

## CONSULTANT'S DIGEST

### Dry Fats...As Different As Holsteins and Herefords

Just as cows have their similarities as well as extensive differences, so do dry fats. That's why it's crucial to sort out the differences when choosing a fat to effectively help high producing cows meet their ever-increasing energy needs for milk production, body condition, and reproductive performance.

#### Fat Performance Depends on Makeup

Fatty acid content and whether the fatty acids are free or linked to other compounds determine the chemical and physical properties of fats. Fats containing a high percent of fatty acids, particularly if they are saturated, long-chain, free fatty acids provide the most energy with the least amount of rumen disturbance.

Adding dry fat boosts ration energy density beyond the bounds of common feedstuffs. As dry fats, they all are more convenient to handle in feeding systems, but that's where the similarity ends. The three major types of dry fats are:

**Partially hydrogenated fats (PHFs)** are animal or vegetable fats that have been hydrogenated to make them solid. Though this process reduces the level of unsaturated fatty acids to make the fat more rumen inert, it also decreases digestibility (40% or less).

**Calcium soaps** provide increased energy and improved digestibility over PHFs, but they contain 45% or more unsaturated fatty acids that upset rumen fermentation, reduce appetite, and depress dry matter intake.

**Pure free fatty acids (FFAs)**, only available as Energy Booster 100, are the latest advancement in dry fats. Fed in the form that the cow is naturally designed to digest, absorb, and use, they are pound for pound more energy dense than any other fat.

	PHFs	Ca-SOAPS	FFAs
Fatty Acid Content (%)	<94.0	82.5	99.0
Total Energy (Mcal/lb of DM)	<4.00	3.50	4.22
Effect on DMI (3 studies*)	-0.5% 0.0% --	-5.0% -3.6% -5.1%	-0.5% 0.0% +1.1%
Digestibility** (%)	37.3	79.5	80.5
NE <sub>L</sub> *** (Mcal/lb as fed)	≤1.26	2.32	2.81

\*Allen, 2000; Chilliard, 1993; Davis, 1993.

\*\*NRC digestibilities adjusted to standardized fatty acid intake of 6% @ 48 lbs. DMI

\*\*\*Net Energy for Lactation (NE<sub>L</sub>) = Total Energy x %Digestibility x 0.80

The most inert in the rumen, Energy Booster 100 does not disturb rumen function because it is digested in the small intestine. Because of the fatty acid profile of Energy Booster 100 and high digestibility, cows maintain intake AND the intake is higher in energy.

#### Dry Fat Selection Factors to Consider

The top four criteria to compare are: 1) total energy content, 2) effect on dry matter intake, 3) digestibility, and 4) cost per unit of energy. These factors determine the most crucial overall measurement: cost-effectiveness.

**Total energy** Because fatty acids contain approximately 2.25 times more energy than carbohydrates or protein, fat supplements containing the highest concentration of fatty acids will contain the most total energy. For example, a triglyceride—three fatty acids bound to glycerol—contains 94% fatty acids and 6% glycerol (carbohydrate), which explains why cereal grains, high oil seeds and animal fats provide less energy than free fatty acid supplements. PHFs are triglycerides.

**Effect on dry matter intake** Unsaturated fatty acids impair fiber digestion, are toxic to rumen bacteria, and signal the cow to stop eating, all of which lead to reduced dry matter intake (DMI). Palatability also affects DMI, so look for fats proven to maintain or increase DMI.

**Digestibility** The cow's ability to absorb energy is affected by many factors, including fat composition. Hydrogenation of triglycerides, but not FFAs—severely reduce digestibility. Though a fat may have a high total energy value, its net energy for lactation (NE<sub>L</sub>) will be drastically reduced by low digestibility.

**Cost per unit of energy** Cost per pound should only be used to determine cost per calorie of energy available for milk production (cost per lb/NE<sub>L</sub>). Compare the costs of different dry fats on a cost per unit of energy, NOT the cost per pound.

#### Fat Fast Facts

- Free fatty acids provide the most energy per pound of feed.
- Unsaturated fatty acids impair rumen fermentation and reduce dry matter intake.
- Hydrogenation of triglycerides (PHFs) reduce rumen upset, but renders them significantly less digestible.
- Fats high in saturated, long-chain, free fatty acids have the most positive impact on NE<sub>L</sub>.
- When choosing a dry fat, calculate cost per calorie of energy available for milk production.