

CONSULTANT'S DIGEST

New Research Confirms Calcium Soaps' Drawbacks

Research conducted at Ohio State University¹ verifies the results of other studies indicating the disadvantages of feeding calcium soaps as a fat source in dairy cow rations. Researchers showed yet again the negative effects of calcium soaps on dry matter intake and milk protein content.

The study compared a control diet containing no fat to diets containing calcium soaps (Ca-Soap) or hydrogenated palm oil (HPO), each fed at two levels: 1.7% and 3.4%. Five ruminally fistulated cows averaging 66 days in milk and 90 pounds of milk per day were assigned to one of the five diets in a 5x5 Latin Square (each cow consumed each diet for 28 days).

Decreased Dry Matter Intake

Ca-Soap significantly² reduced DMI compared with HPO – and the higher the level of Ca-Soap, the more the DMI dropped. These results are consistent with conclusions reached by others.^{3,4} The researchers indicated that the lower DMI for cows fed Ca-Soap compared with those fed HPO could have been caused by palatability differences, differences in energy digestibility, or chemical form of the long-chain fatty acids. They also concluded that feeding 3.4% Ca-Soap reduced DMI by 5% relative to the control diet.

	Control	Ca-Soap		HPO	
		1.7%	3.4%	1.7%	3.4%
DMI, lb/d	50.7	50.9	48.3	52.0	53.1
DM dig, %	69.9	69.0	69.9	68.2	67.6
Energy dig, %	68.8	69.0	70.0	67.4	65.3
Milk, lb/d	83.7	91.5	96.1	90.6	86.6
Fat, %	4.18	4.31	4.18	3.98	4.67
Protein, %	3.07	3.00	2.82	2.99	3.03

Nutrient Digestibility

There were no differences in the digestibility of DM, OM, NDF, starch, and CP between the cows fed the control diet and the fat-supplemented diets. Though fat supplements increased FA digestibility, there were no differences in ENERGY digestibility between the control diet and the fat-supplemented diets.

Cows fed the HPO had lower DM, NDF and FA digestibility² than cows fed Ca-Soap. The lower FA digestibility probably reflects the higher melting point of HPO (a hydrogenated triglyceride)

relative to Ca-Soap. The researchers pointed out that the differences in nutrient digestibility between the two sources of fat were possibly due to a higher DMI by cows fed HPO vs. Ca-Soap (as intake increases, nutrient digestibility decreases).

No Difference in Energy Intake Between Fat Sources

The reduced DMI when cows were fed Ca-Soap cancelled out the improved energy digestibility of Ca-Soap diets so that no difference in DE (or TDN) intake was observed between fat sources.

Reduced Protein Content

The yields of milk, FCM, milk fat, and milk protein were higher when cows were fed supplemental fat.² However, fat supplementation depressed milk protein percent compared to cows fed the control diet and cows fed Ca-Soap produced milk with a lower protein content than did cows fed HPO.² This difference was accentuated in the diet with the higher level of Ca-Soap.

These conclusions are specific to: 1) the comparison of diets supplemented with Ca-Soap or HPO vs. a no-fat control, and 2) the comparison *between* the two fats in the study. These researchers made no conclusions regarding hydrogenated fats or hydrogenated fatty acids from vegetable sources, tallow and grease.

Fat Fast Facts

- Ca-Soap reduced DMI compared to HPO.
- There was no difference in ENERGY digestibility between the control diet and the fat-supplemented diets.
- There was no difference in DE (or TDN) intake between Ca-Soap and HPO. Though supplementing Ca-Soap increased DE concentration in the diet, Ca-Soap reduced DMI, thus negating the improved energy digestibility.
- Ca-Soap reduced milk protein percent compared to HPO.

¹Weiss, W. P. and D. J. Wyatt. 2004. Digestible energy values of diets with different fat supplements when fed to lactating dairy cows. J. Dairy Sci. 87:1446-1454.

²P < 0.05

³Allen, M. S. 2000. Effects of diet on the short-term regulation of feed intake by lactating dairy cattle. J. Dairy Sci. 83:1598-1624.

⁴National Research Council. 2001. Nutrient requirements of dairy cattle.