The Pharma Innovation Journal 2021; SP-10(11): 539-542

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; SP-10(11): 539-542

www.thepharmajournal.com
Received: 12-09-2021
Accepted: 15-10-2021

Ramsawroop
Department of Animal Nutrition
LUVAS, Hisar, Haryana, India

VS Panwar
Department of Animal Nutrition
LUVAS, Hisar, Haryana, India

Sandeep Kumar
Department of Animal Nutrition
LUVAS, Hisar, Haryana, India

Anuj Singh
Department of Animal Nutrition
LUVAS, Hisar, Haryana, India

Corresponding Author
Ramsawroop
Department of Animal Nutrition
LUVAS, Hisar, Haryana, India

Mineral composition of various concentrate feeds in Charkhi Dadri District of Haryana

Ramsawroop, VS Panwar, Sandeep Kumar and Anuj Singh

Abstract
A detailed survey was carried out to record feeding plane and mineral status of lactating buffaloes in Charkhi Dadri district of Haryana state during rabi season. Twelve villages, representing all the blocks of the district were selected for the survey. Samples of feedstuffs, milk, hair and blood were collected from five families from each category of farmers i.e., belonging to landless category and farmers with land holding in a village. Thus, a total of 120 families were selected for the survey. A questionnaire was prepared and individual farmer was interrogated regarding the type of feedstuffs and their amount fed to their animals. The samples of straws (wheat, rice and bajra straw), fodders (barseem, oat and grasses) and concentrate ingredients (cotton seed cake, wheat etc.) offered to animals were collected from each village and analysed for minerals. Wheat grain was used by 76.7% of buffalo owners followed by bajra grain (44.2 %). As protein sources, cotton seed cake and cotton seed were being used by 75% and 47.5% of buffalo owners of landless and farmers with land holding categories, respectively. In cereals, bajra was a richer source of Ca than wheat. Wheat (0.41%) contained more amount of P than bajra. Most of the samples of wheat and bajra grain had sufficient amount of Cu. Concentration of Mn was poor in these sources. Protein sources, cotton seed and cotton seed cake were fairly rich in Zn, Cu and Fe but concentration of Mn was lower. Fe was rich in all the feedstuffs. Very few respondents were providing mineral mixture (17.5%) and common salt (13.3%) to their animals.

Keywords: Minerals, concentrate, grain, cotton seed cake, bajra, Charkhi Dadri, *Rabi* season

Introduction
Minerals are solid crystalline substances which cannot be synthesized in the body and serve the body in different ways. They are also constituent of biomolecules and also help in the activation of many enzymes. As soluble salts in blood and other body fluids they are responsible for maintenance of osmotic relations and acid-base equilibrium. Mineral status of dairy animals also affects the symbiotic micro flora of gastrointestinal tract besides influencing milk production and reproduction efficiency (Maan, 2000) [10].

Mineral deficiency and imbalance feeding are frequently encountered in the livestock rations, especially in tropical countries like India due to lack of knowledge of scientific feeding and seldom use of mineral mixture.

The deficiency or toxicity of minerals is an area specific problem because soil mineral status keeps on changing due to pressure on land for maximizing crop production, fertilizer application, rain and natural calamities. This directly alters the mineral content of feeds and fodders and, hence, their supply to the animals. Feed and fodders are the most critical input in milk production. The farmers can reduce feeding costs without losing milk production by adopting improved feeding practices which have immediate impact on milk production. Balanced and proper feeding along with mineral supplementation result in better utilization of nutrients and optimum milk production. Along with balance feeding, analysing mineral content of feedstuffs and correct mineral supplementation is of utmost importance for maximum benefit of farmers and maximum milk production.

Materials and Methods
Charkhi Dadri is recently created 22nd districts of Haryana state in northern India. Multi-stage stratified random sampling procedure was adopted for the selection of villages. Four blocks of Charkhi Dadri district namely Badhra, Jhojhu, Bond Kalan and Charkhi Dadri were selected purposively for the survey study. Three villages were purposefully selected from each block representing status of their block. 10 families per village were selected, thus a total of 120 farming families were selected for the study.

A questionnaire was prepared keeping in mind the objectives and various dimensions of the study. Individual animal owner was interrogated regarding the type of feedstuffs (dry fodder, green fodder, grains, cakes, mineral mixture and common salt) and their amount fed to their animals. The samples of straws, fodders and concentrates ingredients offered to animals were collected. The collected samples were dried and ground then analysed for the concentration of Zn, Cu, Mn, and Fe using Perkin Elmer Atomic Absorption Spectrometer (PinAAcle 900T). Calcium and Phosphorus content in feeds and fodders were estimated as per AOAC (2007) [1]. The data was statistically analysed as per statistic methods of Snedecor and Cochran (1994) [14].

Results and Discussion

Concentrates

Cotton seed cake is the major concentrate used by majority of the farmers in the district. The mineral composition has been given in Table 1. Cotton seed was also used by most of the farmers with land holding as it was more costly than cotton seed cake. The mineral composition has been given in Table 2.

Table 1: Mineral composition of cotton seed cake in different blocks of Charkhi Dadri district

	Ca (%)	P (%)	Zn(ppm)	Cu(ppm)	Fe(ppm)	Mn(ppm)
Badhra	0.42±0.06	0.74±0.08	45.91±0.94	12.03±1.02	172.54±7.74	37.21±1.75
Jhojhu	0.43±0.05	0.77±0.05	42.96±1.05	13.46±0.84	175.52±8.35	35.31±1.63
Bond Kalan	0.36±0.08	0.86±0.03	38.84±1.52	12.75±0.52	188.63±6.45	36.12±2.41
Charkha Dadri	0.37±0.04	0.89±0.11	39.52±2.75	14.62±0.32	196.45±4.64	38.23±2.32
Mean	0.39±0.02	0.81±0.04	41.80±0.96	13.21±0.46	183.28±3.52	36.71±1.21
Range	0.31-0.45	0.68-0.92	34.64-47.22	11.54-17.02	156.86-194.82	33.75-42.13
Critical level*	<0.30	<0.25	<30.0	<8.0	<50.0	<40.0

± Standard error of mean *As per McDowell (1993) [12]

Table 2: Mineral composition of cotton seed in different blocks of Charkhi Dadri district

	Ca (%)	P (%)	Zn(ppm)	Cu(ppm)	Fe(ppm)	Mn(ppm)
Badhra	0.45±0.01	0.87±0.01	43.24±2.75	12.54±0.41	180.10±2.35	41.54±2.80
Jhojhu	0.46±0.04	0.91±0.02	47.42±1.86	11.53±0.70	172.16±6.43	37.26±1.34
Bond Kalan	0.44±0.02	0.85±0.01	35.27±2.01	14.58±0.84	169.80±3.05	35.32±1.62
Charkhi Dadri	0.48±0.03	0.94±0.03	49.64±1.84	14.27±0.62	167.13±4.83	37.45±1.24
Mean	0.46±0.02	0.89±0.01	43.89±1.28	13.23±0.47	172.29±2.41	37.89±1.02
Range	0.39-0.54	0.78-0.96	32.11-54.37	10.43-17.45	153.13-198.64	31.18-49.32
Critical level*	<0.30	<0.25	<30.0	<8.0	<50.0	<40.0

± Standard error of mean *As per McDowell (1993) [12]

Average Ca concentration (%) in cotton seed cake was 0.39 and ranged from 0.31 to 0.45. The P concentration was above critical limit (0.25%). None of the samples were deficient in Ca and P content. Similarly, Zn was not deficient in any of the samples from its critical level (30 ppm). The values under the present investigation are also in line with the ranges reported earlier and result are in alignments with Bhanderi *et al*, (2013) [3] in his study found that the calcium content in cotton seed cake was 0.17% and same was told by Garg *et al.*, (2011) [6] while surveying the Amritsar, Ludhiana and Patiala districts of Punjab reported that the concentrate feed ingredients were particularly low (0.13%) in Ca and high (0.77%) in P. Garg *et al*. (2008) [7] reported that the calcium content (0.14%) was low in concentrate ingredients. Phosphorus content (0 .45%) in concentrates was higher in comparison to roughages. Similar finding was reported by Maan (2000) [10] who conducted a study in Bhiwani district and concluded that the mean Ca and P content of cotton seed cake was 0.40% and 0.86% respectively and Ca and P content of cotton seed was 0.46 and 0.86 % respectively and according to Baloda (2016) [2] mean Ca and P content of cotton seed cake was 0.21 and 0.37 % respectively in Gurgaon district which were in same manner of present study.

In the present survey mean Cu content of cotton seed cake was 13.21 ppm and Cu content of cotton seed was 13.23 ppm. Mean Zn content of cotton seed cake was 41.80 ppm and mean Zn content of cotton seed was 43.89 ppm. Mean Fe content of cotton seed cake was 183.28 ppm and Fe content of cotton seed was 172.29 ppm while mean Mn content of cotton seed cake was 36.71 ppm and Mn content of cotton seed was 37.89 ppm, so results were supported by study of Rajora and Pachauri (1993) [13] found that the Cu content in concentrate mixture ranged from 15.28 to 16.36 mg/kg and the Mn content in concentrate mixture ranged from 24.40 to 30.29 mg/kg in Terai region and Garg *et al*. (2011) [6] reported that the mean copper content in concentrate feed ingredients was 10 ppm in Punjab.

Dhore *et al*. (2007) [4] reported that the mean value of Zn in feed and fodders was less than 25.06 ppm in Western Agro Climatic Zone of Vidarbha and similar finding by Garg *et al*. (2008) [7] in their study reported that the Zinc was acutely deficient in most of the feedstuffs (mean level< 26.30 ppm) in Bharatpur district of Rajasthan.

According to Malik (1991) [11] the mean value of iron in cotton seed cake was 158.0 mg/kg in Pakistan. Garg *et al*. (2008) [7] reported that the Fe contents were adequate in the diet of animals, with traditional feeding system in Bharatpur district. In a survey conducted by Maan (2000) [10] in Bhiwani district, it was reported that the mean Cu content of cotton seed cake which ranged from 6.25 to 18.75 ppm and Cu content of cotton seed was 12.89 ppm which ranged from 6.25 to 25.00 ppm while Zn content of cotton seed cake ranged from 26.94 to 86.62 ppm and the mean Zn content of cotton seed was 46.36 ppm which ranged from 17.96 to 77.29 ppm. In his study the mean Fe content of cotton seed cake ranged from 56.91 to 243.90 ppm and Fe content of cotton seed was 153.77 ppm which ranged from 73.13 to 333.33 ppm. The mean Mn content of cotton seed cake was 27.92 ppm and Mn content of cotton seed was 36.35 ppm and Baloda (2016) [2] reported that Cu content of cotton seed cake had the mean

value of 12.78 ppm and ranged from 8.31 to 18.60 ppm while Zn content of cotton seed cake had a mean value of 28.05 and ranged from 23.76 to 33.54 ppm. Fe content of cotton seed cake had a mean value of 169.05 ppm and ranged from 136.09 to 214.61 ppm while Mn content of cotton seed cake had a mean value of 33.76 ppm.

Cereals

Wheat was the major cereal used as concentrate ingredient in Charkhi Dadri district. The compositions of minerals in wheat flour/dalia and bajra grain have been given in Table 3 and 4 respectively. Wheat is offered as flour or dalia (coarsely ground wheat) and it was deficient in Ca content in all the blocks.

Table 3: Mineral composition of wheat fluor/*Dalia* in different blocks of Charkhi Dadri district

	Ca (%)	P (%)	Zn (ppm)	Cu (ppm)	Fe (ppm)	Mn (ppm)
Badhra	0.24± 0.02	0.45± 0.03	35.10 ±0.71	9.14 ±0.33	176.54 ±2.05	38.10 ±0.81
Jhojhu	0.25± 0.06	0.41± 0.07	33.91 ±1.41	12.81 ±0.30	156.85 ±5.54	35.56 ±1.02
Bond Kalan	0.23± 0.01	0.38± 0.12	34.74 ±0.34	11.69 ±0.46	172.23 ±2.74	32.75 ±0.82
Charkhi Dadri	0.22± 0.02	0.40± 0.02	28.42 ±1.02	12.51 ±0.61	139.24 ±2.15	29.12 ±0.91
Mean	0.23± 0.01	0.41± 0.02	33.04 ±0.04	11.53 ±0.24	161.21±1.05	33.88 ±0.84
Range	0.20-0.27	0.35-0.48	25.48-38.81	8.02-14.26	121.40-185.32	25.36-42.12
Critical level*	<0.30	<0.25	<30.0	<8.0	<50.0	<40.0

± Standard error of mean *As per McDowell (1993) [12]

Table 4: Mineral composition of bajra grain in different blocks of Charkhi Dadri district

	Ca (%)	P (%)	Zn(ppm)	Cu (ppm)	Fe (ppm)	Mn (ppm)
Badhra	0.95±0.08	0.22±0.01	45.02±1.31	8.15±0.46	167.15±4.50	32.18±0.28
Jhojhu	0.88±0.02	0.19±0.02	43.31±0.82	11.74±1.61	152.27±3.22	34.42±0.41
Bond Kalan	0.91±0.06	0.24±0.02	36.55±0.75	10.52±0.23	160.43±6.97	27.65±0.52
Charkhi Dadri	0.77±0.04	0.32±0.06	35.92±0.80	13.17±1.14	151.41±2.51	30.14±1.22
Mean	0.88±0.05	0.24±0.01	40.20±0.91	10.89±0.51	157.81±2.95	31.10±0.51
Range	0.74-1.02	0.16-0.37	33.24-48.14	7.92-15.43	140.21-171.32	25.61-35.18
Critical level*	<0.30	<0.25	<30.0	<8.0	<50.0	<40.0

± Standard error of mean *As per McDowell (1993) [12]

In the present study the mean Ca and P content of wheat dalia was 0.23 % and 0.41% respectively and Ca and P content of bajra grain was 0.88 and 0.24 %. It was found that wheat grain providing good amount of P while bajra grain was a rich source of Ca and result were in alignments Indira *et al*. (2014) [8] who reported that the grains were poor sources of Ca (0.11 %) as compared to P (0.26%) in West Godavari District of Andhra Pradesh and Maan (2000) [10] studied in Bhiwani district and reported that the mean Ca and P content of wheat dalia was 0.26% and 0.42% respectively and Ca and P content of bajra grain was 1.01 and 0.45 % respectively and Baloda (2016) [2] found that the mean Ca and P content of wheat flour was 0.28 and 0.30% respectively in Gurgaon district.

In the present study the mean Cu content of wheat dalia was 11.53 ppm and Cu content of bajra grain was 10.89 ppm which is above the critical level. The mean Zn content of wheat dalia was 33.04 ppm and Cu content of bajra grain was 40.20 ppm. While the mean Fe content of wheat dalia was 161.21 ppm and Fe content of bajra grain was 157.81 ppm which is adequate but the mean Mn content was deficient in wheat dalia and bajra grain. Similar results were reported in studies conducted earlier. Results are in alignment of Lall *et al*. (1996) [9] the mean Cu content in wheat flour was 9.51 mg/kg while the mean Zn content in wheat flour was 15.63 mg/kg in Hisar district which is below critical level. This might be due to deficiency in soil. Dhore *et al*. (2007) [4] reported that the mean value of Zn in feed and fodders was less than 25.06 ppm in Western Agro Climatic Zone of Vidarbha. Garg *et al*. (2008) [7] reported that the Zinc was acutely deficient in most of the feedstuffs (mean level< 26.30 ppm) in Bharatpur district of Rajasthan while the Fe contents were adequate in the diet of animals. Gami *et al.* (2013) [5] surveyed North Gujarat region and reported that the mean value of Mn in concentrate mixture was 40.09 mg/kg and most of the samples were above critical level. Maan (2000) [10] reported that the mean Cu content of wheat dalia was 9.61 ppm and the mean Zn content of wheat dalia was 31.66 ppm. Zn content of bajra grain from 26.70 to 57.47 ppm and Fe content was found high enough. The mean Mn content of wheat dalia ranged from 16.70 to 51.30 ppm and Mn content of bajra grain ranged from 18.30 to 39.70 ppm. According to Baloda (2016) [2], Cu content of wheat flour had a mean value of 14.09 ppm and Zn content of wheat flour had a mean value of 26.53 ppm. Fe content of wheat flour ranged from 122.80 to 147.42 ppm which is adequate while Mn content of wheat flour had a mean value of 37.19 ppm and ranged from 28.63 to 46.09 ppm.

Feed Pellets

Very few farmers were using feed pellets manufactured by hafed and other agencies. The composition of different minerals was given in Table 5.

Table 5: Mineral composition of feed pellets in different blocks of Charkhi Dadri district

	Ca (%)	P (%)	Zn(ppm)	Cu (ppm)	Fe (ppm)	Mn (ppm)
Badhra	1.13±0.11	1.17±0.02	40.20±0.53	18.64±0.32	175.43±11.17	23.82±1.16
Jhojhu	1.07±0.05	1.09±0.01	37.27±0.83	16.83±0.20	181.10±12.18	19.46±1.35
Bond Kalan	1.04±0.12	1.06±0.03	35.72±0.64	18.79±0.13	173.70±9.87	16.52±1.05
Charkhi Dadri	0.96±0.08	1.07±0.02	37.63±0.47	19.27±0.15	174.74±.8.35	16.42±0.78
Mean	1.04±0.06	1.10±0.02	37.70±0.51	18.38±0.14	176.24±9.20	19.05±1.06
Range	0.87-1.24	1.02-1.27	32.74-45.42	14.21-21.54	162.53-194.43	13.52-26.31
Critical level*	<0.30	<0.25	<30.0	<8.0	<50.0	<40.0

± Standard error of mean *As per McDowell (1993) [12]

The concentrate mixture complete in all respect was pelleted. However, some samples of feed pellets had Mn content below critical level but other mineral concentration was higher than the critical values. Generally mineral content of readymade feed pellets varies depending on the manufactures and most of the feed pellets are imported from various adjoining states.

References

1 AOAC. Official Methods of Analysis of AOAC International, 18th edn. Association of Official Analytical Chemists International, Gaithersburg, Maryland, USA 2007.
2 Baloda, S. Feeding practices of lactating buffaloes in gurgaon district of Haryana. MVSc. thesis submitted to LUVAS, Hisar, Haryana 2016.
3 Bhanderi BM, Garg MR, Goswami A. Study on availability of various macro and micro minerals in lactating buffaloes under field conditions of Sabarkantha district of Gujarat. J. of Buff. Sci 2013;2:12-17.
4 Dhore RN, Udar SA. Micro mineral status of soils, feeds, fodder and serum samples of buffaloes in Western Agro Climatic zone of Vidarbha. Indian J. Anim. Res 2007;41(3):212-215.
5 Gami YM, Gami BI, Ahlawat AR. Mapping of minerals in common feed resources and high yielding cattle's diet of Dantiwada taluka in North Gujarat region. Vet. Sci. Res. J 2013;4(1):1-4.
6 Garg MR, Bhanderi BM, Gupta SK. A study on availability of various mineral elements in milch buffaloes. Anim. Nutr. Feed Tech 2011;11:91-102.
7 Garg MR, Bhanderi BM, Sherasia PL. Assessment of macro and micro minerals status of milch animals for developing area specific mineral mixture for Bharatpur district of Rajasthan. Anim. Nutri. Feed Tech 2008;8:53-64.
8 Indira D, Samuel A. Mineral status of dairy buffaloes in west Godavari district of Andhra Pradesh in India. Int. J. Innovat. Res. Dev 2014;3(5):358-361.
9 Lall D, Dixit VB, Chauhan TR, Khanna S. Feeding Practices Vis a Vis Mineral Supply to Lactating Buffaloes in Hisar District. Indian J Anim. Nutri 1996;13(2):95-100.
10 Maan NS. Mineral status of buffaloes in Bhiwani and Rohtak Districts of Haryana state. PhD. Thesis submitted to CCSHAU, Hisar, Haryana 2000.
11 Malik YM. Mineral imbalance in the livestock of Pakistan. Int. Anim. Nutr. Workers Conference for Asia and Pacific 1991, 162-169.
12 McDowell LR. Minerals in Animal and Human Nutrition. Academic Press. San Diego, CA 1993, 49-51.
13 Rajora VS, Pachauri SP. Micronutrient status of dairy cattle as influenced by soil-plant relationship in Tarai region. The Indian J. Anim Sci 1993;63(8):882-890.
14 Snedecor, G. W. and Cochran, W. G. Statistical methods 8th Edn Journal of Educational and Behavioural Statistics 1994;19(3):304-307.