

Effect of Replacing Cotton Seed Cake with Sunflower Meal in the Ration of Lactating Crossbred Cows

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ABSTRACT

The present trial was conducted to study the substitution of cotton seed cake with sunflower meal in the ration of lactating Friesian x Sahiwal cross bred cows (n = 30). In this trial, 3 rations were prepared. Ration A contained cotton seed cake, ration B had both cotton seed cake and sunflower meal, while ration C contained sunflower meal as a major source of protein in the ration. Feeding was continued for a period of 90 days. There was no significant difference in milk production with different rations. Sunflower meal had slightly positive effect on solids not fat and total solids in milk. The cost of milk production for sunflower meal based ration was 26.7% less than that of cotton seed cake based ration.

Key Words: Sunflower meal, cotton seed cake, milk composition

INTRODUCTION

Sunflower meal is a by-product of edible oil industry. It is a rich source of vegetable protein and other nutrients with crude protein: 30.51, ether extract :0.41, crude fiber :18.51 and ash :10.20 % (Jabbar, 1998). Due to its higher fiber contents, its use in poultry ration is limited but there is no such limitation for use of sunflower meal in ruminants feeding. Traditionally, farmers have been using the cotton seed cake or rape seed cake as a source of vegetable protein in livestock feeding. Due to its limited supply the cost of cotton seed cake has gone high. There is a need for replacing cotton seed cake with some other protein sources. In the current study the possibility of replacing cotton seed cake with sunflower meal, partially or fully, has been studied.

MATERIALS AND METHODS

Thirty lactating crossbred cows (Friesian x Sahiwal) were used in this study. These

animals were in their 2nd and 3rd lactation with similar stage of lactation and milk production. These animals were randomly divided into 3 groups and offered three different rations (A, B and C). The ration A contained cotton seed cake, ration B had both cotton seed cake and sunflower meal while ration C contained sunflower meal as a major source of protein in the ration. All the three rations were iso-nitrogenous with 18-19% protein and 70-72% total digestible nutrients (TDN) (Table 1).

Rations were offered to the animals at the time of milking in the morning and evening. One kg of each concentrate ration was given for every 2 kg of milk produced. Slightly higher concentrate allowance was given to compensate the poor quality of summer fodder. About 60 kg of seasonal green fodder was offered per animal and quantities were estimated at fortnightly interval. Monthly live weights of the animals were recorded. Data on daily feed intake and weekly milk production were collected. Milk samples were collected at weekly interval for the

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analysis of fat, solids not fat and total solid contents. The trial continued for three months.

Statistical Analysis

Completely Randomized Design was used to compare the means at $p < 0.05$ (Steel and Torrie, 1982).

RESULTS AND DISCUSSION

Body Weight

The initial body weights were similar ($p > 0.05$) for group A (365.0 ± 52.0), B (350.0 ± 64.0) and C (355.5 ± 58.8) kg respectively. These weights increased to 394.5 ± 56.0 , 375.0 ± 71.7 and 367.0 ± 65.9 kg with a mean gain of 29.5, 25.0, and 11.5 kg for respective groups and the difference was significant ($p < 0.05$). Data showed that all the three groups were on positive body weight gain and none of group lost weight. These results are in agreement with the findings of Kumar et al. (1999) and Bargof et al. (2001) who reported that by the addition of sunflower meal animals were on positive nitrogen balance and they did not lose their body weight.

Milk Production and Milk Composition

The daily milk production in the crossbred cattle was 9.59 ± 0.89 , 9.71 ± 1.10 and 9.15 ± 0.95 liters for group A, B and C, respectively. Statistically the difference was non significant ($p > 0.05$). This indicates that partial or complete replacement of cotton seed cake with sunflower meal did not effect on milk production in lactating animals.

These results are in agreement with the findings of Kannan et al. (2000) and Sharma et al. (2003) who reported that average feed intake and milk production in control and sunflower meal fed group were similar. Lardy and Anderson (2002) reported that sunflower was especially useful in diets

where additional protein is required with low quality forage.

Table 1 Composition of experimental rations

Ingredients	Rations (%)		
	A	B	C
Cotton seed cake	48.0	25.0	-
Sunflower meal	-	18.0	39.5
Wheat bran	3.5	6.0	20.0
Rape seed cake	11.0	8.0	3.0
Molasses	18.0	15.0	15.0
Maize grain	17.0	25.5	20.0
Mineral mixture	2.5	2.5	2.5
Analyzed composition			
Dry matter	90.5	89.9	89.4
Crude Protein	18.2	18.6	19.0
Total digestible nutrients	69.9	71.7	72.3

The average fat and solids not fat contents were 4.46 ± 0.35 , 4.48 ± 0.42 and 4.47 ± 0.38 ; 8.30 ± 1.4 , 8.28 ± 1.60 and 8.34 ± 0.98 , while total solid contents were 12.73 ± 0.95 , 12.76 ± 0.76 and 12.88 ± 0.83 percent for group A, B and C, respectively. In general addition of sunflower meal had slightly positive effect on milk composition. This increased the market value of milk. However, statistically, the difference among groups for all these parameters was non-significant. Sharma et al. (2003), reported that composition of milk did not differ with the use of sunflower meal, in the ration. Similarly Vincent et al. (1990) found no difference in the milk production or composition when feed was supplemented with rapeseed meal, sunflower or soybean meal in dairy cows.

Economics of Milk Production

The cost of concentrate ration was Rs. 6.2, 5.5 and 4. 2/kg for ration A, B and C, respectively. Excluding the cost of fodder which was offered equally to all the three groups the cost of ration per liter of milk was Rs. 9.24, 8.28 and 6.78, respectively. The cost was lowest with sunflower based ration.

Based on these findings it is suggested that use of sunflower meal for milk production is economical. The cost of milk production for sunflower meal based ration was 26.7% less than the cost of cotton seed cake based ration. These results agree with the findings of Sharma et al. (2003) and Mlay et al. (2005) who reported that sunflower meal can be effectively used as a cheaper source of vegetable protein for replacing costly oil seed cakes.

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