

Use of Canola Meal and Micro-Encapsulated Sodium Butyrate in Starter Feed for Dairy Calves

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The objective of the two studies was to compare the use of canola meal (CM) and soybean meal (SM) with or without micro-encapsulated sodium butyrate (MSB) in starter feed for Holstein-Friesian calves. Sixty heifer calves (9.1 ± 0.8 d of age; 43.2 ± 4.2 kg) were used in a performance study, while twenty-eight bull calves (8.7 ± 0.8 d of age; 43.0 ± 4.4 kg) were used in a performance and metabolism study. Calves were weaned using a step-down approach. Weaning occurred for heifers at 59.1 ± 0.8 d of age and for bulls at 51.7 ± 0.8 d of age. Data collection continued post-weaning for 2 wk for heifers and 3 wk for bulls. In both studies, pelleted starters contained: 1) SM; 2) SM+MSB; 3) CM; and 4) CM+MSB. The CM constituted 35.2%, SB 24.2%, and MSB 0.3% of the respective starters on DM basis. Data were analyzed as a 2×2 factorial design using PROC MIXED of SAS (ver. 9.4). In the heifer study, there were no differences ($P > 0.05$) observed for the MSB inclusion on starter intake and average daily gain (ADG). Protein source have not affected ADG; however, CM tended to increase starter intake post-weaning relative to SM (2.08 vs. 2.25 kg/d; $P = 0.086$). In the bull study, SM had greater ($P = 0.012$) pre-weaning starter intake (256 g/d) than CM (229 g/d) and tended ($P = 0.10$) to have greater ADG (708 g/d vs. 648 g/d) than CM. Feeding CM resulted in greater jejunum tissue weight (2.13 vs. 2.43 kg; $P = 0.046$) and length (20.65 vs. 22.51 m; $P = 0.065$). Bulls fed CM also tended to have lower rumen fluid ammonia concentration (19.1 vs. 13.9 mg/dL; $P = 0.084$); however, there were no differences for the short-chain fatty acid concentrations ($P > 0.05$). Inclusion of MSB tended to increase pre-weaning starter intake (233 vs. 253 g/d; $P = 0.064$) and had a negative effect on the rumen absorptive surface area in the ventral sac (1192.9 vs. 954.3 mm²/cm²; $P = 0.019$).

Implications: Results of this study suggest that MSB may not be beneficial in starter feeds for calves following weaning; however, its use pre-weaning, especially in early stages of development, might still be considered. Canola meal can be used a replacement for soybean meal in calf starters for dairy calves. Our results further suggest that canola meal use may positively affect gastrointestinal tract development with no, or only minor, effects on ADG. Thus, use of canola meal may be one strategy to optimize calf starter cost.