
# Effect of Ca3 BioFresh® Bolus on Blood Calcium and Hypocalcemia Prevalence

Despite the wide-spread adoption of negative-dietary cation-anion differential close-up diets, an estimated 25-50% of newly freshened 2nd lactation and greater cows will experience subclinical hypocalcemia (SCH) or milk fever. Ionized calcium (iCa) levels of 1.0 mmol/L blood or lower is a technical definition of subclinical hypocalcemia, and SCH cows typically experience increased inflammation, reduced milk production, decreased 1st service conception rates and are at greater risk of culling. A research study was conducted to determine if the administration of a Ca3 BioFresh® Bolus immediately after calving would reduce the SCH prevalence at 12 hr post-calving and if there are benefits to dosing a 2nd Ca3 bolus 12 hr post-calving.

## Study Description

The study was conducted by an independent veterinary research company at a 6,000-cow dairy utilizing a close-up ration with a commercial anionic product to maintain urine pH of 6.0 – 6.5. One hundred and five 2nd lactation and greater cows were blocked by parity and then randomly assigned at calving to one of three treatments: (1) negative control with no supplemental calcium at calving (control); (2) one Ca3 bolus within 3 hr of calving (Trt 1); or (3) one Ca3 bolus within 3 hr of calving and a 2nd Ca3 bolus within approximately 12 hr of calving (Trt 2). One control cow and one Trt 1 cow were removed from the study due to developing clinical hypocalcemia, and both received the dairy's standard clinical hypocalcemia treatment and survived. All cows were enrolled in the study between May 5 and 15, 2022.

Blood samples were collected from the tail vein with a vacuum tube with lithium heparin, and whole blood samples were analyzed immediately upon collection for ionized calcium (iCa) with an i-Stat blood analyzer. Blood samples were collected at approximately 0, 12, 24 and 48 hr post-calving from each cow. Individual cows were considered experimental units, and only cows with blood samples from all four sampling times were included in the statistical analyses.

## Study Results and Discussion

At 12 hr, the Trt 1 and Trt 2 cows had greater iCa than the control cows, and the two Ca3 treatments did not differ for iCa (Figure 1). The control and Trt 1 cows were similar for iCa at 24 hr; however the Trt 2 cows, having received the second Ca3 bolus, exhibited a greater iCa than the other two groups. All three treatment groups had similar iCa at 48 hr.



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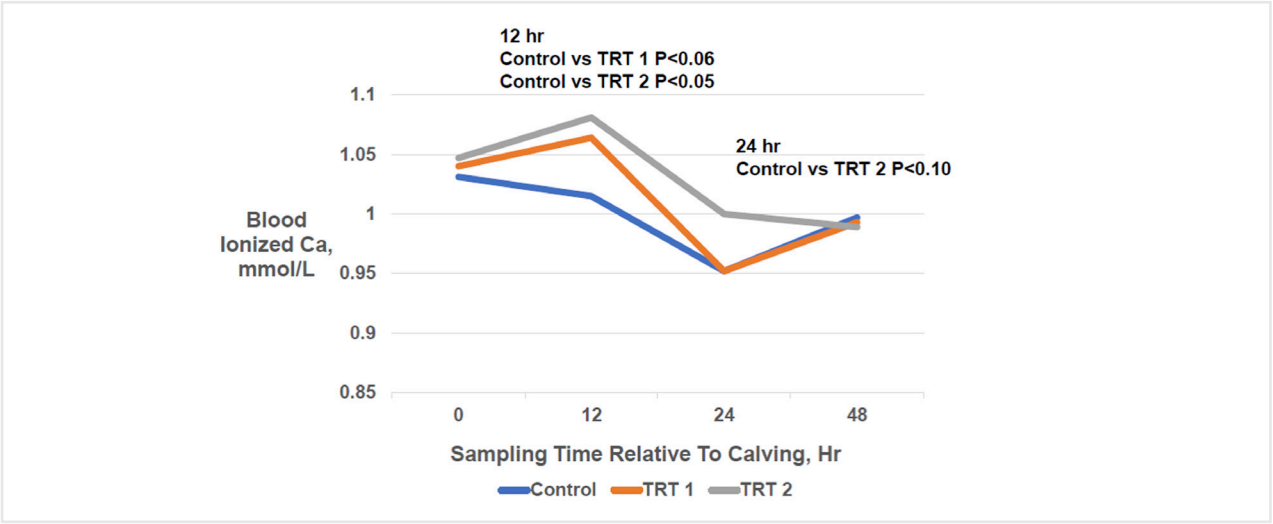


Figure 1. Effect of Ca3 BioFresh Bolus Administration on Blood Ionized Calcium Levels of Newly Freshened 2nd Lactation and Greater Holstein Cows.

Considering a SCH cut-off of 1.00 mmol iCa/L blood, there were no statistical differences for SCH prevalence at 12 hr, although the SCH prevalence tended to be lower for the Trt 1 and Trt 2 cows receiving a Ca3 bolus at calving (Figure 2). At 24 hr, the Trt 2 cows tended to have a lower SCH prevalence than the control group and were similar to the Trt 1 cows. The SCH prevalence did not differ between the research groups at 48 hr.

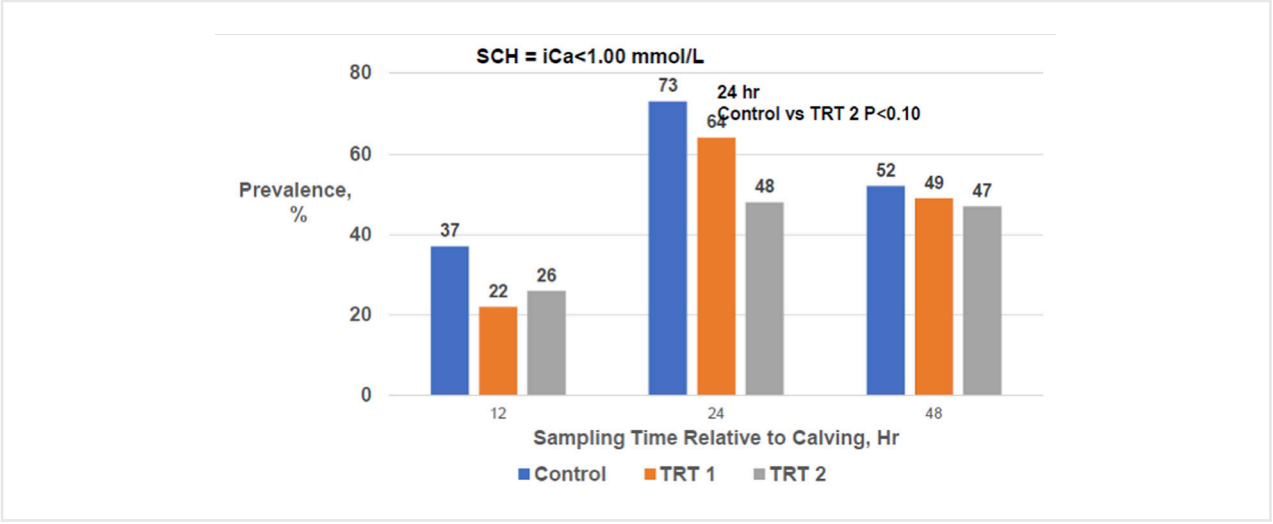


Figure 2. Effect of Ca3 BioFresh Bolus Administration on Subclinical Hypocalcemia Prevalence of Newly Freshened 2nd Lactation and Greater Holstein Cows.

## Conclusions

In this randomized study, administering a Ca3 bolus at calving increased iCa at 12 hr and tended to lower SCH prevalence. Dosing a second Ca3 bolus at 12 hr increased iCa and reduced SCH prevalence compared to the control group.