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Mineral Composition of Concentrate and Feed Pellets in Gurgaon District of Haryana

Saurabh Baloda, Promila[*], Ravinder Dahiya and Sajjan Sihag
Department of Animal Nutrition, College of Veterinary Sciences,
LLR University of Veterinary and Animal Sciences, Hisar-125004, Haryana, India
*Corresponding Author E-mail: promilav45@gmail.com

ABSTRACT

A survey was conducted to study the mineral composition of green and dry roughage in Gurgaon district of Haryana state. From each of the four blocks, three villages were randomly selected. To have a systematic and planned study, all the blocks were included in the survey. From each block, three villages were randomly selected to have a fairly representative sample. From each village, four categories of farmers i.e. landless, small (having up to five acres of irrigated land), medium (five to ten acres of irrigated land) and large (more than ten acres of irrigated land) and having dairy animals were purposefully selected. In each village, five families under each category were interrogated on the prescribed Performa for this study, thus, making a total of 240 families. Cotton seed cake is the major concentrate offered to animals by majority of the farmers. Wheat was the major cereal in Gurgaon district. Feed pellets marketed by Hafed and other agencies were also offered to animals by some progressive farmers results of this study showed that the average Ca and P content of cotton seed cake was 0.21 % and 0.37±0.01 respectively. Some of samples of cotton seed cake were deficient in Zn. whereas none of samples were deficient in Cu and Fe. 90% sample of cotton seed cake was deficient in Mn. The average content of Ca and P content of wheat dalia was 0.28% and 0.30% respectively. Whereas Zn and Mn sample were 90% and 80% deficient respectively. Few samples were deficient in Cu and none of Sample was deficient in Fe. The concentrate mixture of feed pellets was complete in all respect. However, many samples of feed pellets had Zn far below the respective specified levels[11]. Other mineral concentration was higher than the critical values.

Key words: *Survey, Farmers, minerals, Critical limit, Cereals, Cotton seed cake, Wheat dalia.*

INTRODUCTION

Feedstuffs vary in composition. Unlike chemicals that are "chemically pure" and therefore have a constant composition, feeds vary in their composition for many reasons. Actual analysis of a feed to be used in a ration is more accurate than tabular data. Obtain and use actual analysis whenever possible. Often, however, it is either impossible to determine actual compositional data, or there is insufficient time to obtain an analysis. Tabulated data are the next best source of information.

When using tabulated data, remember that feeds vary in their composition. The organic constituents (e.g., crude protein, ether extract, crude fiber, acid detergent fiber and neutral detergent fiber) can vary as much as 15 percent, the mineral constituents as much as 30 percent, and the energy values at least 10 percent, from table values.

Therefore, the values shown can only be guides. For this reason they are called "typical values." they are not averages of published information. Some judgment was used in arriving at some of the values in the hope that the values will be realistic for use in cattle rations. Feeds can be chemically analyzed for many things that may or may not be related to the response of the animals to which they are fed. In the accompanying table, certain chemical constituents are shown. The response of cattle when fed a feed, however, can be termed the biological response to the feed in question. This is a function of its chemical composition and the ability of the animal to derive useful nutrients from the feed.

The latter relates to the digestibility or availability of a nutrient in the feed for absorption into the body and its ultimate efficiency of use in the animal. This also depends on the nutrient status of the animal and the productive or physiological function being performed by the animal. Ground fence posts and shelled corn may have the same gross energy value in a bomb calorimeter, but have markedly different useful energy value (TDN, digestible energy, and net energy) when consumed by the animal. That means that the biological attributes of a feed have much greater meaning in predicting the productive response of animals. However, they are more difficult to accurately determine because there is an interaction between the chemical composition of the feed and the digestive and metabolic capabilities of the animal being fed. So actual feed analysis for the mineral content should be done before proceeding for the diet formulation for cattle because mineral deficiency leads to productive, reproductive and growth losses

MATERIAL AND METHODS

A survey was conducted to study the mineral content in concentrate and feed pellet in Gurgaon district of Haryana state. The survey was conducted accordingly during July and August 2015 (Kharif season) through personal approach at the doorstep of individual farmers to collect the required information. Gurgaon district has four blocks. To have a systematic and planned study, all the blocks were included in the survey. From each block, three villages were randomly selected to have a fairly representative sample. From each village, four categories of farmers i.e. landless, small (having up to five acres of irrigated land), medium (five to ten acres of irrigated land) and large (more than ten acres of irrigated land) and having dairy animals were purposefully selected. In each village, five families under each category were interrogated on the prescribed Performa for this study, thus, making a total of 240 families. The farmers cooperated well in recording body weight, milk yield, feed intake and answering the questionnaire for collection of data. The samples of feed, fodders, blood and hair were collected for chemical analysis. The proximate analysis of feed and fodder samples was done following standard procedure[1]. The data was statistically analyzed as per statistic methods of Snedecor and Cochran[13] Feed and fodder samples collected were kept in hot air oven (at 100 ± 5^oC for 24 hours) to express the result on dry matter basis. Fully automated Random Access Clinical Chemistry Analyzer (EM 200[TM] Erba Mannheim – Germany) was employed for estimation of biochemical parameters using kits produced from Transasia Biomedical Limited, Germany.

1. Calcium was estimated by Arsenazo method.
2. Phosphorus was measured by UV phosphomolybdate method.

RESULT AND DISCUSSION
Concentrates
Cotton seed cake is the major concentrate offered to animals by majority of the farmers. The composition of different minerals was

given in Table 1. Ca was highly deficient in cotton seed cake. The average Ca content was 0.21 % and had ranged from 0.14-0.29%.

The concentration of P (%) in cottonseed cake ranged from 0.27 to 0.48 and had an average value of 0.37±0.01. The P concentration was above critical limit (0.25%). Samples were not deficient of P.

The average values of Zn concentration in cottonseed cake of different blocks were 29.14, 28.96, 27.74 and 26.37 ppm. Concentrations of Zn, considering the whole data, ranged from 23.76-33.54 ppm. The average value of Zn content was highest (29.14 ppm) in block Gurgaon and the lowest (26.37) in block Sohna (Table 1). Zn was deficient in some samples as its level was below than critical level (30 ppm).

The average values of Cu concentration in cottonseed cake of different blocks were 12.74, 14.08, 10.86 and 13.46 ppm. Concentrations of Cu, considering the whole data, ranged from 8.31-18.60 ppm. The average value of Cu content was highest (14.08 ppm) in block Pataudi and the lowest (12.74 ppm) in block Gurgaon (Table 1). Considering 8ppm as critical limit, none of the samples were deficient in the district.
The average Fe content of district was 169.05 ppm and had ranged from 136.09-214.61 ppm. Considering 50 ppm as critical limit, none of the samples were deficient in the district.

Concentration of Mn was poor. 90 per cent samples were deficient in Mn. The average value of Mn was 33.76 ppm. According to Malik[10] the average value of Cu in cottonseed cake was 25.8 mg/kg in Pakistan. Rajora and Pachauri[12] found that the Cu content in concentrate mixture ranged from 15.28 to 16.36 mg/kg in Terai region. According to Lall *et al.*[9] the average Cu content in cottonseed cake was 32.36 mg/kg in Hisar district. Garg *et al.*[6] while surveying the

Amritsar, Ludhiana and Patiala districts of Punjab reported that the average copper content in concentrate feed ingredients was 10 ppm.

Dhore *et al.*[4] reported that the average value of Zn in feed and fodders was less than 25.06 ppm in Western Agro Climatic Zone of Vidarbha. Garg *et al.*[6] reported that the Zinc was acutely deficient in most of the feedstuffs (average level< 26.30 ppm) in Bharatpur district of Rajasthan. The values under the present investigation are also in line with the ranges reported earlier.

According to Malik[10] the average value of iron in cotton seed cake was 158.0 mg/kg in Pakistan. Rajora and Pachauri[12] found that the Fe content in concentrate mixture ranged from 531.40 to 777.45 mg/kg in Terai region. Garg *et al.*[6] reported that the Fe contents were adequate in the diet of animals, with traditional feeding system in Bharatpur district.

According to Malik[10] the average value of Mn in cotton seed cake was 25.0 mg/kg in Pakistan. Rajora and Pachauri[12] found that the Mn content in concentrate mixture ranged from 24.40 to 30.29 mg/kg in Terai region. The values under the present investigation are also in line with the ranges reported earlier.

Bhanderi *et al.*[2] while surveying the Sabarkantha District of Gujarat reported that the calcium content in cottonseed cake was 0.17%. Garg *et al.*[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.*[6], reported that the calcium content (0.14%) was low in concentrate ingredients. Phosphorus content (0.45%) in concentrates was higher in comparison to roughages.

Table1: Mineral Composition of Cotton seed cake in different sites of Gurgaon district

Site No.	Name of Block	n	Ca (%)	P (%)	Zn (ppm)	Cu(ppm)	Fe(ppm)	Mn(ppm)
1.	Gurgaon	60	0.19±0.02	0.34±0.02	29.14±1.69	12.74±1.52	159.01±7.72	35.55±2.38
2.	Pataudi	60	0.21±0.02	0.38±0.01	28.96±3.19	14.08±2.45	162.03±12.47	33.48±1.85
3.	Farrukhnagar	60	0.25±0.02	0.37±0.01	27.74±1.37	10.86±1.95	191.34±10.22	34.14±2.26
4.	Sohna	60	0.19±0.02	0.37±0.02	26.37±1.75	13.46±2.11	163.81±6.77	31.88±1.30
Mean			0.21±0.01	0.37±0.01	28.05±0.96	12.78±0.94	169.05±5.65	33.76±1.94
Range			0.14-0.29	0.27-0.48	23.76-33.54	8.31-18.60	136.09-214.61	27.53-41.05

± Standard error of mean

Cereals

Wheat was the major cereal in Gurgaon district. The compositions of minerals in wheat have been given in Table 2. Wheat is offered as flour or dalia (coarsely ground wheat). It was deficient in Ca. The concentration of Ca ranged from 0.21-0.34 % and the average value was 0.28 %. P content was good in Wheat dalia. The average value was 0.30% and had ranged from 0.24-0.41%.

The average values of Zn concentration in wheat dalia of different blocks were 25.99, 26.29, 27.61 and 26.25 ppm. Concentrations of Zn, considering the whole data, ranged from 23.04-30.78 ppm. The average value of Zn content was highest (27.61 ppm) in block Farrukhnagar and the lowest (25.99) in block Gurgaon (Table 2). Zn was deficient in 90 percent samples as its level was below than critical level (30 ppm).

The average value of Cu content was 14.09 ppm which was above than critical level (8 ppm). The Cu content ranged from 7.11-20.37 ppm. Few samples were deficient in Cu. The average value of Fe content was 134.60 ppm which was above than critical level (50 ppm). The Fe content ranged from 122.80-147.42 ppm. None of the samples were deficient in Fe.

Concentration of Mn was poor. 80 per cent samples were deficient in Mn. The average value of Mn was 37.19 ppm. The Mn concentration ranged from 28.63-46.09 ppm. According to Lall *et al.*[9] the average Cu content in wheat flour was 9.51 mg/kg in Hisar district. The values under the present investigation are also in line with the ranges reported earlier. Cereal grains generally contain 4.8µg/g as reported by Davis and Mertz[3].

According to Lall *et al.*[9] the average Zn content in wheat flour was 15.63 mg/kg in Hisar district. The values under the present investigation are higher than the reported earlier. Dhore *et al.*[4], reported that the average value of Zn in feed and fodders was less than 25.06 ppm in Western Agro Climatic Zone of Vidarbha. Garg *et al.*[6], reported that the Zinc was acutely deficient in most of the feedstuffs (average level< 26.30 ppm) in Bharatpur district of Rajasthan.

According to Kadiyan[8] the average Fe content in wheat flour was 119.0 mg/kg in Haryana. Garg *et al.*[6], reported that the Fe contents were adequate in the diet of animals, with traditional feeding system in Bharatpur district. The values under the present investigation are also in line with the ranges reported earlier.

According to Kadiyan[8] the average Mn content in wheat flour was 48.6 mg/kg in Haryana. According to Lall *et al.*[9], the average Mn content in wheat flour was 17.66 mg/kg in Hisar district. Gami *et al.*[5], while surveying Dantiwada taluka in North Gujarat region, reported that the average value of Mn in concentrate mixture was 40.09 mg/kg. Indira *et al.*[7], reported that the grains were poor sources of Ca (0.11 %) as compared to P (0.26%) in West Godavari District of Andhra Pradesh.

Table 2: Mineral Composition of Wheat dalia in different sites of Gurgaon district

Site No.	Name of Block	n	Ca (%)	P (%)	Zn (ppm)	Cu(ppm)	Fe(ppm)	Mn(ppm)
1.	Gurgaon	60	0.29±0.01	0.31±0.01	25.99±0.13	15.13±1.83	137.78±4.17	36.88±2.68
2.	Pataudi	60	0.28±0.01	0.32±0.01	26.29±1.13	11.90±1.72	133.07±4.31	34.16±1.93
3.	Farrukhnagar	60	0.27±0.03	0.28±0.06	27.61±1.02	12.62±2.23	132.64±4.82	38.52±1.77
4.	Sohna	60	0.28±0.03	0.28±0.02	26.25±0.93	16.74±1.66	134.93±4.65	39.21±0.70
Mean			0.28±0.01	0.30±0.02	26.53±0.43	14.09±0.99	134.60±3.01	37.19±1.51
Range			0.21-0.34	0.24-0.41	23.04-30.78	7.11-20.37	122.80-147.42	28.63-46.09

± Standard error of mean

Feed Pellets

Feed pellets marketed by Hafed and other agencies were also offered to animals by some progressive farmers. The composition of different minerals was given in Table 3. The concentrate mixture complete in all respect

was pelleted. However, many samples of feed pellets had Zn far below the respective specified levels[11]. Other mineral concentration was higher than the critical values.

Table3: Mineral Composition of Feed pellets in different sites of Gurgaon district.

Site No.	Name of Block	n	Ca (%)	P (%)	Zn (ppm)	Cu(ppm)	Fe(ppm)	Mn(ppm)
1.	Gurgaon	60	0.75±0.04	0.39±0.03	25.27±1.31	17.50±1.82	160.14±3.78	70.97±3.51
2.	Pataudi	60	0.71±0.05	0.35±0.01	26.95±1.25	17.86±1.85	161.78±8.90	71.26±1.60
3.	Farrukhnagar	60	0.74±0.03	0.34±0.02	25.60±1.71	19.23±1.08	160.93±4.49	68.97±2.58
4.	Sohna	60	0.68±0.04	0.32±0.02	25.65±2.42	18.42±1.14	152.63±3.15	67.31±1.96
Mean			0.72±0.02	0.35±0.01	25.87±0.76	18.25±0.68	158.87±2.61	69.63±1.18
Range			0.59-0.84	0.27-0.48	18.56-30.83	13.65-23.74	140.29-180.31	60.15-71.86

± Standard error of mean

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