Feeding and Management Programs Impact Milk Composition of Dairy Herds

COOPERATIVE EXTENSION SERVICE

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Dairy farmers are paid not only for the amount of milk their cows produce, but also for the components found in that milk. In the upper Midwest and other parts of the US, dairy producers are paid based on fat and protein yields known as cheese yield. In the Southeast, a majority of the milk produced is used for fluid milk consumption. As such, dairy farmers are paid for milk production and butterfat content. Thus, any decreases in butterfat content will negatively impact one's milk check. This article looks at the factors which impact the butterfat or milk fat content of milk.

Milk is composed of approximately 87% water, 5% lactose or milk sugar, 3 to 4% milk protein and 3 to 5% milk fat. Milk lactose concentration does not vary and is known to determine the overall amount of milk produced. Milk protein concentration does vary some but not as widely as milk fat concentration. The question then becomes: what factors impact the concentration of milk fat from dairy cows? These factors can be loosely divided into genetic, environmental, and nutritional factors.

Genetic factors:

1. First, breed of dairy cows does impact milk fat percentage. Jersey cows produce milk of higher butterfat content than Holsteins.
2. Secondly, genetics of cows within a breed impacts the milk fat percentage. Milk fat percentage is moderately to highly heritable. Thus, relatively quick progress can be made if selecting sires for higher or lower milk fat percentage.
3. Although not a genetic factor per se, higher producing cows generally have a lower milk fat percentage.

Environmental Factors: Heat stress does tend to decrease milk fat content. Often times, this is related to a decrease in feed intake and especially when intake of the forage component of the diet is reduced.

Nutritional Factors: Feeding programs and the management of these feeding programs can directly impact milk fat percentage. Dairy cows are ruminants and their digestion processes are set up to turn forages into nutrients the cow's mammary gland can use to produce milk and milk fat. Maintaining the pH in the rumen is important for the bacteria to produce the nutrients in the correct amounts needed by the mammary gland. Also, we now know that a lower rumen pH can result in the production of rumen products that have a detrimental effect on milk fat synthesis at the level of the mammary gland cells. Thus, maintaining the appropriate pH in the rumen is very important.

Dairy cows need to be fed diets that contain adequate amounts of forage and that forage must contain enough long particles to stimulate the cow to chew her cud to maintain rumen pH. Cud chewing stimulates the secretion of saliva which buffers the contents of the rumen. When cows are resting we expect to see at least 60% of them chewing their cuds. We do not want to include too finely chopped forages in a cow's diet. Usually we make the recommendation that the diet should contain 10 to 15% of forage particles which are the width of a cow's muzzle. Mixing a TMR too long also can result in pulverized forages, especially in vertical mixers. Inclusion of forages in TMR's that are of poor palatability or those not properly processed by the mixer can also lead to sorting by cows and result in reduced consumption of forages (especially fiber that stimulates cud chewing). We also know that feeding excessive amounts of dietary fats and certain types of fat can result in depressed milk fat test. Cows fed a large percentage of their diets from fresh, grazed forages also may have a reduced milk fat percentage.

Milk fat depression can be a result of genetic, environmental, or nutritional factors. Evaluating each of these areas is necessary to correct the milk fat depression to improve profitability in dairy herds.