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Consider Dietary Changes to Take Advantage of Changes in Milk Component Prices

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In Ohio milk markets, milk is priced mostly on its fat and protein contents. In most of 2019, a pound of milk fat was worth about $2.50 in Federal Order 33, but monthly protein price ranged from $1.18 to 3.91/lb (Figure 1). Although yield of milk fat is more responsive to diet changes, nutrition can also influence milk protein yield. Unfortunately, nutritional modifications that increase milk protein yield, often decrease fat yield and vice versa. Producers should consider altering diets to take advantage of changes in the relative value of milk fat to milk protein. So far in 2020, (January through April), the value of protein averaged $1.00/lb more than a pound of fat.

The main dietary factors that are related to increased milk protein yield are:

1. Increasing dietary starch concentrations (but not so much as to cause acidosis)
2. Increasing dietary inclusion of fermentable starch, such as high moisture corn or wheat grain
3. Increasing concentrations of high quality undegradable protein
4. Improving amino acid profile by feeding specific protein sources or by feeding rumen protected amino acids, especially methionine
5. Reducing the concentration of dietary fat (fat supplements, distiller grains, whole cottonseed or whole soybeans)

The main factors related to increased milk fat yields are:

1. Reducing dietary starch concentrations
2. Reducing dietary inclusion of fermentable starch sources
3. Increasing inclusion rate of specific supplemental fat (e.g., sources of palmitic acid)
4. Increasing dietary cation anion difference (i.e., feed more potassium and sodium without increasing dietary chloride or sulfur)
5. Reducing dietary sulfur concentrations to just meet requirements (practically this usually means reducing inclusion rate of distiller grains which are usually high in sulfur)

If the price of milk protein is high relative to milk fat, replace some byproduct fiber (e.g., soyhulls, or corn gluten feed) with corn grain. This will increase starch concentration and usually increase protein yield. Avoid excess starch because it can cause acidosis, severe milk fat depression, lameness, and other health problems. Because numerous factors affect the maximum safe starch concentration, specific guidelines cannot be given, but generally more than 28 to 30% starch is risky, especially with feeding high moisture corn. On average, assuming the diet has adequate forage and fiber (i.e., does not cause ruminal acidosis), increasing starch concentration about 5 percentage units and reducing neutral detergent fiber (NDF) by the same amount is expected to increase the daily yield of milk protein of an average Holstein cow by about 0.075 lb, but reduce milk fat by 0.06 lb. Feed costs would likely not change greatly and if milk protein is more valuable, income over feed costs should increase. Using the average fat and protein prices for January through April, this simple change could potentially increase daily income by 10¢ per cow if no additional feed costs were incurred.

Feeding a proven source of rumen-protected methionine (RP-met) usually increases milk protein yield. The response varies depending on diet, but on average, feeding 20 g/day of methionine from RP-met is expected to increase milk protein yield by about 0.06 lb/day which is worth about $0.17/cow. The cost of the RP-met product needs to be deducted from that return to determine whether it is a profitable decision. Feed intake is not expected to change so only the cost of the product needs to be considered. Feeding high quality undegradable protein with a good amino acid profile also often increases milk protein yield but will increase diet costs. Make sure the increase in milk protein more than pays for the increase in feed costs. If milk protein is valuable, feeding inadequate metabolizable protein or a diet with improper amino acid profile can be costly, especially for fresh cows because of long term carry over effects.

Several different sources of supplemental fat are available, and they can affect milk component yields differently. However, in general, supplemental fat usually increases milk fat yield but decreases milk protein percentage and are either neutral or negative with respect to milk protein yield. In today's economic environment, fat supplementation needs to be evaluated very carefully and potential negative effects on milk protein must be included in the evaluation.

Buffers such as potassium carbonate and sodium bicarbonate usually increase milk fat and are neutral on milk protein. If diets are adequate in forage and fiber, the response to buffers becomes less and in combination with low milk fat prices, buffer inclusion may not be economically viable.

Bottom Line:

Producers do not have much control over average milk price; however, by targeting nutrition to produce either milk protein or milk fat, producers can affect the milk price they receive. Milk composition can change rapidly in response to diet manipulation which will allow producers to capture value based on changes in the market value of milk protein and milk fat.

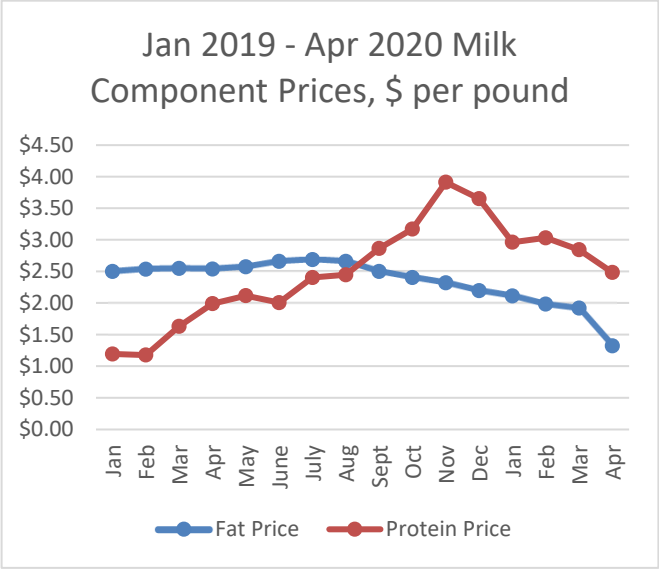

Figure 1. Data Source: USDA Agricultural Marketing Service, Federal Order 33.

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