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Diwakar Verma

Scientist, Livestock Production and Management, Krishi Vigyan Kendra, Sultanpur, Uttar Pradesh, India

Kuladip Prakash Shinde

Assistant Professor, Livestock Production and Management, SKRAU-College of Agriculture, Bikaner, Rajasthan, India

Shailesh Kumar Gupta

Assistant Professor, Livestock Production and Management, IGKV-College of Agriculture and Research Station, Kunkuri, Jashpur, Chhattisgarh, India

Corresponding Author:

Diwakar Verma

Scientist, Livestock Production and Management, Krishi Vigyan Kendra, Sultanpur, Uttar Pradesh, India

Nutritional status of feeds and fodders fed to dairy animals in Haryana

Diwakar Verma, Kuladip Prakash Shinde and Shailesh Kumar Gupta

Abstract

One of the main obstacles to the highest possible livestock output is the inadequate nutritional quality of feed resources. In order to measure the nutritional quality of key feed resources for interventions, there is a deficiency of information regarding their chemical makeup. Assessing the Nutritional Status of Feeds and Fodders Fed to Dairy Animals in Haryana was the goal of this study. A thorough investigation conducted in the districts of Hisar, Bhiwani, and Kaithal in the state of Haryana revealed that wheat straw, Jowar, berseem, and oat were common roughage sources. Conversely, cotton seed cake, gramme churi, wheat bran, soya churi, wheat crushed, mustard cake, gramme husk, wheat grain, barley, bajra, and fenugreek seeds, as well as commercial pellet feed, were common sources of concentrates fed to dairy animals. Wheat straw had the highest DM percentage of all the roughages (92.56%) and amongst class of concentrates in mustard cake had maximum DM percentage (93.72%). Berseem had the highest CP% (20.12%) and EE% (2.67%) in roughages and in Soya churi highest CP% (42.13%) and EE% (4.25%) among concentrates. A wide difference in CF% was observed in roughages and ranged from 31.56% (Wheat straw) to 42.11% (Jowar fodder) and among concentrates CF content ranged between 1.76% (Bajra grains) to 24.32% (Gram churi).

Keywords: Haryana, districts, chemical composition, feeds and fodders

Introduction

Livestock farming and agriculture are complementary industries. Both contribute significantly to enhancing food and nutritional security and offer employment and livelihood options for people living in rural areas. Based on the available data, India is the country with the greatest number of livestock worldwide nearly one-fifth of all livestock worldwide. About 29.63 percent of India's total agricultural output and 4.11 percent of the country's GDP come from the livestock industry. The nation needs a supply of feed and fodder that is proportionate to demand in order to sustain its enormous livestock population. The nation currently has a net deficit of 36% concentrate feeds, 23.4 percent dry crop residues, and 11.24 percent green fodder. Despite possessing only 2.29 percent of the global land area, India is home to approximately 10.7 percent of livestock (Roy *et al.* 2019) [8]. India's dairy industry is growing into a self-sufficient, financially sustainable business that pays its farmers quickly and consistently through the sale of milk and its byproducts. High-quality product feeding is necessary for a dairy business to be profitable because it improves animal health and productivity. However, commercial concentrates are too expensive for farmers and the existing fodder are not available in sufficient quantity for livestock in terms of nutritional quality also. According to the BAHS (2019) [2], India has 193.46 million cattle and 109.85 million buffaloes. Over the past six years, the country's milk production has increased by 35.61 percent, reaching 198.4 million tonnes in 2019–20 (The Economic Times, 2019) [10]. Millions of rural Indian households depend heavily on these ruminants for their security of food and income. Among the numerous variables affecting livestock productivity, feeding accounts for over 60–70% of all recurring costs; therefore, improvements in both the qualitative and quantitative aspects of this area will typically result in higher productivity. The establishment of any successful livestock business depends critically on optimal nutrition. A profitable livestock enterprise relies heavily on the balanced feeding of its dairy animals. This approach highlights the significance of providing all the nutrients needed for optimal production,

reproduction, and health maintenance. It also ensures that dairy animals receive the necessary amounts of protein, energy, and minerals. The quality of feeds and fodder is initially determined by their chemical composition, which also indicates the general health and productivity of the local animal population. Therefore, accurate data on the proximate composition and fiber fractions of feeds and fodders fed to dairy cattle is crucial for evaluating the nutritional status of both the feeds and fodders and the animals to which they are fed (Ganai *et al.* 2004) [4]. The primary nutrient composition found in any feed material or ingredient is represented by its proximate composition.

Materials and Methods

Three districts in Haryana that are important for raising livestock were chosen for the study. Fifty six feed and fodder samples were collected in polythene bags from a selected district, which were fed to the dairy animals (Table 1). For analysis, the samples were correctly labelled, pooled, and kept in polythene bags. For laboratory analysis, the representative feed and fodder samples were ground, labelled, and kept in airtight polythene bags after being dried for an entire night at 100 ± 5 °C in a hot air oven. In accordance with AOAC (2005) [1], the composite feed and fodder samples were analysed for proximate principles.

Table 1: Chemical composition of roughages fed to dairy Animals in different district of Haryana

Sr. No.	Name	Feed	DM%	CP%	CF%	EE%	NFE%
1	Village: Satrod, Hisar Haryana	Cotton seed cake	91.90	37.00	21.32	9.40	28.17
		Gram churi	89.36	16.52	24.32	2.75	50.88
		Wheat bran	88.87	16.76	11.8	2.6	62.08
		Soya churi	87.93	42.13	8.50	4.25	40.87
2	Village: Govind Nagar, Hisar Haryana	Feed	DM%	CP%	CF%	EE%	NFE%
		Cotton seed cake	89.35	36.62	21.56	7.21	29.4
		Gram churi	93.50	17.32	9.45	2.65	66.05
		Wheat crushed	89.95	7.21	1.95	1.41	86.68
		Jowar fodder	19.78	8.12	42.11	2.67	36.54
3	Village: Pur, Hisar, Haryana.	Wheat straw	92.56	2.90	33.45	0.85	54.05
		Feed	DM%	CP%	CF%	EE%	NFE%
		Mustard cake	91.21	35.97	8.82	7.51	41.16
		Gram churi	90.57	17.25	5.90	1.87	68.84
		Cotton seed cake	90.76	38.23	20.76	10.76	24.71
4	Village: Gujrani, Bhiwani, Haryana	Gram husk	86.63	16.64	21.87	0.69	59.55
		Wheat bran	88.65	16.67	9.86	2.20	64.84
		Feed	DM%	CP%	CF%	EE%	NFE%
		Gram churi	89.63	18.07	4.86	2.09	67.55
		Cottonseed cake	91.87	38.23	22.52	10.76	22.95
5	Village: Kungar, Hisar, Haryana	Gram husk	86.63	17.42	21.52	0.87	58.94
		Gram	93.15	22.87	6.21	1.76	64.29
		Crushed wheat	88.87	7.21	0.95	1.65	87.88
		Feed	DM%	CP%	CF%	EE%	NFE%
		Barley	85.01	11.66	5.65	2.75	76.97
		Fenugreek seed	91.76	12.54	1.53	3.54	80.21
		Cotton seed	90.79	22.9	2.91	3.64	67.79
6	Village: Satsrod, Hisar, Haryana	Cotton seed cake	90.79	37.52	21.23	9.62	26.76
		Gram churi	92.56	16.68	5.43	2.78	69.68
		Wheat bran	88.9	13.78	9.93	2.5	67.03
		Feed	DM%	CP%	CF%	EE%	NFE%
		Fenugreek seed	91.58	13.46	1.68	3.80	78.88
		Cotton seed	90.79	23.76	2.76	4.76	65.96
		Mustard cake	93.72	34.56	7.08	7.54	46.41
7	Village: Ramana, Kaithal, Haryana	Bajra grain	89.16	13.35	1.87	4.60	79.03
		Wheat grain	89.3	15.75	2.21	2.27	76.91
		Conc. Mixture	90.46	20.28	5.64	4.46	61.53
		Feed	DM%	CP%	CF%	EE%	NFE%
		Conc.mixture	90.09	18.59	4.37	4.25	64.43
8	Village: Ramana, Kaithal, Haryana.	Berseem fodder	15.76	20.12	41.65	2.67	20.71
		Wheat straw	92.56	2.90	31.56	0.85	55.94
		Feed	DM%	CP%	CF%	EE%	NFE%
		Conc. Mixture	89.46	19.46	7.65	4.34	60.13
9	Village: Pilni, Kaithal, Haryana	Maize fodder	22.32	8.76	40.21	2.32	39.74
		Wheat straw	92.40	2.70	32.45	0.85	55.44
		Feed	DM%	CP%	CF%	EE%	NFE%
		Conc. Mixture	90.12	19.68	6.42	4.75	60.52
10	Village: Umra, Hisar, Haryana	Berseem green	12.87	19.44	41.55	2.55	21.72
		Wheat straw	92.76	2.90	33.43	0.89	54.05
		Feed	DM%	CP%	CF%	EE%	NFE%
		Cotton seed	91.23	37.34	2.81	10.56	43.61
		Wheat crushed	89.91	7.42	0.92	1.52	86.39
		Mustard cake	89.37	35.58	8.18	7.27	42.53

11	Hisar Haryana	Wheat straw	91.9	3.00	33.31	0.89	54.24
		Feed	DM%	CP%	CF%	EE%	NFE%
		Gram husk	86.63	17.42	21.52	0.87	58.94
		Bajra grain	90.68	13.22	1.76	4.50	79.37
		Conc. Mixture	89.39	20.27	6.90	4.44	60.30
		Jowar fodder	21.64	8.76	41.76	2.44	38.07
12	Kaithal, Haryana	Wheat straw	92.56	2.80	32.22	0.81	55.83
		Feed	DM%	CP%	CF%	EE%	NFE%
		Gram churi	91.90	16.88	5.46	2.14	69.74
		Fenugreek seed	91.58	13.22	8.76	4.50	79.37
		Wheat straw	91.87	2.80	35.12	0.81	52.93
13	Village: Gujrani, Bhiwani, Haryana	Feed	DM%	CP%	CF%	EE%	NFE%
		Conc. Mixture	89.87	20.71	7.63	4.43	58.57
		Oat green fodder	21.64	7.90	41.70	2.44	38.99
		Wheat straw	92.56	3.22	31.78	0.85	55.4
		Commercial pellet feed	90.90	19.96	9.88	4.37	56.69

Results and Discussion

Feed stuffs are evaluated on the basis of chemical composition and by their nutritional value. To develop the balanced rations farmers are required to have precise information about the nutritive value of feeds and fodders they feed to their dairy animals. The chemical composition (% DM basis) of roughage and concentrates in different villages of Haryana state are presented in Table 1.

The DM, CP, CF, EE and NFE content in cotton seed cake ranges from 89.35 to 91.90, 36.62 to 38.23, 20.76 to 22.56, 7.21 to 9.40 and 24.71 to 29.4 respectively. The DM, CP, CF, EE and NFE content in Gram churi ranges from 89.36 to 93.50, 16.52 to 18.07, 4.86 to 24.32, 1.87 to 2.78 and 50.88 to 69.74 respectively. The DM, CP, CF, EE and NFE content in Wheat bran ranges from 88.65 to 88.90, 13.78 to 16.76, 9.86 to 11.08, 2.20 to 2.60 and 62.08 to 67.03 respectively. The DM, CP, CF, EE and NFE content in Wheat crushed ranges from 88.87 to 89.95, 7.21, 0.95 to 1.95, 1.41 to 1.65 and 86.68 to 87.88 respectively. The DM, CP, CF, EE and NFE content in Jowar fodder ranges from 19.78 to 21.64, 8.12 to 8.76, 41.76 to 42.11, 2.44 to 2.67 and 36.54 to 38.07 respectively. The DM, CP, CF, EE and NFE content in Wheat straw ranges from 91.9 to 92.56, 2.80 to 3.00, 31.56 to 33.45 and 0.81 to 0.85 respectively. The DM, CP, CF, EE and NFE content in Wheat bran ranges from 88.65 to 88.90, 13.78 to 16.76, 9.86 to 11.8, 2.5 to 2.60 and 62.08 to 67.03 respectively. The DM, CP, CF, EE and NFE content in Fenugreek seed ranges from 91.58 to 91.76, 12.54 to 13.46, 8.76 to 1.68, 3.54 to 4.50 and 78.88 to 80.21 respectively. The DM, CP, CF, EE and NFE content in Concentrate mixture ranges from 89.46 to 90.46, 18.59 to 20.28, 4.37 to 7.65, 4.25 to 4.75 and 58.57 to 64.43 respectively. The DM, CP, CF, EE and NFE content in Mustard cake ranges from 89.37 to 93.72, 34.56 to 35.97, 7.08 to 8.82, 7.27 to 7.51 and 41.16 to 46.41 respectively. The DM, CP, CF, EE and NFE content in Gram is 93.15 22.87 6.21 1.76 and 64.29. The DM, CP, CF, EE and NFE content in oat green fodder is 21.64, 7.90, 41.70, 2.44 and 38.99. The DM, CP, CF, EE and NFE content in Commercial pellet feed is 90.90, 19.96, 9.88, 4.37 and 56.69. The DM, CP, CF, EE and NFE content in Soya churi is 87.93, 42.13, 8.50, 4.25 and 40.87. The DM, CP, CF, EE and NFE content in Bajra grain is 90.68, 13.22, 1.76, 4.50 and 79.37. The DM, CP, CF, EE and NFE content in Berseem green is 12.87, 19.44, 41.55, 2.55 and 21.72. The DM, CP, CF, EE and NFE content in Maize fodder is 22.32, 8.76, 40.21, 2.32 and 39.74. The DM, CP, CF, EE and NFE content in Barley is 85.01, 11.66, 5.65, 2.75 and 76.97. The chemical composition of feeds and fodders was found within normal range (ICAR, 2013), with slight variations which may be due to varietal differences

environmental effect, geographical area differences and management practices. The results of the present study corroborate with the earlier reports of Prusty *et al.*, (2013) [7] NRC (2007) [6], Garg *et al.*, (2009) [5], Singh *et al.*, (2011) [9] and Baloda *et al.*, (2018) [3].

Conclusion

All feeds and fodders in the district had a normal chemical composition. The main fodder crops included maize, jowar, berseem, and barley, while the byproduct of wheat was used as dry fodder. Growing fodder crops was more cost-effective than other food crops, so farmers were encouraged to put more effort and resources into cultivating fodder. Farmers may receive subsidies for inputs like premium seeds and other relevant supplies because they have limited financial resources.

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