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"Conceptually" Brighter Fertility by Feeding Transition Cows the Right Fatty Acids

New research demonstrates for the first time that supplementing dry cows with fat enhances reproductive performance. The key is adding fat with a suitable fatty acid profile.

Researchers at Cornell University discovered that feeding dry cows a high stearic acid fat (Energy Booster 100®) significantly increased pregnancy rates and decreased days open during the subsequent lactation when compared to dry cows that received no added fat.[1]

Dry cows supplemented with Energy Booster 100 achieved a pregnancy rate of 86 percent, a marked improvement over the 58 percent for the control group. Furthermore, days open for cows consuming the Energy Booster 100 diet was 31 days less than unsupplemented cows (110 days vs. 141 days).

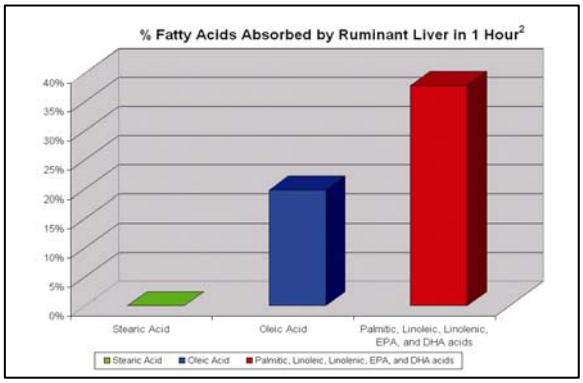
	Control	Energy Booster 100
% Pregnant [a]	58	86
Median Days Open [a]	141	110

Frajblat and Butler, 2003. [a]Treatments differed (P< 0.05).

There were no differences in liver triglyceride accumulation, postpartum milk production, dry matter intake, and most metabolic markers of reproductive performance. The positive effect on pregnancy rate and average days open mark the first time a supplemental fat in the dry cow diet has been proven to benefit reproductive performance. It is likely that these benefits may result from positive effects on the fertility of eggs that cows will ovulate in the subsequent lactation.

Fatty Liver No Problem With Right Fat

Research on supplementing dry cow diets with fat has shown variable results. The fatty acid profile of the fat added to the diet helps explain this variability in dry cow response to fat. Fats containing palmitic, oleic, or polyunsaturated fatty acids (PUFA), such as the formulas currently being promoted to improve reproduction, accumulate in the liver. Fatty liver has been demonstrated to negatively affect reproductive performance. Only highly digestible fats containing mostly stearic acid do not accumulate in the liver.



As evidence of the variability in dry cow response to fat, note the results from previous studies:

- Feeding calcium soaps (Ca-SOAPS) increased liver triglyceride accumulation during negative energy balance and reduced the rate of liver fat excretion during positive energy balance.[3]
- Liver fat accumulation was not affected by feeding hydrogenated fat,[4] thanks to its high stearic acid content. Hydrogenated fat's low digestibility, however, renders it an unworthy fat supplement.
- Tallow added to the dry cow diet decreased postpartum liver fat accumulation by 76 percent to 80 percent.[5] However, tallow increased non-esterified fatty acids (NEFA) concentrations during the dry period, indicating fat mobilization from the body. A follow-up trial[6] suggested the effects on liver fat accumulation were related more to decreased dry matter intake than to fat addition to the diet.
- Recently, 450 dry cows received 0.25 pounds/day of Ca-SOAPs and 0.2 pounds/day of animal protein for the last three weeks before calving. Compared to dry cows receiving no added fat, lower crude protein, and lower undegradable intake protein, Ca-SOAPS had no effect on milk yield and reproduction.[7] It is likely that the positive effects of supplemental protein (both quantity and bypass effects) offset the negative effects (fatty liver) of Ca-SOAPs.

Fat *Fast Facts*

- Differences in fatty acid profiles of fats have lead to variability in dry cow response to fat supplementation. Now, for the first time, research shows that feeding dry cows the right kind of fat significantly enhances reproduction.
- Reproductive performance is negatively affected by the disorder known as fatty liver, an accumulation of fat in the liver. Fats containing palmitic, oleic, or PUFA accumulate in the liver. Only highly digestible fats containing mostly stearic acid do not lead to fatty liver.
- Because Energy Booster 100 is the only highly digestible fat available containing mostly stearic acid, it is the only fat that should be fed to dry cows.

[1]Frajblat and Butler, 2003. J Dairy Sci 86 (Suppl. 1):in press.
[2]Mashek and Grummer. 2003. J. Dairy Sci. 86:1218.
[3]Bertics and Grummer, 1999. J Dairy Sci. 82:2731.
[4]Skaar et al., 1989. J Dairy Sci 72:2028.
[5]Grum et al., 1996. J Dairy Sci 79:1850.
[6]Douglas et al., 1998. J. Dairy Sci. 81 (Suppl. 1):295.
[7]Cummings, 2003. www.ahdairy.com/research/techup_transrat.html.

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