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Survey of Cattle Feeds and Feeding Practices in Banaskantha District

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ABSTRACT

A comprehensive cattle and buffalo nutrition survey was carried out in Banaskantha district of Gujarat State in different seasons (July-August 1980, January-February 1981 and May-June 1981). Some of the typical unconventional feeds like *Kalingada* (*Citrullus vulgaris*) **seeds,** *isabgul* **by-products** (*lali* **and** *gola*) **and** *Prosopis juliflora* **pods are used for feeding cattle and buffaloes in this region. The compounded feeds available in this region do not conform to I.S.I. specifications. The home-made concentrate mixtures were deficient in crude protein and were imbalanced in calcium and phosphorus. Almost all fodder samples were deficient in zinc and low quality roughages like straws were also deficient in copper. Most of the concentrate samples were deficient in zinc. Majority of feeds and fodder samples were adequate in manganese and iron.**

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INTRODUCTION

Banaskantha is the home tract of the famous Kankrej breed of cattle. It is also one of the important milk pocket areas of Gujarat. Because of its arid and semi-arid conditions the feeds and fodders fed to animals are different. A survey was therefore, conducted in this district to know the available cattle feed resources, their composition including trace elements.

MATERIALS AND METHODS

Animal Nutrition Survey work was carried out in randomly selected following villages of Banaskantha district in different seasons (July-August 1980, January-February 1981 and May-June 1981).

Taluka	Village		
	Monsoon	Winter	Summer
Dhanera	Dharnodhar	Dharnodhar	Dharnodhar
	Pathawada	Pathawada	Pathawada
Tharad	Naroli	Naroli	Naroli
	Duva	Duva	Duva
Wav	Dhima	Dhima	Dhima
	Tithgam	Tithgam	Tithgam
	Balutri	—	—
Danta	Kuwarsi	Kuwarsi	Kuwarsi
	Danta	Danta	Danta
Kankrej	Thara	—	—
	Nanota	—	—

During the animal nutrition survey information on feeding practices followed by cattle owners for feeding of their animals together with samples of feeds and fodders were collected in different seasons.

The samples of feeds and fodders were analysed for proximate constituents as per A.O.A.C. (1970) methods. The trace elements (zinc, copper, manganese and iron) were analysed by wet digestion method using Atomic Absorption Spectrophotometer.

RESULTS AND DISCUSSION

Proximate composition: The average results for proximate composition of fodder samples collected from Banaskantha district are presented in Table 1.

TABLE I

Chemical composition (% on D.M. basis) of fodders collected during animal nutrition survey in Banaskantha district.

Name of sample		*Crude Protein*	*Ether Extract*	*Crude fibre*	*N.F.E.*	*P*	*Ca*
			Green Fodders				
Dhaman (*Cenchrus ciliaris.* Linn.)	(2)	12.02	2.74	28.80	42.48	0.21	0.78
Kuri grass (*Brachiaria ramosa*)	(2)	8.42	1.75	32.76	44.03	0.41	0.40
Mixed green grasses	(5)	9.91 ±1.35	2.54 ±0.26	31.28 ±1.58	42.06 ±2.54	0.23 ±0.03	0.60 ±0.10
			Cultivated Green Fodders/Fodder Tree				
Bajri (*Pennisetum typhoides*, Burmf.)	(2)	6.82	2.67	34.34	44.62	0.11	1.21
Rajka bajri (*Pennisetum* spp.)	(3)	11.14 ±2.46	3.21 ±0.16	29.61 ±3.02	41.13 ±5.35	0.39 ±0.07	0.68 ±0.22
Jowar (*Sorghum vulgare*, Pers)	(2)	9.99	3.73	27.99	44.36	0.19	1.42
Kubabul (*Leucaena leucocephala*, (Lam.) de wit.)	(2)	25.48	3.76	14.47	47.38	0.25	1.94
Lucerne (*Medicago sativa*, Linn.)	(6)	19.31 ±1.67	4.01 ±0.51	27.25 ±2.40	37.64 ±1.33	0.30 ±0.03	1.76 ±0.24
			Tree Leaves and Creepers				
Khakhar leaves (*Butea monosperma*, (Lam.) Taub.)	(3)	11.85 ±2.01	3.42 ±0.36	33.57 ±2.46	37.13 ±0.92	0.14 ±0.01	2.98 ±0.65

1	2	3	4	5	6	7
Wev creeper (*Cocculus hirautus*, (L.) diels.) (2)	25.26	4.84	14.62	36.83	0.50	1.49
Dry Fodders						
Bajri straw (*Pennisetum typhoides*, Burmf.) (21)	3.76 ±0.35	1.92 ±0.12	35.17 ±0.76	50.06 ±0.84	0.15 ±0.02	0.63 ±0.04
Jowar straw (*Sorghum vulgare*, Pers) (7)	3.03 ±0.31	3.14 ±0.24	28.95 ±1.23	57.93 ±1.75	0.12 ±0.02	0.40 ±0.03
Wheat straw (*Triticum aestivum*, Linn.) (4)	3.56 ±1.09	2.37 ±0.21	37.84 ±2.20	44.29 ±2.12	0.05 ±0.01	0.36 ±0.06
Mixed straws (3)	3.69 ±0.52	2.43 ±0.39	39.75 ±1.99	41.65 ±1.28	0.10 ±0.03	0.53 ±0.10
Mixed straw + *gotar* (2)	7.62	4.39	30.13	45.39	0.10	1.89
Guar gotar (*Cyamopsis tetragonoloba* (L), Taub.) (3)	6.75 ±0.23	2.76 ±0.22	18.88 ±2.00	60.50 ±2.93	0.09 ±0.02	1.14 ±0.13
Guar stem (2)	5.83	1.80	53.16	34.25	0.06	0.45
Mung gotar (*Phaseolus aureus P. radiatus.*) (3)	11.20 ±1.76	4.74 ±0.43	16.72 ±0.60	50.41 ±0.69	0.18 ±0.03	2.93 ±0.34
Mung stem (3)	5.93 ±1.22	1.38 ±0.20	47.42 ±5.48	36.78 ±3.25	0.12 ±0.01	1.04 ±0.20
Tur gotar (*Cajanus cajan*, (L.) Mill. Sp.) (3)	11.83 ±1.96	5.31 ±1.09	24.35 ±0.48	48.79 ±3.34	0.10 ±0.01	1.31 ±0.19
Mixed *gotar* (3)	8.88 ±0.86	3.27 ±0.63	18.82 ±3.76	55.66 ±1.90	0.08 ±0.01	2.15 ±0.26

( ) Figure in the parenthesis indicates number of sample analysed.

The green grasses and weeds available in Banaskantha district are *dhaman* (*Canchrus cilieris* L.), *kuri* (*Brachiaria ramosa*) etc. They have crude protein content ranging from 8.42 to 12.02%. The mixed green grasses have enough protein (9.91 ± 1.35%) and calcium content (0.6 ± 0.10%). Cultivated green fodders used for feeding of animals are *Bajri* (*Pennisetum typhoides*), *Rajka bajri* (*Pennisetum* spp.), Sorghum, *kubabul* (*Leucaena leucocephala*), maize and they have usual range of composition. The tree leaves such as *Asotari* (*Bauhinia racemosa*, Lam.), *Khakhar* (*Butea monosperma*, Lam.), *Kher* (*Acacia chundra*)

and *Sundesaro* (*Delomix elata*) are being used for feeding. The tree leaves have 11.85 to 25.26% crude protein. They have higher content of calcium (1.5 to 3.0%). The dry fodders as straws and *gotars** are used for feeding of the animals. They have usual range of composition.

The proximate composition of concentrates are given in Table 2.

TABLE 2

Chemical composition of concentrate samples collected during animal nutrition survey in Banaskantha district.

Name of sample		*Crude Protein*	*Ether Extract*	*Crude Fibre*	*N.F.E.*	*Ash*	*P*	*Ca*
1		*2*	*3*	*4*	*5*	*6*	*7*	*8*
				Seeds				
Barley seeds (*Hordeum vulgare*, Linn)	(7)	11.23 ±0.83	3.04 ±0.17	4.01 ±0.43	78.57 ±0.95	3.15 ±0.22	0.29 ±0.03	0.16 ±0.02
Cotton seeds (*Gossypium herbaceum*, Linn)	(5)	15.93 ±0.60	14.83 ±0.39	26.51 ±2.03	37.52 ±2.09	5.21 ±0.26	0.42 ±0.02	0.26 ±0.09
Cheno seeds (*Panicum miliaceum*, Linn)	(2)	12.12	5.46	8.50	68.52	5.40	0.21	0.09
Guar seeds (*Cyamopsis tetragonoloba*, (L.); Taub.)	(8)	30.38 ±0.50	4.44 ±0.19	2.74 ±0.83	57.71 ±1.22	4.73 ±0.40	0.38 ±0.03	0.26 ±0.06
Kuri seeds (*Brachiaria ramosa*)	(3)	9.89 ±1.85	6.65 ±0.63	15.90 ±3.24	57.19 ±2.60	10.37 ±0.43	0.26 ±0.03	0.19 ±0.03
Kang seeds (*Setaria italica* (L) P. Beauv.)	(3)	11.71 ±0.89	7.10 ±0.38	7.56 ±0.41	68.60 ±0.53	5.03 ±0.16	0.32 ±0.03	0.13 ±0.01
Kalingda seeds (*Citrullus vulgaris*, Schrad.)	(7)	21.54 ±0.95	28.83 ±0.22	29.41 ±1.20	16.58 ±1.56	3.64 ±0.29	0.34 ±0.02	0.19 ±0.01
Puvad seeds (*Cassia tora*, Linn)	(2)	19.47	8.30	3.56	62.17	6.50	0.43	0.90
				Pods				
Babul pods (*Acacia nilotica*, (L) Del.)	(2)	12.41	5.43	12.80	62.53	6.83	0.17	1.25
Prosopis juliflora pods	(13)	14.04 ±0.49	3.65 ±0.22	21.83 ±0.99	54.45 ±1.22	6.03 ±0.25	0.20 ±0.01	0.51 ±0.04

* Gotar–Tender stems, leaves, pod covers and immature seeds of legume crops.

(Table 2 Contd.)

1		2	3	4	5	6	7	8
			Cakes					
Cotton seed cake (*Gossypium herbaceum*, Linn)	(1)	24.93	8.83	26.07	34.62	5.55	0.62	0.26
Til cake (Expeller) (*Sesamum indicum*, Linn)	(1)	42.30	10.68	1.81	32.40	12.81	1.04	2.40
			Bharda **and** *Ghunies*					
*Guar bhardo** (*Cyamopsis tetragonoloba*, (L); Taub.)	(2)	43.65	5.64	1.35	43.61	5.75	0.59	0.38
Guar chuni (Powder)	(2)	16.76	2.69	1.03	23.70	5.82	0.25	0.57
*Guar chuni***	(4)	44.77 ±6.01	6.90 ±0.74	2.49 ±1.85	39.50 ±5.46	6.34 ±0.28	0.70 ±0.09	0.45 ±0.05
			Husk					
Dhania husk (*Coriandrum sativum*, L.)	(1)	6.19	5.90	35.32	42.12	10.47	0.15	0.76
Castor (*Divela*) husk (*Ricinus communis*, Linn)	(3)	8.75 ±0.81	4.67 ±0.15	34.75 ±1.07	41.44 ±0.63	10.39 ±0.71	0.12 ±0.02	0.86 ±0.06
Bajra husk (*Pennisetum typhoides*, Burmf)	(11)	6.66 ±0.58	2.23 ±0.21	27.86 ±2.52	51.44 ±2.35	11.81 ±0.71	0.20 ±0.03	0.52 ±0.03
			Compounded Concentrate Mixtures.					
Com. Con. Mixture † (A)	(6)	18.82 ±0.28	4.66 ±0.79	10.61 ±0.92	53.58 ±1.67	10.35 ±0.47	0.87 ±0.06	0.78 ±0.06
Com. Con. Mixture (B)	(3)	5.99 ±0.21	5.39 ±0.82	19.85 ±1.59	49.22 ±2.38	19.45 ±0.54	0.26 ±0.01	1.15 ±0.15
			Home-made Concentrate Mixtures.					
Prosopis juliflora con. mix ++ (Dry *bafnu*)	(8)	10.63 ±1.45	3.45 ±0.49	25.12 ±1.83	50.92 ±1.38	9.88 ±1.23	0.16 ±0.02	0.55 ±0.07
Prosopis juliflora pods con. mix. (*Boiled bafnu*)	(6)	10.09 ±2.21	2.66 ±0.32	28.92 ±3.33	50.72 ±2.27	7.61 ±0.61	0.16 ±0.02	0.50 ±0.06
Concentrate mixture	(10)	11.39 ±2.76	3.99 ±0.51	20.70 ±4.42	56.81 ±4.80	9.11 ±1.26	0.25 ±0.04	0.38 ±0.09
			Miscellaneous Concentrates					
Isabgul gola (*Plantago ovata*, Forsk)	(5)	19.35 ±0.33	7.29 ±0.52	30.60 ±1.06	39.96 ±0.79	2.80 ±0.17	0.40 ±0.02	0.27 ±0.01
Isabgul lali	(1)	33.92	18.01	5.91	34.97	7.19	0.89	0.50
Maize cobs (Grainless) (*Zea mays*, Linn)	(3)	1.76 ±0.10	1.46 ±0.09	33.56 ±1.33	61.44 ±1.06	1.78 ±0.17	0.04 ±0.00	0.15 ±0.03

( ) Figure in the parenthesis indicates number of the sample analysed.

* *Bhardo*=Crushed ** *Ghuni*=Broken pulse + seed coverings from pulse mill industry.

† Commercial compounded concentrate mixtures.

++ Concentrate mixtures containing pods of *Prosopis juliflora* ready for boiling.

Bafnu=Recipe prepared for livestock by boiling the feed ingredients and crop residue with water in earthen pot.

Varieties of conventional and unconventional feeds such as barley, *Cheno* (*Panicum miliaceum*, L.), *Kuri* (*Brachiaria ramosa*), *Kang* (*Setaria italica* (L) P. Beauv.), *Kalingada* (*Citrullus vulgaris*) seeds, *Puvad* (*Cassia tora*) seeds, cotton seeds, *Guar* (*Cyamopsis tetragonoloba* (L) Taub.) seeds, *Prosopis juliflora* pods, *Babul* (*Acacia nilotica*) pods etc. are fed to the cattle and buffaloes in this tract. They have usual range of composition. Similar type of composition is also reported earlier (Sen *et al.* 1978 and Desai *et al.* 1979, Anonymous 1952-73, 1980, 1981). The byproducts of *guar* and rice have usual range of composition. The compounded feed mixtures have varying type of composition. None of the mixtures have composition as per I.S.I. specifications. Some of the compounded concentrate mixtures have even less than 10% crude protein.

Home-made concentrate mixtures prepared using local ingredients have around 10% crude protein which is lower than requirements. They are also not balanced in calcium and phosphorus ratio.

Trace elements: The trace element content of fodder samples are given in Table 3.

TABLE 3

Trace element contents of fodder samples collected from Banaskantha district.

Name of sample		*Zn ppm*	*Mn ppm*	*Cu ppm*	*Fe mg 100 g*
1		*2*	*3*	*4*	*5*
Green Fodders					
Dhaman (*Cenchrus ciliaris*, Linn)	(2)	12.81	75.75	14.20	46.96
Jeramdo (*Panicum* Spp.)	(2)	14.40	71.97	16.49	44.76
Kuri grass (*Brachiaria ramosa*)	(4)	31.52	70.07	13.36	47.67
		±2.31	±19.83	±1.96	±6.23
Tarado (*Digitaria adscendes*, (H B & K) Henr.)	(2)	23.04	119.30	19.00	97.21
Mixed green grasses	(8)	14.96	100.37	11.79	76.88
		±1.93	±5.54	±1.12	±18.56
Cultivated Green Fodders					
Bajri (*Pennisetum typhoides*, Burmf.)	(2)	11.40	55.52	7.31	28.22
Rajka Bajri (*Pennisetum* Spp.)	(3)	18.91	65.32	13.22	54.71
		±5.92	±10.98	±3.01	±15.23
Jowar (*Sorghum vulgare*, Pers)	(2)	17.63	79.81	10.03	53.65
Kubabul (*Leucaena leucocephala* (Lam) de. wit.)	(2)	13.90	39.77	10.86	28.50
Lucerne (*Medicago sativa*, Linn)	(6)	17.48	48.53	14.96	58.67
		±2.89	±6.94	±1.57	±10.18
Lucerne* Sarson (*Medicago sativa*, Linn)+(*Brassica campestris* Linn.)	(1)	31.80	76.34	17.12	72.80
Tree Leaves and Creepers					
Khakhar leaves (*Butea monosperma*, (Lam.) Taub)	(3)	14.91	77.50	10.72	53.25
		±2.14	±33.90	±0.50	±8.32
Wev creeper (*Cocculus hirsutus*, (L.) Diels.)	(2)	27.00	91.09	19.63	142.48

1		2	3	4	5
Dry Fodders					
Bajri straw (*Pennisetum typhoides*, Burmf.)	(21)	10.60 ±1.37	32.26 ±2.95	7.32 ±0.45	18.50 ±2.81
Jowar straw (*Sorghum vulgare*, Pers)	(7)	13.63 ±2.65	33.52 ±4.37	6.86 ±0.71	14.37 ±2.85
Wheat straw (*Triticum aestivum*, Linn)	(4)	6.35 ±0.92	43.81 ±9.75	5.65 ±1.71	35.98 ±13.53
Mixed straws	(3)	9.81 ±1.99	48.00 ±18.04	5.57 ±1.11	57.35 ±20.35
Mixed straws+*gotar*	(2)	10.73	65.93	3.34	57.35
Guar gotar ("*Guwatri*") (*Cyamopsis tetragonoloba*, (L); Taub)	(3)	7.80 ±2.71	28.92 ±7.25	9.19 ±0.24	26.57 ±7.72
Guar stems	(2)	5.40	26.03	7.72	22.36
Mung gotar (*Phaseolus aureus P. radiatus.*)	(3)	11.72 ±1.70	87.91 ±4.63	8.35 ±2.93	52.65 ±15.33
Mung stems	(3)	10.32 ±2.62	30.65 ±12.92	7.52 ±1.28	16.95 ±6.14
Tur gotar (*Cajanus cajan*, (L.), Mill Sp.)	(3)	15.45 ±1.73	69.40 ±13.88	9.33 ±2.05	87.83 ±17.84
Mixed *gotar*	(3)	13.40 ±1.31	94.27 ±7.11	10.16 ±0.37	46.11 ±7.56

( ) Figure in the parenthesis indicates number of samples analysed.

Almost all fodder samples were found deficient in zinc (< 40 ppm). Deficiency of zinc in fodders and grasses of other regions in Gujarat State and other States was also reported earlier (Shukla *et al.* 1980; Sawhney *et al.* 1973; Shukla *et al.* 1982 and Desai *et al.* 1983). Most of the cereal straws and some of the *gotars* were found deficient in copper. Green fodders and tree leaves have adequate amount of copper.

The trace element contents of concentrates are given in Table 4.

From the perusal of data given in Table 4 it can be seen that most of the concentrate samples were deficient in zinc except *sheria*, sesame cake and deoiled rice bran. Some of the compounded feeds as well as home-made concentrate mixtures were also found deficient in zinc content. Most of the concentrates were adequate in copper as they contained more than 10 ppm of copper which was suggested as recommended level by N.R.C. (1971). Majority of the concentrates were adequate in manganese and iron content.

Thus the overall results suggested that most of the fodders and feeds samples were deficient in zinc and there is a need to supplement zinc or zinc rich feeds such as oil cakes, deoiled rice bran or mineral mixture, while using deficient feedstuffs alone. Straw when mixed with *gotar* have better composition than straw alone. Therefore, straw should be fed after mixing with *gotars*.

TABLE 4

Trace element content of concentrate samples collected from Banaskantha district.

Name of sample		*Zn ppm*	*Mn ppm*	*Cu ppm*	*Fe mg/100g*
1		*2*	*3*	*4*	*5*
Seeds					
Barley (*Hordeum vulgare*, Linn.)	(7)	21.94 ±3.83	23.05 ±4.24	8.87 ±0.78	18.83 ±4.33
Cotton seeds (*Gossypium herbaceum*, Linn.)	(6)	19.99 ±0.82	19.96 ±1.60	12.32 ±0.91	36.88 ±3.34
Cheno (*Panicum miliaceum*, Linn.)	(2)	23.02	17.35	9.61	31.50
Guar (*Cyamopsis tetragonoloba* (L); Taub)	(8)	20.02 ±2.50	18.44 ±3.08	8.77 ±0.72	50.75 ±10.35
Kuri (*Brachiaria ramosa*)	(3)	25.47 ±2.13	27.00 ±3.68	7.52 ±1.69	36.10 ±6.00
Kang (*Setaria italica*, (L.) P. Beauv.)	(3)	29.16 ±0.75	19.67 ±0.58	9.74 ±2.41	30.78 ±7.24
Kalingada (*Citrullus vulgaris*, Schard)	(8)	19.92 ±0.57	21.58 ±4.18	15.55 ±1.36	37.05 ±3.49
Puvad (*Cassia tora*)	(2)	27.51	19.96	8.56	37.57
Shan (*Crotalaria juncea*, L.)	(2)	24.26	19.09	13.98	31.74
Wheat (*Triticum aestivum*, Linn)	(2)	17.10	37.31	12.74	20.28
Pods					
Prosopis juliflora pods	(14)	13.68 ±0.67	19.46 ±1.47	10.74 ±0.81	20.80 ±2.37
Cakes					
Cotton seed cake (*Gossypium herbaceum*, Linn)	(1)	25.44	20.82	10.02	30.53
Til cake (*Sesamum indicum*, Linn)	(1)	60.00	48.58	31.73	66.56
Bharda & Chunies					
Guar bhardo (*Cyamopsis tetragonoloba*, (L.); Taub.)	(3)	32.20 ±2.95	20.82 ±0.00	15.03 ±1.05	47.84 ±13.17
Guar chuni	(6)	28.81 ±1.54	24.87 ±1.83	9.54 ±1.04	62.12 ±6.47
Husk					
Dhania husk (*Coriandrum sativum*, L.)	(1)	26.40	69.40	11.27	137.28
Castor (*Divela*) husk (*Ricinus communis*, Linn.)	(3)	7.60 ±1.56	34.70 ±0.00	7.93 ±0.24	48.88 ±11.96
Bajri husk (*Pennisetum typhoides*, Burmf.)	(10)	12.23 ±1.07	58.64 ±9.40	9.52 ±1.53	76.65 ±8.89

1		2	3	4	5
Commercial Concentrate Mixture					
Com. Con. Mixture (A)	(8)	39.13	107.14	19.73	107.36
		±1.92	±7.69	±2.83	±4.86
Com. Con. Mixture (B)	(3)	25.80	147.99	13.22	136.59
		±2.49	±3.01	±2.01	±4.89
Home-Made Concentrate Mixture					
Prosopis juliflora pods con. mix.	(8)	16.76	48.58	8.09	62.18
(dry *bafnu*)		±4.01	±6.56	±0.83	±11.21
Prosopis juliflora pods con. mix.	(6)	13.47	44.82	6.82	53.94
(boiled *bafnu*)		±1.48	±4.21	±0.66	±6.18
Con. mixture	(10)	16.65	54.65	7.76	44.61
		±2.20	±12.07	±1.41	±7.67
Miscellaneous Concentrates					
Isabgul gola (*Plantago ovata*, Forsk)	(6)	16.64	13.12	9.60	15.51
		±1.04	±0.35	±1.22	±1.42
Isabgul lali	(1)	45.00	43.37	22.13	43.68
Maize cobs (Grainless)	(3)	20.38	10.99	2.78	14.34
(*Zea mays*. Linn.)		±5.21	±2.08	±0.61	±0.97

( ) Figure in the parenthesis indicates number of samples analysed.

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