

Director's Digest



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Higher Fat Rations Pay Off in Dairy Cows

The beneficial effect of fat has stimulated considerable interest in utilizing this high energy ingredient in dairy rations. Professor D. L. Palmquist recently published results of research supported by the Fats and Proteins Research Foundation which demonstrated that as much as 7 to 8% fat may be included in lactation total diets to provide additional energy for high producing cows. The added fat may also replace grain in order to permit increased roughage intake and thus prevent milk fat depression.

Previously, the use of higher fat levels had been questioned because some research reports indicated that ruminants could not utilize large amounts of fat. However, digestion trials by Professor Palmquist at the Ohio Agricultural Research and Development Center elicited no detrimental effects attributable to added fat on acid detergent fiber, cellulose or calcium digestibilities. Through genetic selection dairymen have made great progress in improving the production potential of their dairy herds. Scientists recognize that high milk production requires large amounts of feed energy to meet the enormous energy demands in order to fully utilize this genetic potential. Because the dairy cow has limited capacity, the amount of roughage consumed to maintain normal rumen function is greatly reduced when large quantities of grain are consumed.

It is not uncommon to feed more than 20 pounds of grain ration per day to high producing cows. In addition, corn silage contains approximately 50% grain which increases significantly the total grain intake. As a result, many lactating cows are being fed rations containing 50 to 70% carbohydrate to maintain maximum milk production. Research studies have shown that when the grain content of the ration exceeds 50% of the dry matter, the total digestibility of the ration declines and the possibility of several metabolic disorders increases. One of the first problems that develops due to excessive grain feeding is a marked reduction in milk butterfat. Dairy cows fed high grain rations frequently gain excessive body weight and are prone to have rumen acidosis and other digestive disturbances as well as liver and kidney disorders. In addition, the total dry matter digestibility decreases, thus reducing the effective value of the ration.

In one study, rations containing 2.9 to 10.8% fat were fed to lactating Holstein and Jersey cows. In this experiment milk production, fat and protein were not significantly different when high levels of fat were fed to Holstein cows. Jerseys were observed to produce the most fat-corrected milk per unit of body weight on the 10.8% fat diet.

In another study Professor Palmquist fed 12 Holstein cows four rations in a switchback design. Two levels of protein as well as two levels of fat were fed to test whether high fat feeding increased protein requirements. The results of this test are summarized in Table 1:

TABLE 1 - Feed Intake and Production of 12 Holstein Cows Fed Isocaloric High Grain and High Fat Rations

	Rations *			
	1	2	3	4
Ration Fat, % of dry matter	3.7	3.5	7.3	6.8
Ration crude protein, % of dry matter	14.3	16.8	14.0	16.5
Milk Fat, %	2.7	2.7	3.4	3.4
4% FCM, lb./day	52.1	53.1	57.9	61.0
Body weight gain lb./day	2.6	3.3	1.6	0.7

* Rations 1 and 2 contained no added fat and 7% bran. Rations 3 and 4 contained 10% added HEF. 20% wheat bran was included to improve pelleting characteristics of the high fat rations.

No differences were observed in feed intake or actual milk production but milk fat percentage, fat production and the 4% FCM (fat corrected milk) were significantly higher. Body weight gain was significantly lower with the high fat diets. A slight milk production advantage was noted for the higher protein rations.

The results of these studies show convincingly that up to 10% fat can be included in the grain mix so that 7 to 8% fat is contained in the total ration when grain is fed as one third of the total dry matter. It was observed that the replacement of cereal grains by fat maintained a high energy intake for the high-producing cows without depression of milk fat.

These feeding trials indicate an important role for feeding fat in high-producing cows requiring large quantities (more than 20 pounds per day) of high energy concentrate to maintain maximum milk production.

From the results of feeding high fat rations to lactating cows it may be concluded that:

1. 7 to 8% fat in the total ration does not reduce ration digestibility.
2. High-producing cows may respond to additional energy by producing more milk.
3. Fat can be substituted for cereal grains (starch) to maintain milk fat percent and prevent excessive body weight gain.

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