

CONSULTANT'S DIGEST

Is Your Fat Masquerading as a Rumen By-Pass Fat?

The advertising says it by-passes the rumen. The sales rep says it, too. It even says so on the bag. But recent research has revealed some intriguing results—some fats are not all they are passed off to be.

For over a decade, researchers have been studying the reactivity of inert fats—fats that by-pass the rumen. By studying the degree of ruminal biohydrogenation, which unsaturated fatty acids such as oleic, linoleic, linolenic, DHA and EPA undergo in the rumen, scientists have discovered that certain types of fats, though called by-pass fats, actually are not rumen inert.

Calcium-Soaps Biohydrogenate in Rumen

Figure 1 shows the results of Wu et al., 1991. In this study, oleic, linoleic, and linolenic acids in Calcium-Soaps were observed to dissociate, react with the rumen fluid and biohydrogenate into primarily stearic acid. As much as 81% of the unsaturated fatty acids were converted into stearic acid or one of many isomers of the individual fatty acid. The extent of biohydrogenation of these unsaturated fatty acids is similar to a commonly used blend of animal and vegetable fat.

Scollan et al. found similar results in 2001. Figure 2 shows the unsaturated fatty acids in fish oil, whole linseed, and Calcium-Soaps of palm oil are highly biohydrogenated in the rumen.

These two studies show the lack of inertness of the fatty acids in these fat sources, and consequently, the inability of these fat sources to by-pass the rumen. This finding is especially concerning since companies marketing Calcium-Soaps of palm oil, soybean oil, or other unsaturated fatty acid sources claim the fats are not active in the rumen. The data clearly demonstrate that Calcium-Soaps offer little protection to unsaturated fatty acids when compared to raw oils and fats or whole oil seeds. Calcium-Soaps contain 45% or more unsaturated fatty acids and that boils down to a great deal of detrimental activity in the rumen.

Fortunately, there is a true by-pass fat available to dairy producers. Energy Booster 100®, with 99% free fatty acids that are over 90% saturated. These saturated fatty acids by-pass the rumen as fed. The Energy Booster 100 fatty acid profile also contains over 80% stearic and palmitic fatty acids, both 100% saturated.

Because Energy Booster 100 has a high level of saturated fatty acids, it does not cause reduction in fiber digestion that can lead to reduced butterfat tests and lower dry matter intake. In several published research trials, Calcium-Soaps of palm oil have been shown to reduce dry matter intake and butterfat tests, as well as milk protein tests. It is becoming more apparent that the degree of

biohydrogenation of the unsaturated fatty acids in Calcium-Soaps of palm oil or other unsaturated fatty acid sources are, to a large extent, responsible for these negative effects.

Biohydrogenation Rates

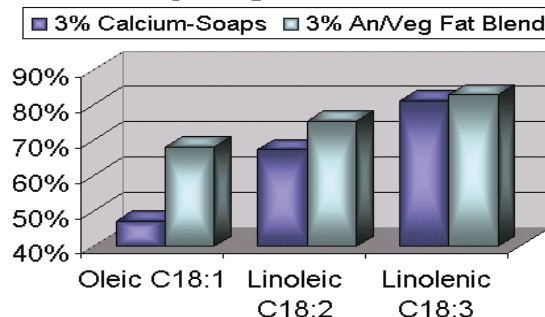


Figure 1
Adapted from Wu and Palmquist, 1991, *Journal of Dairy Science*

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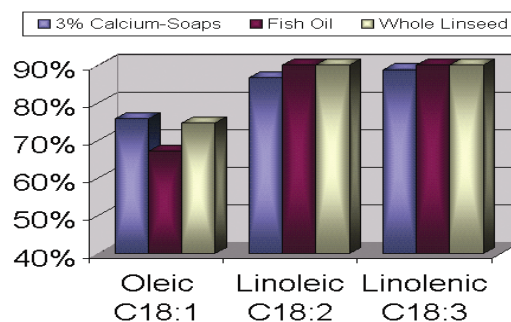


Figure 2
Adapted from Scollan et al., 2001, *Journal of Agricultural Science*

Fat Fast Facts

- Research proves that unsaturated fatty acids in Calcium-Soaps do, in fact, become rumen active.
- Though touted as by-pass fats, Calcium-Soaps of palm oil unsaturated fatty acids do not escape the rumen unscathed, but are up to 81% biohydrogenated into stearic acid or other isomers.
- Energy Booster 100® contains 99% free fatty acids that are over 90% saturated to by-pass the rumen.