
ORIGINAL ARTICLE

Effect of Feeding Interval on Dry Matter Intake in Crossbred Cows during Different Seasons

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ABSTRACT

The objective of the study was to determine the effect of feeding interval on dry matter intake in crossbred cows during different seasons. Fifteen cross bred lactating cows were divided into three groups in randomize block design (RBD). Feeding treatments consisting of three different feeding intervals of TMR in three different seasons. Feeding time of cows for once a day (**T₁**) was at 6:00 a.m., for twice a day (**T₂**) at 6:00 a.m. and 6:00 p.m. and for thrice a day (**T₃**) at 6:00 a.m., 12:00 p.m. and 6:00 p.m., with 24, 12 and 6 hours interval, respectively. Test ration was given on component-fed basis. Concentrate was given according to milk production of cows ie. 1 Kg. Concentrate mixture for every 3 Kg. Milk produced. The experimental diets were offered to the cows in 40:60 concentrate and roughage ratio. This study shows that feeding interval has positive effect on dry matter intake and CP digestibility (%) in cross bred cows in all season like winter, summer and rainy.

Keywords: Total mixed ration, Randomize block design, dry matter intake.

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INTRODUCTION

Animal production is a relatively a simple, operation that can be easily taught to villagers in the developing nations. However, production result will not be good unless breeding stock and feed staffs are improved and properly blended. Also modern animal industry has to be practiced in a way to obtain the maximum profit. There are difference of opinion in India as to whether it is always profitable to keep flock because cost of feed have increased more in comparison to the cost of animal production. Farmer is always aiming at achievement of higher productive performance along with lower feed consumption i.e. best utilization. All the studies estimated that 65% of total cost of animal production is towards the food cost [3, 4], hence animal scientist and feed manufactures are continuing the search for better management and improved feeding practices to obtain better feed efficiency. One Key area of focus for today is dairy producers is feeding management. In turn, feeding management is critically importance in promoting good production and animal health. Feeding management is also a crucial component of animal welfare and should, therefore, be a monitoring priority for producers. Past research in dairy cattle nutritional management has been focused almost exclusively on the nutritive aspects of the diet, resulting in many discoveries and improvements in dairy cow health and production. The function of the digestive tract and utilization of feeds is also influenced by the feeding technique, among others by the feeding frequency during the day. It is a common practice to feed dairy cow twice a day. This fact contradicts the opinion that the more frequent feeding the higher the dry matter intake. However, there is also a conflict with the theory, that it is economically more advantageous to feed at minimal frequency and, in this way, to enhance labour productive. The question of the feeding frequency of concentrates but also of TMR is still being solved. Especially the frequency of feeding concentrates, namely the dry matter intake (DMI). Hot and humid environmental conditions tend to reduce dry matter intake (DMI) in lactating dairy cows [6, 7]. According to Gottardo *et al.* [2], cows receiving feed in two daily distributions during the summer season increased DMI (+9.0%) compared with animals fed once a day.

MATERIALS AND METHODS

Selection and distribution of animals: Fifteen cross bred cows will be selected for the study and distributed randomly based on their milk yield, parity and stage of lactation into 3 treatments groups of 5 cows in each treatment group.

Feeding and housing management of experimental animals: Feeding treatments consisting of three different feeding intervals of TMR in three different seasons. Feeding time of cows for once a day (**T₁**) was at 6:00 a.m., for twice a day (**T₂**) at 6:00 a.m. and 6:00 p.m. and for thrice a day (**T₃**) at 6:00 a.m., 12:00 p.m. and 6:00 p.m., with 24, 12 and 6 hours interval, respectively. The study was conducted in the winter (December- 2015), summer (March-2016) and rainy (July-2016) seasons. Experimental period was of 31 days including 10 days for adaptation and 21 days for measurements in each season. Data recording was done after the adaptation period. Test ration was given on component – fed basis. Wheat straw was given ad. lib. Concentrate was given according to milk production of cows i.e. 1 Kg. Concentrate mixture for every 3 Kg. Milk produced. The experimental diets were offered to the cows in 40:60 concentrate and roughage ratio. Concentrate and roughage fed as total mixed ration (TMR) prepared through Keenan Mechfiber machine. All experimental cows were housed in well-ventilated cement floored shed, with arrangements of separately collection of faeces and Feeding of the animals individually. Hygienic practices were adopted throughout the experimental period.

Preparation of total mixed ration: Total mixed ration prepared in the Keenan Mechfiber machine having digital weighing balance. Weighted quantity of wheat straw and un-chopped green maize or Barseem fodder were first added to the Keenan Mechfiber machine and processed to a proper particle length in 50 minute at 4 revolutions per minute thereafter weighted quantity of concentrate was added to the processing chamber and mixed with roughage for 5 minute at 4 revolutions per minute. TMR was taken out from the machine and offered to the cow for feeding.

Table.1. Composition of ration (per 100 kg of DM)

Sl. No.	Particular	Parts	Seasons
1	Wheat straw	20	Winter
	Barseem	40	
	Concentrate	40	
2	Wheat straw	20	Rainy and Summer
	Green Maize	40	
	Concentrate	40	

Table.2. Physical composition of the concentrate mixture used (% on DM basis) for experimental diets

Sl. No.	Ingredients	Parts in concentrate mixture
1	Wheat Bran	21
2	Rice Polish	10
3	Maize Grain	32
4	Groundnut Cake	21
5	Mustard Cake	13
6	Salt	1
7	Mineral Mixture	2
Total		100

Collection of samples:

Representative samples of feed, residues were taken daily for DM estimation during metabolism trial. These samples of feed offered, residue left over, faeces were collected and pooled together. The pooled samples were ground to pass through 1mm sieve size and used for proximate and fibre fraction analysis.

Digestion trial: Throughout the experimental period digestion trial was conducted wherein at a Particular day, the amount of feed consumed by the animal was recorded and on the next day the faeces was collected as per total faecal collection method. Total amount of faeces voided by each animal per day were recorded and a known aliquot of faeces and were taken in a pre-weighed bottles each day for each animals. Feed, residue, and faeces were oven dried every day.

Proximate analysis of different feed materials: Ground samples of roughage, concentrate were analyzed for proximate principles as per standard procedures [1].

Statistical Analysis: The data on various parameters will be collected, tabulated and subjected to analysis of variance technique (ANOVA) as per randomized block design (RBD) of Snedecar and Cochran [5] to determine influence of different feeding interval of feeds on parameters.

RESULT AND DISCUSSION

Fifteen cross bred cows were selected for the study and distributed randomly based on their milk yield, parity and stage of lactation into 3 treatments groups of 5 cows in each treatment group. All experimental cows were housed in well-ventilated cement floored shed and Feeding of the animals individually. Feeding treatments consisting of three different feeding intervals of TMR in three different seasons. Feeding time of cows for once a day (**T₁**) was at 6:00 a.m., for twice a day (**T₂**) at 6:00 a.m. and 6:00 p.m. and for thrice a day (**T₃**) at 6:00 a.m., 12:00 p.m. and 6:00 p.m., with 24, 12 and 6 hours interval, respectively. The study was conducted in the winter (December- 2015), summer (March-2016) and rainy (July-2016) seasons. Experimental period was of 31 days including 10 days for adaption and 21 days for measurements in each season. Data recording was done after the adaptation period. Test ration was given on component – fed basis. Wheat straw was given ad. lib. Concentrate was given according to milk production of cows i.e. 1 Kg. Concentrate mixture for every 3 Kg. Milk produced. The experimental diets were offered to the cows in 40:60 concentrate and roughage ratio. Concentrate and roughage fed as total mixed ration (TMR) prepared through Keenan Mechfiber machine.

Chemical composition of experimental diets: The chemical composition of feed or total mixed rations used in experiment is presented in Table 3. Wheat straw contained 92.18, 91.46, 2.51, 2.14, 82.17 and 62.16 percent dry matter (DM), organic matter (OM), crude protein (CP), ether extract (EE), neutral detergent fibre (NDF) and acid detergent fibre (ADF), respectively. Green maize contained 13.86, 89.51, 9.40, 1.72, 49.80 and 39.28 percent DM, OM, CP, EE, NDF and ADF, respectively. Barseem contained 18.17, 87.58, 16.20, 3.82, 42.03 and 22.78 percent DM, OM, CP, EE, NDF and ADF, respectively. Maize grain contained 94.26, 96.74, 9.36, 3.34, 25.21 and 8.47 percent DM, OM, CP, EE, NDF and ADF, respectively. Wheat bran contained 95.24, 93.27, 14.18, 3.73, 13.25 and 12.31 percent DM, OM, CP, EE, NDF and ADF, respectively. Rice polish contained 85.29, 87.47, 9.82, 10.34, 36.46 and 20.37 percent DM, OM, CP, EE, NDF and ADF, respectively. Groundnut cake contained 94.41, 94.45, 40.40, 7.37, 22.15 and 16.24 percent DM, OM, CP, EE, NDF and ADF, respectively. Mustard cake contained 92.04, 95.71, 38.33, 7.36, 25.05 and 23.30 percent DM, OM, CP, EE, NDF and ADF, respectively. TMR contained 32.40, 90.25, 12.41, 3.17, 61.28 and 38.16 percent DM, OM, CP, EE, NDF and ADF, respectively.

Table 3 Chemical composition (% DM) of feed used during lactation trial:

Feed	DM	OM	CP	EE	ASH	NDF	ADF
Wheat straw	92.18	91.46	2.51	2.14	8.28	82.17	62.16
Green Maize	13.86	89.51	9.40	1.72	10.48	49.80	39.28
Barseem	18.17	87.58	16.20	3.82	12.84	42.03	22.78
Maize Grain	94.26	96.74	9.36	3.34	2.57	25.21	8.47
Wheat Bran	95.24	93.27	14.18	3.73	6.67	13.25	12.31
Rice Polish	85.29	87.47	9.82	10.34	12.34	36.46	20.37
Groundnut Cake	94.41	94.45	40.40	7.37	6.02	22.15	16.24
Mustard Cake	92.04	95.71	38.33	7.36	5.48	25.05	23.30
TMR	32.40	90.25	12.41	3.17	9.82	61.28	38.16

Table 4. Mean values of different parameters

Mean values of parameters in different feeding intervals in different seasons												
Parameters	Winter season				Summer season				Rainy season			
	T 1	T 2	T 3	Results	T 1	T 2	T 3	Results	T 1	T 2	T 3	Results
Dry matter intake (Kg.)	11.57	12.20	12.64	S	11.36	11.71	12.33	S	11.51	11.55	12.28	S
CP Digestibility (%)	58.59	55.27	47.83	S	58.32	55.05	47.61	S	58.32	55.19	47.34	S

Effect of feeding interval on DMI and CP digestibility (%) in cows in winter season: The highest mean of dry matter intake was observed in cows of T₃ feeding interval (12.64 Kg.) followed by the cows in T₂ feeding interval (12.20 kg.) and T₁ feeding interval (11.57 Kg). The differences between the treatments were found significant indicating thereby a significant effect of feeding intervals on dry matter intake in cows in winter season. The highest mean of CP digestibility (%) was observed in cows of T₁ feeding interval (58.59 %) followed by the cows in T₂ feeding interval (55.27 %) and T₃ feeding interval (47.83 %). The differences between the treatments were found significant indicating thereby a significant effect of feeding intervals on CP digestibility in cows in winter season.

Effect of feeding interval on DMI and CP digestibility (%) in cows in summer season: The highest mean of dry matter intake was observed in cows of T₃ feeding interval (12.33 Kg.) followed by the cows in T₂ feeding interval (11.71 kg.) and T₁ feeding interval (11.36 Kg). The differences between the treatments were found significant indicating thereby a significant effect of feeding intervals on dry matter intake in cows in summer season. The highest mean of CP digestibility (%) was observed in cows of T₁ feeding interval (58.32 %) followed by the cows in T₂ feeding interval (55.05 %) and T₃ feeding interval (47.61 %). The differences between the treatments were found significant indicating thereby a significant effect of feeding intervals on CP digestibility in cows in summer season.

Effect of feeding interval on DMI and CP digestibility (%) in cows in rainy season: The highest mean of dry matter intake was observed in cows of T₃ feeding interval (12.28 Kg.) followed by the cows in T₂ feeding interval (11.55 kg.) and T₁ feeding interval (11.51 Kg). The differences between the treatments were found significant indicating thereby a significant effect of feeding intervals on dry matter intake in cows in rainy season. The highest mean of CP digestibility (%) was observed in cows of T₁ feeding interval (58.32 %) followed by the cows in T₂ feeding interval (55.19 %) and T₃ feeding interval (47.34 %). The differences between the treatments were found significant indicating thereby a significant effect of feeding intervals on CP digestibility in cows in rainy season.

CONCLUSION

On the basis of results, it was concluded that feeding interval has positive effect on DMI and CP digestibility (%) in cross bred cows in all season like winter, summer and rainy. Minimize the cost of animal feeds and to prevent wastage of animal feeds, farmers or milk producers can be advised for increased the feeding interval. Farmers or milk producers can be advised for increased the feeding interval. Increased the feeding interval for cows has an important role play to make a dairy business profitable.

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