.44	50.5
Dharedo (<i>Streblus asper</i> Lour)	(1)	37.41	60.00	12.78	44.7
Dhahardi	(1)	32.25	145.00	13.33	79.3
Gansayadi	(1)	26.23	115.00	18.89	31.7
Khakhar (<i>Butea monosperma</i>)	(3)	6.59 ±2.45	97.33 ±41.90	5.37 ±0.93	33.3 ±10.8

Name of sample		Zn ppm	Mn ppm	Cu ppm	Fe mg/100g
<i>Neem</i> (<i>Azadirachta indica</i>)	(2)	13.12	30.00	4.44	33.2
<i>Pipal</i> (<i>Ficus tsiela</i> Roxb.)	(1)	24.08	20.00	7.78	23.1
<i>Sag</i> (<i>Tectora grandis</i> L.f.)	(1)	15.91	67.50	7.22	37.5
<i>Wau creeper</i> (<i>Cocculus hirsutus</i> L.)	(1)	15.91	30.00	12.78	31.7
Miscellaneous					
<i>Acacia</i> pods (<i>Acacia nilotica</i> L.)	(1)	19.78	20.00	6.11	15.9
Cotton boll (green)	(1)	154.36	44.31	5.86	130.7
Cotton boll cover	(4)	10.32	21.25	5.14	15.2
		± 1.73	± 3.15	± 0.48	± 1.7
Groundnut shell	(1)	9.03	35.00	7.78	23.1
<i>Mahuda</i> flower	(5)	14.43	14.04	2.51	54.6
		± 2.11	± 1.68	± 0.23	± 4.5
<i>Mahuda</i> flower (extracted)	(1)	32.35	50.54	9.59	170.5
Maize cob cover	(4)	17.53	15.00	4.31	12.3
		± 2.59	± 0.00	± 0.86	± 0.9
<i>Prosopis juliflora</i> pods (unripe)	(1)	19.78	15.00	9.44	11.5
<i>Sheria</i> boll (green with seeds)	(2)	20.21	52.50	5.00	23.8
<i>Sheria</i> boll (Cover only)	(1)	15.05	40.00	5.56	28.9

Figure in the parenthesis indicates number of samples analysed.

Percentage adequate or deficient of trace elements in feeds:

Percentage of samples adequate or deficient in trace element in Panchmahal was calculated and results are presented in Table-2.

TABLE 2

Percentage of feed samples adequate or deficient in trace elements in Panchmahals district.

Particulars	Trace elements			
	Zn	Mn	Cu	Fe
Concentrates				
Adequate	15.5	76.0	34.0	98.5
Deficient	84.5	24.0	66.0	1.5
Roughages				
Adequate	5.5	87.5	15.5	95.5
Deficient	94.5	12.5	84.5	4.5

From the data it is seen that 85 and 66 per cent samples of concentrate were deficient in zinc and copper respectively. In case of roughages 95 and 85 per cent samples respectively were found deficient.

From this study it is recommended that zinc and copper be supplemented in the cattle ration in Panchmahals area.

Zinc deficiency was also reported by Sawhney (1973) in Gujarat, Desai *et al.* (1980) in Dang district and Shukla *et al.* (1980) in Surat district.

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