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Comparative study of chemical composition at different stages of growth, green fodder intake and green fodder yield of DHN-6 and CO-4 green fodder

P V PATIL[1]✉, V M SALUNKE[1] and P P DEVKATE[1]

Maharashtra Animal and Fishery Sciences University, Nagpur, Maharashtra 413 517 India

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At present, the country faces a net deficit of 11.24% green fodder, 23.4% dry crop residues and 36% concentrate feeds. India with only 2.29% of the land area of the world, is maintaining nearly 10.7% of livestock (Roy *et al*. 2019). Dairy farming in India is becoming an independent and economically viable enterprise that provides quick and regular income to the farmers from the sale of milk and its byproducts. Profitable dairy business requires feeding of high-quality products for better production and health of animals. However, commercial concentrates are too expensive for farmers and the existing fodder are not available in sufficient quantity for livestock. Hence to increase fodder production and to reduce the feed cost, efforts have been intensified to evolve outstanding hybrid forage (Panneerselvam *et al.* 2020).

As there is less or no data available regarding the nutritional value of improved fodder varieties, study was undertaken to know the chemical composition, palatability, green fodder intake as well as to compare the different aspects of DHN-6 and CO-4 fodder varieties.

The DHN-6 and CO-4 fodders were cultivated by following the same package of practices and work was carried out at Livestock Farm Complex, College of Veterinary and Animal Sciences, Udgir, Dist. Latur (Maharashtra). The green fodder samples of both forages were collected on 10, 20, 30, 40, 50, 60, 70 and 80 days of plantation and chemical composition was analyzed accordingly (AOAC 1995). DHN-6 and CO-4 green fodder intake was recorded in Deoni cows for 20 days. Moisture level in chaffed fodder was evaluated up to 9 h of chaffing of green fodder. The difference regarding harvesting, taste, toughness, greenishness of fodder, green fodder yield between the DHN-6 and CO-4 fodder was recorded.

The data were analyzed and compared by using paired 't' test as per Snedecor and Cochran (1994).

It was found that DHN-6 was hard to cut as compared to CO-4 grass which was soft to cut, therefore saves energy for other work. Moisture in CO-4 fodder evaporated at a faster rate than DHN-6 fodder at different time intervals. These values indicated that the DHN-6 fodder has more moisture holding capacity than CO-4 fodder. This difference might be due to more thickness of the outer covering of DHN-6 fodder stem in comparison to CO-4 fodder.

It was observed that at every stage of harvesting, the juice of DHN-6 fodder was sweet in taste whereas the juice of CO-4 fodder was tasteless. Whereas the greenishness of leaves was same in the case of DHN-6 fodder and CO-4 grass.

From the data of chemical composition, it was observed that, at every stage of growth, the crude protein content of DHN-6 green fodder was more than the protein content of CO-4 green fodder, which was also proved by statistical analysis. Whereas the total ash content was more in CO-4 green fodder than DHN-6 green fodder. More crude fibre content was found in CO-4 fodder than DHN-6 green fodder. In the present study, no particular trend was noticed for the ether extract content of DHN-6 and CO-4 green fodders. Patil *et al*. (2020) reported the crude protein content of DHN-6 fodder was 12.81%, crude fibre content was 25.48%, and Ether extract content was 5.10%, whereas total ash content was 10.6%. Pavithra *et al*. (2019) reported 14.0% crude protein, 30.8% crude fibre and 3.84% ether extract, ash 14.8% and NFE 36.4% in CO-4 fodder. The chemical composition of CO-4 and DHN-6 grass reported in the present study is different than reported previously (Pavithra *et al*. 2019, Patil *et al*. 2020) which might be due to soil and climatic variations of study locations.

The green fodder yield of DHN-6 grass was quantitatively more as compared to the green fodder yield from CO-4 green fodder on 75, 135, 195, 255 and 315th day of harvesting. Bai *et al.* (2020) reported 220.6 MT/ha/year green fodder yield from DHN-6 grass whereas Rathod and Dixit (2019) reported the total green fodder yield from DHN 6 and CO-4 fodder as 250–300 tonnes/ha annually from 6–8 cuttings. The difference in green fodder yield of CO-4 and DHN-6 grass in the present study compared to

Present address: [1]Instructional Livestock Farm Complex, College of Veterinary and Animal Sciences, Udgir, Dist. Latur, Maharashtra. ✉Corresponding author email: drpv9ann@gmail.com

Table 1. Chemical composition of DHN-6 and CO-4 fodders at different stages of growth

Days of cultivation	DM%		CP%		CF%		EE%		Total ash	
	CO-4	DHN-6	CO-4	DHN-6	CO-4	DHN-6	CO-4	DHN-6	CO-4	DHN-6
10	21.36± 0.20	18.31± 0.03**	9.73± 0.03	10.22± 0.04**	30.88± 0.16	27.85± 0.16**	1.69± 0.008	1.97± 0.02**	10.75± 0.06**	4.92± 0.05
20	19.97± 0.04	20.93± 0.05**	10.07± 0.05	10.77± 0.03**	31.88± 0.16	29.65± 0.07**	1.92± 0.01	2.13± 0.02**	11.08± 0.06**	5.32± 0.06
30	19.26± 0.06	17.90± 0.08**	11.10± 0.05	12.34± 0.03**	32.54± 0.21	30.12± 0.10**	2.35± 0.04	2.38± 0.03^{NS}	12.22± 0.04**	5.20± 0.05
40	20.19± 0.07	18.27± 0.05**	12.12± 0.05	12.93± 0.02**	32.21± 0.09	31.80± 0.13**	2.97± 0.02	2.61± 0.04**	12.64± 0.06**	5.33± 0.05
50	18.81± 0.09	18.00± 0.03**	12.48± 0.06	12.98± 0.02**	33.24± 0.10	32.06± 0.06**	2.88± 0.04	2.93± 0.03^{NS}	12.14± 0.05**	5.95± 0.04
60	18.55± 0.06	18.37± 0.04^{NS}	12.59± 0.03	13.14± 0.06**	33.25± 0.08	32.19± 0.06**	2.92± 0.05	2.98± 0.03^{NS}	12.35± 0.04**	5.93± 0.03
70	19.33± 0.06	20.24± 0.09**	12.64± 0.03	13.05± 0.03**	33.44± 0.05	33.11± 0.07^{NS}	2.97± 0.04	2.90± 0.04^{NS}	12.35± 0.06**	5.80± 0.04
80	22.63± 0.14	23.09± 0.09*	11.58± 0.01	11.75± 0.05**	34.44± 0.05	34.07± 0.07**	2.91± 0.04	2.81± 0.02^{NS}	12.09± 0.01**	5.47± 0.03

Table 2. Green fodder yield of DHN-6 and CO-4 fodders

Days of harvesting	Green fodder yield in MT/ha	
	DHN-6	CO-4
75	81.16	55.18
135	91.90	86.80
195	96.40	90.10
255	83.40	81.30
315	88.60	84.20

Table 3. Green fodder intake of DHN-6 and CO-4 fodder/cow/day in Deoni cows

Day	Fodder (Mean±SE)		P value	Result
	CO-4	DHN-6		
1	17.70±0.81	26.10±0.64	0.0000	**
2	17.32±0.68	26.68±0.43	0.0000	**
3	17.93±0.66	27.27±0.38	0.0000	**
4	17.47±0.58	26.43±0.42	0.0000	**
5	17.78±0.63	26.25±0.51	0.0000	**
6	17.80±0.52	26.47±0.45	0.0000	**
7	17.65±0.50	26.72±0.37	0.0000	**
8	17.65±0.47	26.13±0.46	0.0000	**
9	17.52±0.26	26.45±0.45	0.0000	**
10	17.68±0.55	26.53±0.41	0.0001	**
11	17.65±0.78	26.35±0.45	0.0001	**
12	17.68±0.75	26.47±0.42	0.0002	**
13	17.45±0.70	26.77±0.32	0.0000	**
14	17.47±0.66	27.23±0.31	0.0000	**
15	17.75±0.70	26.13±0.45	0.0003	**
16	17.68±0.69	25.98±0.43	0.0001	**
17	17.17±0.66	26.12±0.34	0.0001	**
18	17.58±0.65	26.60±0.38	0.0001	**
19	17.33±0.46	26.37±0.50	0.0001	**
20	17.38±0.70	26.58±0.31	0.0001	**

**Highly Significant.

other studies (Rathod and Dixit 2019, Bai *et al*. 2020) could be attributed due to soil and climatic variations of the study location.

Green fodder intake of DHN-6 and CO-4 fodder/cow/day is depicted in Table 3. The green fodder intake of DHN-6 fodder was more than CO-4 fodder and a highly significant difference was found between fodder intakes of both fodders. It also indicated that DHN-6 grass was more palatable as compared to CO-4 grass.

The crude protein content of the DHN-6 and CO-4 fodders was at a higher level on 50 to 70 days of plantation; hence the harvesting of these grasses is necessary to be carried out during 50 to 70 days of the plantation. DHN-6 grass has more moisture-holding capacity, green fodder yield, green fodder intake more juiciness; the juice is sweet in taste as compared to CO-4 fodder. Overall it can be concluded that DHN-6 fodder is superior for feeding to animals as compared to CO-4 fodder in climatic conditions at Marathwada region of Maharashtra.

SUMMARY

The present study was conducted with the objective to evaluate the usefulness of DHN-6 and CO-4 fodders in terms of chemical composition, fodder intake and other parameters. The green fodder samples of both fodders were collected on 10, 20, 30, 40, 50, 60, 70 and 80 days of plantation and chemical composition was analyzed accordingly. Green fodder intake of DHN-6 and CO-4 was recorded for 20 days in Deoni cows. Moisture level in chaffed fodder was evaluated upto 9 h of chaffing of green fodder. The chemical composition of DHN-6 fodder was found better than the CO-4 fodder. DHN-6 fodder has more juiciness, sweetness; high green fodder intake, high moisture-holding capacity and more green fodder yield as compared to CO-4 fodder variety whereas CO-4 green fodder was found easy for harvesting and chewing to animals. No difference was found in the greenishness of both of the fodders. Overall it can be concluded that

DHN-6 fodder is superior for feeding to animals as compared to CO-4 fodder and harvesting of these grasses should be carried out at 50 to 70 days of plantation to provide better nutrition to animals.

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