



ISSN: 2456-2912

VET 2024; 9(1): 330-332

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www.veterinarypaper.com

Received: 18-11-2023

Accepted: 24-12-2023

Vivek Saharan

Department of Animal
Nutrition, Lala Lajpat Rai
University of Veterinary and
Animal Sciences, Hisar,
Haryana, India

Pushpa Lamba

Department of Livestock
Production Management, College
of Veterinary and Animal
Science, RAJUVAS, Bikaner,
Rajasthan, India

Sajjan Sihag

Department of Animal
Nutrition, Lala Lajpat Rai
University of Veterinary and
Animal Sciences, Hisar,
Haryana, India

BS Tewatia

Department of Animal
Nutrition, Lala Lajpat Rai
University of Veterinary and
Animal Sciences, Hisar,
Haryana, India

Sushil Kumar

Department of Animal
Nutrition, Lala Lajpat Rai
University of Veterinary and
Animal Sciences, Hisar,
Haryana, India

Corresponding Author:

Vivek Saharan

Department of Animal
Nutrition, Lala Lajpat Rai
University of Veterinary and
Animal Sciences, Hisar,
Haryana, India

Proximate nutrient composition (on dry matter basis) of feedstuffs used by farmers of raya-pearl millet growing zone of Haryana

Vivek Saharan, Pushpa Lamba, Sajjan Sihag, BS Tewatia and Sushil Kumar

Abstract

An extensive survey was carried out to assess proximate nutrient composition (on dry matter basis) of feedstuffs used by farmers in raya-pearl millet growing zone of Haryana during Kharif season. 42 blocks, representing all the districts of the zone were selected for the survey. Samples of feedstuffs were collected from cattle and buffalo farmers. Thus, a total of 504 farming 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. Feed and fodder samples collected were kept in hot air oven (at 100 ± 5 °C for 24 h) to express the result on DM basis. The proximate analysis of feed and fodder samples was done following standard procedure (AOAC, 2005). Nitrogen free extract (NFE) was calculated by difference. The result reveals that the proximate composition of various feeds and fodders had nutrient composition within normal range. Highest crude protein was found in mustard cake followed by cotton seed cake and least in cotton seed.

Keywords: Feed, fodder, hot air oven, cotton seed cake, Nitrogen free extract (NFE) and *Kharif* season

Introduction

Feed resources accounts for nearly 70-80% of the inputs cost in dairy industry for efficient production, reproduction and maintenance of normal health in dairy animals, it is essential to provide nutrients according to their needs. Where possible locally available feeds should be used so that the costs can be managed (Baloda *et al.*, 2016) [1]. A survey work conducted in Charkhi Dadri district (Ramsawroop *et al.*, 2019) [5] revealed that majority of buffaloes were fed adequately in terms of TDN but underfed in terms of dry matter and crude protein.

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. Lactating animals should be given the best feed the farmer can offer. A well-balanced ratio of protein, energy, vitamins and minerals in a palatable and tasty feed is the best way of increasing milk production and live weight, as well as improving health and fertility (Krizsan *et al.*, 2021) [3].

Cost of feeding is the single largest component in the total cost of milk production. In developing countries, where the level of production of milking animals is not high and the returns from milk production are marginal, which is primarily due to higher consumption of DM per unit of milk production. Animal of different physiological status have different demands for nutrients but this concept remains unutilized in commercial dairy farms because they offer the same level of nutrients to all animals. This was the major factor responsible for increasing the cost of milk and also causes serious disturbances in the health status of animals. Thus, nutrient supplementation beyond the need of the animals may yield only diminishing returns. Hence, to elicit the maximum benefit out of the supplementation a specific strategy must be chalked out prior to the start of the nutrient supplementation. Therefore, to reap maximum benefit from animals along with keeping them healthy, balance feeding is of utmost importance.

Materials and Methods

A detailed survey was carried out to proximate nutrient composition (on dry matter basis) of feedstuffs used in raya-pearl millet growing zone of Haryana during Kharif season. Raya-pearl millet growing zone (Charkhi Dadri, Bhiwani, Jhajjar, Gurugram, Mewat, Mahendragarh and Rewari) has 0.64 million cattle and 1.35 million buffaloes, i.e. 36.65% and 31.58% of the state cattle and buffalo population. 42 blocks, representing all the districts of the zone were selected for the survey. Samples of feedstuffs, were collected from cattle and buffalo farmers. Thus, a total of 504 farming 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. Daily offer of concentrates, green fodder and dry roughage were verified with the help of spring balance. Usually farmers use a basket (Tokari) to offer the green and dry roughage, the weight of one basketful of green and dry roughage were recorded separately. The total feed offered daily was calculated on the basis of frequency of feeding. On interrogation about residual feed, it was found that farmers with their daily experience were feeding in such quantity that residue left was almost nil. If residue was left, it was generally added to the next day diet. Total digestible nutrients (TDN) content (%) of the feeds and fodders were calculated by using reported values of digestibility coefficients (Sen *et al.*, 1977) ^[6] of respective proximate nutrients (i.e., CP, EE, CF and NFE) of a particular feed ingredient. TDN and CP are the two nutritional factors most likely to limit milk production and growth. The amount of TDN and CP offered to a particular animal was calculated from the quantity of a particular feed ingredient offered on

dry matter (DM) basis.

Results and Discussion

The proximate nutrient composition of different feedstuffs fed to the cattle and buffaloes are given in Table 1. Among dry roughage, wheat straw was used mainly by farmers of this zone followed by paddy straw and bajra kadbi. The values of proximate nutrients on dry matter basis in wheat straw i.e CP %, EF%, CF%, NFE% and TDN % were 3.06, 1.02, 35.31, 48.12 and 45 respectively, however in paddy straw CP %, EF%, CF%, NFE% and TDN % were 4.11, 1.21, 41.22, 34.24 and 40 respectively and in bajra kadbi CP %, EF%, CF%, NFE% and TDN % were 4.14, 1.08, 34.56, 51.76 and 52 respectively. Maximum crude protein %, CF% and TDN % among dry roughage was found in bajra kadbi, whereas least CP% was found in wheat straw.

Among green fodder, bajra fodder was most preferred followed by sorghum and grasses. Proximate analysis of green fodder showed that dry matter % in these fodder ranged from 19.10 to 14.31% with highest dry matter in bajra fodder and least in grasses. The values of proximate nutrients on dry matter basis i.e. CP %, EF%, CF%, NFE% and TDN % in bajra fodder were 7.79, 1.24, 37.07, 48.34 and 52 respectively, however in sorghum CP %, EF%, CF%, NFE% and TDN % were 8.32, 1.61, 32.03, 50.38 and 55 respectively and in grasses CP %, EF%, CF%, NFE% and TDN % were 9.41, 1.72, 25.03, 51.43 and 50 respectively. Among green fodders highest crude protein % was found in grasses followed by sorghum and least in bajra fodder however maximum TDN % was observed in sorghum and least in grasses.

Table 1: Proximate nutrient composition (on dry matter basis) of feedstuffs used by farmers of raya- pearl millet growing zone

Feedstuff	n	DM	CP	EE	CF	NFE	TDN*
Wheat straw	454	88.21 (87.41-91.60)	03.06 (02.59-03.73)	01.02 (00.91-01.42)	35.31 (33.25-37.68)	48.12 (45.59-50.13)	45.00
Bajra Kadbi	14	86.40 (85.37-87.91)	04.14 (03.37-04.95)	01.08 (00.69-01.37)	34.56 (33.32-35.96)	51.76 (50.63-52.09)	52.00
Paddy straw	61	89.65 (88.53-90.12)	04.11 (03.31-04.87)	01.21 (01.05-01.87)	41.22 (40.32-42.12)	34.24 (33.32-35.89)	40.00
Sorghum	188	18.31 (17.21-18.93)	08.32 (08.16-08.86)	01.61 (01.32-02.57)	32.03 (31.01-33.41)	50.38 (49.41-50.85)	55.00
Bajra Green	373	19.10 (18.76-19.89)	07.79 (07.13-08.02)	01.24 (01.05-01.98)	37.07 (36.11-37.88)	48.34 (47.67-48.91)	52.00
Grass	179	14.31 (13.67-14.86)	09.41 (09.19-09.91)	01.72 (01.12-01.91)	25.03 (24.65-25.81)	51.43 (50.53-51.98)	50.00
Wheat grain	275	89.21 (88.73-90.06)	11.15 (11.08-11.83)	02.22 (01.69-02.79)	04.12 (03.77-04.83)	77.12 (76.02-77.91)	82.00
Bajra grain	176	90.60 (89.92-91.75)	12.18 (11.73-12.95)	03.28 (01.91-03.75)	03.19 (02.64-04.84)	76.16 (68.63-79.83)	75.00
Wheat bran	48	92.22 (91.03-93.47)	14.05 (13.58-14.88)	02.12 (01.54-02.67)	15.32 (14.74-15.91)	60.32 (59.81-61.18)	65.00
Cotton seed	39	88.31 (87.73-88.91)	20.16 (19.86-20.87)	16.11 (15.41-16.79)	21.24 (20.84-21.96)	36.15 (35.81-36.92)	88.00
Cotton seed cake	313	88.22 (88.05-88.68)	22.31 (22.01-22.74)	08.32 (07.63-08.91)	22.43 (22.13-22.81)	37.32 (36.07-37.83)	75.00
Mustard cake	101	90.10 (89.93-90.81)	35.04 (34.81-35.73)	08.12 (07.65-08.94)	12.17 (11.02-14.73)	40.54 (40.02-40.93)	78.00
Pelleted Feed	140	89.10 (88.72-89.73)	19.16 (18.64-20.04)	02.23 (01.63-02.87)	13.12 (12.76-14.18)	62.43 (61.53-63.71)	62.00

* Calculated values Sen *et al.*, (1977) ^[6], Figures in Parenthesis indicate range.

The main ingredients used for the concentrate preparation at home in this zone were bajra and wheat which might be attributed to the easy availability of these grains in most of the households of this zone. Proximate analysis of grains reveals that in wheat and bajra grain, CP % was 11.15 and 12.18

respectively. Ether extract % was 2.22 and 3.28 in wheat and bajra grain respectively. CF % was 4.12 and 3.19 in wheat and bajra grain respectively. Total digestible nutrients % in wheat and bajra grain was 82 and 75 respectively. The by-products of the rice milling industry were not being used by

the farmers and instead of it farmers were using wheat bran as a source of fibre having very high CF % i.e. 15.32%.

Cotton seed cake was the main source of dietary crude protein for cattle and buffalo in the zone. However mustard cake was also feed in some areas. Although, mustard cake and cotton seed cake are not being produced in the area, where they were used as part of the concentrate. The mustard cake and cotton seed cake were being purchased from the market. CP % on dry matter basis in cotton seed cake, mustard cake and cotton seed was 22.31%, 35.04% and 20.16% respectively. Highest crude protein was found in mustard cake followed by cotton seed cake and least in cotton seed. Ether extract % was 8.32, 8.12 and 16.11% in cotton seed cake, mustard cake and cotton seed respectively. CF % was 22.43, 12.17 and 21.24% in cotton seed cake, mustard cake and cotton seed respectively. NFE % was 37.32, 40.54 and 36.15% in cotton seed cake, mustard cake and cotton seed respectively. Total digestible nutrients % in in cotton seed cake, mustard cake and cotton seed was 75, 78 and 88% respectively.

Farmers were also feeding pelleted feed to their animals which were having dry matter of 89.10%. CP %, EF%, CF%, NFE% and TDN % were 19.16, 2.23, 13.12, 62.43 and 62 respectively in pelleted feed. The mean values of proximate nutrients composition of the feedstuffs used by cattle and buffalo owners corroborated well with the values reported by Sen *et al.* (1977)^[6] although some variations were observed in proximate nutrients which might be due to difference in varieties, different processing techniques used and possible adulterations.

The results of this study were in general agreement to the study conducted by Singh (1997)^[8] and also to that of another study conducted by Singh, (2002)^[7] who reported that buffaloes in Mahendragarh district were found to be fed 7.54% excess TDN and 7.41% deficient CP. Similar to this, excess TDN and deficit CP in ration of buffaloes of Gurugram district were also reported Baloda (2016)^[1]. Similarly, Randhe carried a study on nutritional status of different categories of buffaloes owned by farmers with different land holding in Maharashtra and revealed that there was deficiency of DM supply in all the groups. Jarial *et al.* (2013)^[2] also reported that in Tehri Garhwal and Pithoragarh districts of Uttarakhand, the lactating buffaloes were underfed in terms of DM. However, Maan *et al.* (2014)^[4] found that farmers of Bhiwani district generally were not supplementing mineral mixture and common salt in ration of lactating buffaloes.

Conclusion

The proximate composition of various feeds and fodders had nutrient composition within normal range. Highest crude protein was found in mustard cake followed by cotton seed cake and least in cotton seed.

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