Effects of Hydroxy vs. Sulfate Forms of Trace Minerals in Milk Replacer or Starter on Dairy Calves through Weaning

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Young dairy calves fed at a higher plane of nutrition may benefit from trace mineral (TM) sources with greater bioavailability, but few data are available for hydroxy forms of Zn, Cu, and Mn. The goal of this study was to evaluate differences in intake, growth, and health status of calves fed milk replacer and starter grain with different sources of TM. Male Holstein calves (n=64) <1 wk old were transported from a commercial farm to the research facility. Calves were assigned to treatments in a 2 x2 factorial arrangement of TM source in milk replacer and TM source in starter grain in a randomized complete block design. All calves were fed milk replacer (28% crude protein, 20% fat) at a fixed feeding rate [700 g/d of powder for wk 1, 950 g/d of powder for wk 2-6, and 450 g/d of powder for wk 7] and had ad libitum access to starter [22% CP] and water. Milk replacers were formulated to contain either sulfate (S) or hydroxy (H) TM (70, 10, and 50 mg/kg of Zn, Cu, and Mn, respectively). Starters formulated either with STM or HTM contained 150, 30, and 100 mg/kg of Zn, Cu, and Mn, respectively. Fe at 70 ppm was supplied in all treatments as Fe sulfate. All calves were weaned on d 49 and continued to have ad libitum access to water and starter until the end of the experiment at d 63. Body weights and measurements were taken on all calves on a weekly basis. Fecal and respiratory scores were monitored daily and any use of medications was recorded. Final body weight and average daily gain (overall mean of ADG = 0.91 kg/d) did not differ among treatments. Calves fed the HTM milk replacer plus STM starter had greater hip height (P = 0.03) and hip height average daily gain (P = 0.007). Starter intake was greater in calves fed HTM milk replacer than those fed STM milk replacer (P < 0.0001). Calves fed the STM milk replacer had a greater frequency of elevated fecal scores in the first 3 wk of life (odds ratio STM to HTM = 1.80), although use of medication was not different among treatments. Results indicated that calves fed HTM milk replacer and starter had similar overall growth as calves fed STM but maintained a better health status throughout the pre-weaning phase.