



NEWSLETTER

Milk Components Are Not Determined by Genetics Alone

In modern dairy farming, success is no longer measured solely by kilograms of milk produced, but also by the kilograms of milk protein and milk fat, two key parameters that largely determine milk quality and economic value.

While genetics undoubtedly plays a major role, milk components are influenced just as much—if not more—by **rumen function**. If the rumen is not healthy and stable, the animal's genetic potential cannot be fully expressed. Conversely, a rumen characterized by a stable and relatively high pH, consistent fermentation patterns, and an active microbial population supports higher milk yields, improved fat and protein content, and greater production consistency over time.

Milk fat synthesis is closely linked to ruminal fermentation, particularly to the production of **acetate**, one of the main volatile fatty acids generated through fibre digestion. When ruminal pH falls below approximately **5.8**, fibre fermentation becomes impaired because cellulolytic bacteria are highly sensitive to acidic conditions and struggle to survive at lower pH levels. As a result, acetate production declines, leading to a reduction in milk fat concentration—a phenomenon commonly referred to as **Milk Fat Depression (MFD)**.

Molasses can play an important role in preventing this issue through two complementary mechanisms:

- By improving ration homogeneity, it reduces feed sorting and encourages greater fibre intake.
- By supplying rapidly fermentable sugars, it provides readily available energy for rumen microorganisms and contributes to greater ruminal fermentation stability over time.

Together, these effects promote the optimal environment and substrate availability required by cellulolytic bacteria. Enhanced fibre digestion leads to increased acetate production, which in turn supports higher milk fat synthesis.

Milk protein concentration, on the other hand, is strongly influenced by the amount of **microbial protein** synthesized within the rumen. Microbial protein can supply nearly 50% of the cow's **metabolizable protein requirements**, making it one of the most important contributors to productive performance.

During ruminal fermentation, dietary protein and non-protein nitrogen sources release nitrogen that rumen microbes can capture and incorporate into microbial protein. However, this process requires an adequate supply of fermentable energy. When sufficient energy is not available, a portion of the nitrogen is lost as ammonia, resulting in reduced microbial protein synthesis and increased milk urea levels.

For this reason, supplying readily fermentable carbohydrates—particularly sugars—is one of the most effective nutritional strategies for maximizing microbial protein production efficiency. By improving the synchronization between ruminal nitrogen and energy availability, sugars enhance microbial growth and ultimately contribute to greater milk protein synthesis.

To achieve these benefits, the recommended dietary sugar concentration is generally **6–8% of total dry matter**.

Ultimately, producing high-quality milk is not simply a matter of superior genetics. The real key lies in maintaining a **highly efficient and well-functioning rumen**. When optimal rumen health is combined with outstanding genetic potential, dairy cows can fully express their productive capacity, resulting in higher milk solids, improved feed efficiency, and greater overall value of the milk produced.