

Extra fats in calf starters can slow growth

by Al Kertz

SOMETIMES what might seem intuitive does not work that way. For instance, on several occasions, I have noticed fat sources added to calf starters. Most might think that addition would bolster energy intake. But what I learned from looking at published literature over 25 years ago is that added fat in calf starters, via either higher fat ingredients or supplemental fat sources, actually reduces dry matter intake (DMI) and daily gain.

A classic Minnesota calf study not only illustrated this point but also showed that higher-fat milk replacers may reduce total energy intake. This takes place because the higher-fat milk replacer had more energy, which resulted in less starter intake and less total energy intake.

That study was done with 120 calves at three locations. Calves were started on the study at 14 days of age by initially feeding a milk replacer with 21.4% crude protein and 21.6% fat. On Day 14, calves were fed either calf starters with 20% crude protein on a dry matter basis with 3.7% total fat or 7.3% fat as shown in Table 1.

Calves were weaned at 42 days of age with milk replacer feeding cut in half during the last week prior to full weaning. The added fat source in the starter was from 17% ground, roasted soybeans. Starters and water were fed free choice from Days 14 to 56. The study was conducted from February through October, ensuring a cross-section of winter through fall seasons.

Prior to weaning, there was no benefit from high fat in the starter for intake or daily gain. After weaning, there was a significant reduction in both starter DMI and daily gain for the high-fat starter treatment. Before weaning, there was no difference in milk replacer or starter energy intake when comparing low- versus high-fat starter treatments. After weaning, energy intake was less with the high-fat starter due to lesser starter DMI. Thus, the added fat from soybeans in the high-fat starter reduced DMI and total energy intake compared to the starter without added fat.

More recently, trials were done to evaluate the addition of dried corn distillers grains (DDG) with solubles in calf starters and growers beyond 8 weeks of age. While the results were somewhat inconsistent, in general, more DDG in calf starters reduced intake.

In dairy cattle, increasing unsaturated fat sources reduces DMI and can lead to milkfat depression due to intermediates of ruminal biohydrogenation. Unsaturated fatty acids have been shown in some British research to reduce or eliminate ruminal protozoa, and this could contribute to marginal ruminal acido-

sis and reduced DMI in calves. But all fat sources added to calf starters, not just unsaturated sources, have shown this reduction in DMI.

Another look

In that light, a series of trials were done using tallow and soybean oil in calf starters at the Provimi calf research center to look at differing fat sources more specifically and using calves up to 4 months of age. All calves were Holstein bulls coming from one large dairy and were fed a 27% protein and 17% fat milk replacer mixed at 15% solids. A texturized, 20% crude protein starter was fed with no fat, 2% tallow, or 2% soy oil treatments. The fat sources used were tallow because it did not alter the concentration of linoleic and linolenic unsaturated fatty acids, and soy oil, which was higher in linoleic fatty acid.

In one trial, there were no significant differences prior to weaning at 42 days as shown in Table 2, but there was a numerical trend for lower average daily gain (ADG) for fat treatments. For the two weeks postweaning, soy oil reduced daily gain, and starter intake ver-

selves in the rumen. Defaunation or killing of protozoa generally lowers rumen pH. In this study, the youngest calves prior to weaning had the least response to fat treatments, but they also likely had no or low populations of protozoa at that time.

Put into practice

As previously established, there is an inverse relationship between the amount of milk replacer and its fat level fed with calf starter intake. A well-texturized calf starter is the best for calf rumen development. Adding fat sources or high-fat ingredients to the starter will generally have a negative effect on intake and daily gain.

Table 1. Calf intake and daily gain

Fat in calf starter	3.7%	7.3%
Starter DMI, lbs./day		
Days 14 to 42	1.15	1.16
Days 43 to 56	3.91	3.62
Daily gain, lbs./day		
Days 14 to 42	1.03	1.00
Days 43 to 56	2.18	1.97
Days 43 to 56, lbs. total		
Starter intake	73.0	69.8

Table 2. Three textured starters compared

Item	No added fat	2% tallow	2% soy oil
Prewaning 0 to 42 days			
Daily gain, lbs./day	1.03	0.92	0.96
Starter intake, lbs./day	0.44	0.42	0.43
Postweaning, 42 to 56 days			
Daily gain, lbs./day	1.46	1.50	1.33
Starter intake, lbs./day	3.70	3.64	3.45
Overall, 0 to 56 days			
Daily gain, lbs./day	1.24	1.21	1.15
Starter intake, lbs./day	2.07	2.03	1.94

sus no fat control. Overall, soy oil decreased daily gain and starter intake versus no fat, and both fat treatments raised body condition score versus no fat control.

Overall, results showed suppressed DMI and lower daily gain for either fat source with a trend for soy oil treatment versus tallow to be more negative. Why would this trend take place?

First, fat or oil may be somewhat greasy for calves, and they do not like that greasiness. This has been found with cows as well. But it is more likely that fat sources for calves may inhibit growth or deplete existing rumen protozoa. More unsaturated fatty acids have been found to be more toxic to rumen protozoa.

In the first weeks of a calf's life, rumen pH is in the lower 5 range. That begins to climb after about age 35 days, as found in a French study. That may be when rumen protozoa begin to establish them-

The 2014 versus 2007 National Animal Health Monitoring System (NAHMS) survey found that dairy producers in the U.S. elevated their daily feeding of milk/milk replacer from 4 to 6 quarts. That was a 50% upward movement and a good change. However, a smaller scale 2018 NAHMS study showed that while Holstein dairy calves gained 1.6 pounds daily prior to weaning around 2 months of age, which would meet the goal of doubling calf birth weight at 2 months of age, there was a slump in the month after weaning. This was most likely caused by a poor weaning transition program related to poor rumen development due to a poor starter feeding program. Don't further contribute to this scenario by feeding a higher fat starter. 🐄

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