



# Dairy Technical Bulletin

## Top Reasons Why LFI Liquid Supplements are Different from Corn Starch

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**Reason 1:** Cows are naturally adapted to high sugar but not high starch diets. High starch diets (> 27%) and/or high starch fermentability depress ruminal fiber digestion but high sugar diets (6.5 – 8.5%) do not. Pasture grass, grass hay, and alfalfa hay are all high in sugar. Currently, dairy cows are fed large amounts of starchy grains, which can cause acidosis and other health issues. LFI liquid supplements help to facilitate higher sugar diets, which will reduce the risk of acidosis compared with high starch diets.

**Reason 2:** Rations with high starch content and fermentability reduce rumen pH, and may induce subclinical ruminal acidosis, reduce NDF digestibility, and trigger milk fat depression. On the other hand, feeding a high sugar diet using molasses can help maintain a higher rumen pH and has been shown to improve milk fat yield and help correct milk fat depression (Martel et. al.; J. Dairy Sci. 2011. Vol. 94:3995).

**Reason 3:** Feeding a high starch diet will depress ruminal butyrate and acetate production. On the other hand, feeding a higher sugar diet promotes the production of ruminal butyrate and acetate, two key short-chain fatty acids contributing to milk fat synthesis. Feeding a LFI liquid supplement so that the sucrose content of the diet is 5% to 7.5% will increase ruminal butyrate production (Vallimont et. al. 2004. J. Dairy Sci. Vol. 87:4221). This will in turn improve milk fat and protein yield.

**Reason 4:** Recent research found De Novo fatty acid production has a strong positive correlation with the production of milk fat and protein. De Novo fatty acids are the fatty acids synthesized within the mammary gland from butyrate and acetate, which are produced by the rumen fermentation of fiber. When feeding diets containing 7% to 10% total sugar, ruminal butyrate concentration was increased (de Ondarza, Emanuele and Sniffen; The Professional Animal Scientist. 2017 Vol. 33#6 pp 700-707). Butyrate is used as a substrate for De Novo fatty acid and milk component synthesis. On the other hand, starch fermentation produces propionate and reduces rumen pH, which does not facilitate De Novo fatty acid synthesis.

**Reason 5:** LFI sugar products do not contribute to rumen fill, while starchy grains contribute to rumen fill and could trigger satiety. Inclusion of LFI typically helps increase feed intake, every kilogram of intake usually converts to 2 kilograms of milk yield.

**Reason 6:** Molasses-based LFI liquid supplements stick the TMR together and reduce sorting. Sorting causes variations in TMR consumption, rumen pH, manure consistency, and milk components. Many cows develop acidosis and lameness because of sorting. Feeding 1.8 to 2.2 kilograms of a LFI liquid supplement will reduce sorting and promote more consistent rumen fermentation patterns, increase milk components, and decrease vet costs. On the other hand, most cows sort for starchy grains, resulting in harmful effects on health and production.

**Reason 7:** LFI liquid supplements can especially help drive feed intake in pre-fresh and fresh cows due to increased palatability and stickiness of the ration. Excessive starch fermentation may depress intake and cause fat cows. By stimulating the dry matter intake of fresh cows, LFI liquid supplements help to reduce fresh cow health issues and increase start-up milk.

**Reason 8:** LFI liquid supplements can help improve feed digestibility, while corn starch reduces total tract digestibility. In addition, using LFI liquid supplements allows for the feeding of higher forage diets, which are more economical and beneficial to rumen and cow health.

**Reason 9:** LFI liquid supplements have no shrink, while starchy grains have shrink. Shrink accounts for 10 to 15% of feed loss on a commercial dairy. Dairy producers can greatly reduce feed shrink by feeding LFI liquid products. LFI products allow for the delivery of protein, minerals, vitamins and additives through liquid supplements. Once mixed into LFI liquid products, expensive minerals, vitamins and additives can be delivered to each individual cow much more consistently in TMR without shrink.

**Reason 10:** High sugar diets reduce the risks from poor management factors, while high starch diets exacerbate the risks of poor management factors. Dr. Charlie Sniffen recommended different feeding rates of starch and sugar based on different cow management and environment factors. If the stocking density is high and bunk space is limited, you need to feed more sugar and less starch. This is consistent with the concept that poor feeding environment exacerbate ruminal dysfunction and acidosis and replacing some starch with sugar can reduce the harmful risks caused by starch.