# EFFECT OF FEEDING BYPASS FAT ON FEED INTAKE, MILK PRODUCTION AND BODY CONDITION OF HOLSTEIN FRIESIAN COWS

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*(Received on October 10, 1997)*

## ABSTRACT

**Bypass fat, produced from rapeseed acid oil (a by-product of oil refining process having 80 per cent degree of saponification), was incorporated in the ration of Holstein Friesian (HF) cows @500g/head/d for a period of six months. Feeding bypass fat significantly (P<0.05) improved milk yield 1 and 4% fat corrected milk (FCM) without affecting total DM intake. The initial body condition score of 1.0 of the experimental cows was changed to 0.5 in control and 1.5 in experimental cows at the end of trial period, indicating that cows in control group lost more body weight. Average period for conception after calving was 92 d in experimental cows compared to 118 d in control.**

**Key words:** Bypass fat, Milk production, Body condition score, Cows.

Energy density in the ration of lactating animals is low in developing countries, and hence is not able to meet the energy requirements after calving, as DM intake during this period (8-10 weeks) is low[1]. This leads to substantial loss in body weight which adversely affects production and reproduction in dairy animals. Energy density of ration can be increased by incorporating bypass fat in ration of lactating animals[2]. Bypass fat is inert in the rumen and a good source of fatty acids for meeting energy needs of animals and fatty acids requirements for milk synthesis. Bypass fat was produced from vegetable acid oil, a byproduct of oil refining process and available at approx. one third the price of edible oils. This paper reports the effect of feeding bypass fat to lactating HF cows from the early stage of lactation upto six months, on their feed intake, milk yield and body condition score.

## MATERIALS AND METHODS

Rapeseed acid oil was used for production of bypass fat, which had 95 per cent fatty matter. Bypass fat (600 kg) was produced by precipitation method[3].

Twelve pure multiparous HF cows, 7-12 d after calving, with average body weights in the range of 510 to 540 kg were divided into two equal groups, based on 4 percent FCM (15.3kg). All the cows were fed similar ration to meet their requirements[1]. Cows in experimental group were fed 500 g bypass fat daily in the morning, alongwith the cattle feed. Animals in both the groups were offered same quantity of green jowar or maize or oats or cowpea fodder and had

free access to urea molasses mineral block licks during a particular month. Ration was divided into two equal parts and fed during morning (9:00 AM) and evening (6:00 PM). Cattle feed with the brand name 'Amuldan' (CP 26 per cent; ME 11.0 MJ/kg) was fed at the time of milking, while hay was fed after milking. Animals had free access to clean drinking water. Daily milk yield and feed intake was recorded for 180 d. Fat in milk was estimated once a week, using milko tester, manufactured by Rajasthan Electronics instrumentation Ltd., Jaipur.

Feeds and fodder offered to animals were analysed[4]. Fat content in bypass fat was estimated by hydrolysing the bypass fat with hydrochloric acid and extracting it with petroleum ether[5]. Body condition score of cows was recorded before and after the completion of trial. Date were analysed statistically[6].

## RESULTS AND DISCUSSION

Chemical composition of feeds and fodder offered to animals in both the groups is shown in Table 1. Cattle feed contained 3.0 per cent fat while other feed ingredients contained 2.5 per cent fat on an average. It is reported[5] that upto 50 per cent of ether extract from forages may be non-fatty matter. This showed that total dietary fat was approximately 2 per cent. However, 3 to 5 per cent total fat in the ration was reported to enhance milk production[7]. In view of this, additional 500 g bypass fat (approx. 425 g fatty matter) was supplemented in the ration of experimental group.

**Table 1 Chemical composition of feeds and fodder (%DM)**

| Feed/fodder | CP | EE | CF | TA | AIA | Calcium |
|---|---|---|---|---|---|---|
| Green jowar | 9.0 | 2.6 | 26.0 | 16.6 | 2.4 | - |
| Green maize | 8.8 | 2.8 | 28.0 | 15.8 | 1.8 | - |
| Green oat | 10.5 | 2.2 | 26.0 | 12.4 | 1.9 | - |
| Green cowpea | 16.6 | 2.3 | 26.0 | 11.8 | 2.4 | 2.6 |
| Jowar hay | 8.0 | 2.2 | 32.0 | 15.5 | 2.6 | - |
| Cattle feed | 28.0 | 3.0 | 8.0 | 8.5 | 3.0 | 1.0 |
| Urea molasses block | 32.0 | 1.9 | 4.6 | 21.6 | 1.5 | 6.5 |
| Bypass fat | - | 85.0 | - | 15.0 | - | 8.0 |

Feed intake data (Table 2) indicate that total DM intake in both the groups was non-significantly different. Bypass fat or rumen inert fat did not affect DM intake, as also reported by other workers[8,9].

Effect of bypass fat feeding on milk yield (4% FCM) is shown in Table 3, and depicted graphically in Figure 1. Bypass fat feeding had maximum effect on milk yield during first quarter of lactation, when feed intake is usually low. Although, increase in milk yield in experimental cows was significantly ($P<0.05$) higher during the period of feeding bypass fat, but the effect was less prominent as lactation advanced. (Fig.1), probably due to DM intake start increasing after 6 to 8 weeks of calving. Increase in milk yield and/or fat on feeding bypass fat has been reproted by other workers as well[10,11].

**Table 2 Feed intake and body condition score in control and experimental cows**

| Particular | Control | Experimental |
|---|---|---|
| Body weight (kg) | 533.80±5.73 | 532.83±4.58 |
| DMI (kg) through green fodder | 6.60±0.09 | 7.04±0.13 |
| Jowar hay | 1.80 | 1.80 |
| Cattle feed | 6.30 | 6.30 |
| Urea molasses block | 0.45±0.06 | 0.48±0.08 |
| Bypass fat | - | 0.48 |
| Total DM intake (kg/d) | 15.15±0.08 | 16.10±0.12 |
| **Body Condition Score** | | |
| Initial | 1.0 | 1.0 |
| Post trial | 0.5 | 1.5 |
| Average period for conception after calving (d) | 118 | 92 |

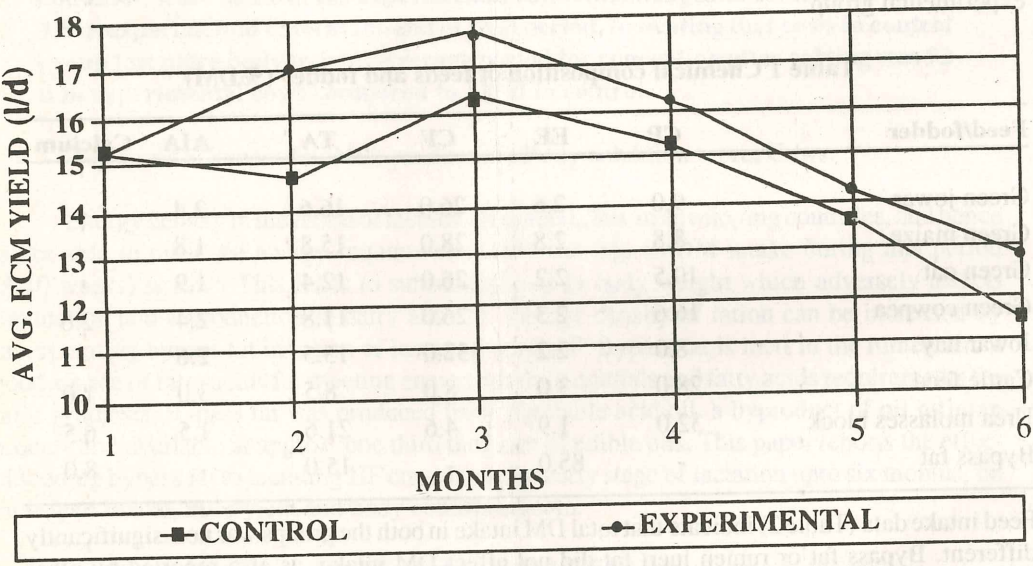


**Fig. 1 Effect of feeding bypass fat on monthly milk production in HF cows**

Body condition scores were determined for all the cows initially and after the experimental period. Cows in control and experimental groups had body condition scores of 1.0, which was 0.5 in control and 1.5 in experimental cows on completion of trial. In control group, area on either side of the tail head further sunkened and became hollow. Ribs of the cows in control group were distinctly visible at the end of trial. However, body condition score of experimental cows improved due to bypass fat feeding. Cows gained flesh on either side of the tail head and backbone did not stand out as individual vertebrae. This indicated that bypass fat feeding reduced weight loss in the first quarter and helped gaining substantially after 90 days

of feeding. Improvement in body condition score on feeding bypass has been reported[12]. Similarly, average days for conception postcalving in control group was more compared to experimental group. Obviously, the cows in control lost more weight and were in negative energy balance which might have affected their cyclicity. Effect of bypass fat on improvement of conception rate is reported by other group of workers[13].

The present study indicates that the feeding of bypass fat, produced with precipitation method from repeseed acid oil, helped improving milk production, body condition score and conception rate, without affecting total DM intake.

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