



Effect of bypass fat supplementation during early lactation on milk composition of cross bred dairy cows of Kerala

Chithrma Seethal C. R¹., Jasmine Rani K²., and Banakar P.S.³

^{1,3}MVSc scholar, ²Assistant professor

Department of Animal Nutrition, College of Veterinary and Animal Sciences,
Mannuthy, Thrissur, Kerala, India.

Abstract

India is the highest milk producer in the world, contributing about 17% of the world production. The annual growth rate in this sector is 4% which is nearly three times that of world. As the agricultural lands are far decreasing and the human population is far increasing, our aim to improve milk output should be by way of improving productivity of animals rather than increasing the heads of bovine population. The pricing of milk throughout India is based on the fat and SNF content. During early lactation there will be a drop in both of these parameters as the production is increasing. In a state like Kerala where there is scarcity of roughage, alternative sources to address the low milk fat syndrome during early lactation are the need of the day. A study was conducted to evaluate the effect of bypass fat supplementation on milk constituents in crossbred cows in early lactation. 18 early lactating crossbred cows were selected and divided into 3 groups of 6 each. Animals in group T2 and T3 were supplemented with 200 gm. and 400 gm. bypass fat respectively for 45 days. The milk fat and total solid per cent in animals supplemented with 400 g of bypass fat (T3) was higher than T2 and T1 at the end of the experiment, but the milk protein per cent was lower in both supplemented group compared to T1.

Keywords: *early lactation, milk fat, milk protein, bypass fat, energy*

I. INTRODUCTION

Energy is one of the most important nutritional factor that limit production in dairy cattle. During early lactation cows are unable to consume enough energy from the feed to meet their energy demand for lactation, results negative energy balance. Addition of concentrates at higher level in ration of high producing dairy animals as a strategy for enhancing energy density of ration decreases fibre digestibility and leads to acidosis. Although, dietary fat has great potential to enhance energy density of the ration, there are various factors which limit its use in large amounts in ration. The extent of hydrolysis of these dietary FFA in rumen is very high, which causes reduction of fibre digestibility. Role of bypass fat in the rations of high producing dairy animals is very crucial for enhancing energy density of ration. Dietary fat, that resists lipolysis and biohydrogenation in rumen by rumen microorganisms, but gets digested in lower digestive tract, is known as by pass fat or rumen protected fat. But supplementation of bypass fat during early lactation may alter the composition of milk like fat, protein and solid not fat content (SNF). Hence this study was conducted to assess the effect of energy supplementation in the form of bypass fat on milk composition in the early lactating cross bred dairy cattle.

II. MATERIALS AND METHODS

Eighteen healthy crossbred cows within 10 to 15 days of lactation were selected from the University Livestock Farm, Mannuthy. They were divided into three groups of six each, as uniformly as possible with regard to age, parity, previous lactation yield and body weight are allotted randomly to experimental rations. All the experimental animals were fed concentrate mixture containing 65 per cent of total digestible nutrient (TDN) and 17 per cent crude protein. All the experimental animals were fed as per ICAR (1998)[1] standards for a period of 45 days. The animals in the second (T2) and third (T3)

group were supplemented daily with 200 and 400 gm of bypass fat respectively. The quantity of feed given was revised fortnightly according to milk production. The animals were fed twice daily before milking. Milk samples were collected fortnightly from each animal and analysed for total solids (TS), protein [2] and fat [3]. The data were analyzed using analysis of variance technique [4] and are presented.

III. RESULTS

Table 1. Chemical composition of feed and green grass fed to experimental animals, % on DM basis

Parameter	Concentrate mixture	Fodder
Dry matter	92.5	17.08
Crude protein	16.8	8.68
Crude fibre	7.14	34.69
Ether extract	2.19	3.05
Total ash	9.65	10.75
Nitrogen free extract	63.81	42.83
Acid insoluble ash	1.08	1.85

Table 2. Milk fat, protein and total solid per cent of animals maintained on three experimental rations at the end of experiment

Parameter	T1	T2	T3	P value
Milk fat	3.42±.48 ^a	3.94±.51 ^a	4.96±.53 ^b	.033
Milk protein	2.48±.20 ^b	1.82±.18 ^a	1.76±.17 ^a	.004
Total solids	10.99±1.03 ^a	11.14±1.09 ^a	12.68±1.10 ^b	.004

*mean of six animals . mean values bearing different superscripts within a row differ significantly(P ≤ 0.05)

The per cent chemical composition of the concentrate mixtures and fodder fed to the experimental animals are presented in the Table 1. The CP content of the concentrate mixture was 16.8 per cent while that of fodder used for feeding was 8.68 per cent on dry matter basis. The total solids, fat, and protein of the milk collected fortnightly from experimental animals are given in Table 2. The average milk composition was 3.42, 3.94 and 4.96 per cent of fat; 2.48, 1.82 and 1.76 per cent of protein and 10.99, 11.14 and 12.68 per cent of total solids for animals of group T1, T2 and T3 respectively.

From the table 2, it can be concluded that the milk fat and total solid per cent in animals supplemented with 400 g of bypass fat(T3) was higher than T2 and T1 at the end of the experiment, but the milk protein per cent was lower in both supplemented group compared to T1. During early lactation, 400g bypass fat supplementation improved the milk fat and total solids in crossbred dairy cows.

IV. DISCUSSION

The average fat per cent in the milk from animals of group T1, T2 and T3 were 3.42, 3.94 and 4.96 per cent respectively. The increase in milk fat content in supplemented group cows was due to availability of more fatty acid (SFA and USFA) to the mammary gland and their incorporation into milk

fat [5]. Comparable values of 4.32 per cent and 4.06 were reported by [6] and [7] respectively in the cross bred dairy cattle in early lactation. In agreement to the present result, [8], [9], [10] and [11] observed an increase in the milk fat per cent in cows fed with protected fat. However [12] reported a decrease in milk fat content and yield when lactating cows were fed diet supplemented with tallow at 3.1 per cent.

The average total solids (TS) in the milk from the animals of the group T1, T2 and T3 were 10.99, 11.14 and 12.68 per cent, respectively. The observed values of TS are comparable with the values of 12.56 and 12.9 per cent as reported by [6] and [13] respectively in lactating crossbred cows of University Livestock farm.

The average protein content of the milk from the animals of the group T1, T2 and T3 were 2.48, 1.82 and 1.76 per cent, respectively. Similar to this result [14] reported a decrease in milk protein when early lactating cows were fed with supplemental fat at the level of 2.8 per cent in the diet. But bibliography [15] observed an increase in the milk protein percentage with the corn supplementation in cows fed alfalfa legume as sole roughages.

From the overall evaluation of results obtained during the course of the investigation it could be concluded that the dietary supplementation of bypass fat in early lactation altered milk composition significantly. Supplementation of 400 g bypass fat improved milk fat and total solid percent during early lactation where as milk protein percent was lower in both supplemented group.

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