

Southeast Dairy Producer's Check-Off Program Research Summary

Feeding rumen-protected methionine to program postnatal phenotype of dairy cattle

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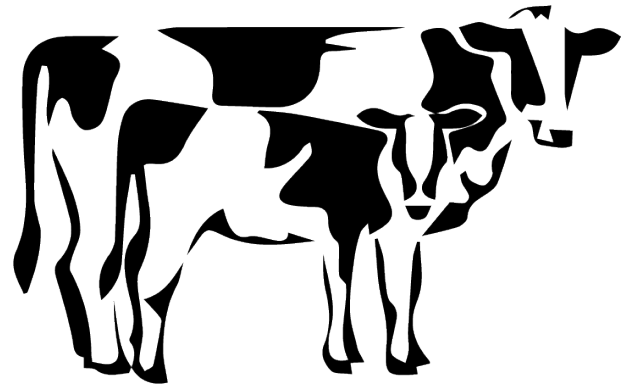
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Amount Awarded: \$23,000

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Implications

Work continues to perfect a method for delivery of either rumen-protected methionine or rumen-protected choline for an extended period.



Methods

The following experimental plan was approved for funding: The experiment will be conducted on a cooperating dairy farm equipped with head-locking stanchions. A total of 600 first-service multiparous cows inseminated with Holstein semen will be enrolled in the experiment. Weekly cohorts of fresh cows will be paired by previous lactation 305-day milk yield and, within each pair, randomly assigned to receive either rumen-protected methionine or a control supplement. Cows will be subjected to timed AI using the ovulation synchronization protocol employed on the farm. Cows will be individually fed a supplement of either rumen-protected methionine [15 g of Smartamine (Adisseo) mixed in 100 g corn meal) or a control supplement (100 g corn meal) from day 1 before AI until day 7 after AI. Treatments will be applied at the morning feeding as a top dressing while cows are locked in stanchions. Placental function of pregnant cows will be assessed at day 60 and 120 of pregnancy by measuring uterine blood flow using color-Doppler ultrasound and by taking a blood sample to measure concentrations of the placenta-derived proteins called pregnancy associated glycoproteins (PAGs). Calves will be weighed at birth, weaning, 6 months of age and 12 months of age. Height will be measured at the same time. Reproductive measurements to be recorded in heifers will include age at first insemination, pregnancy per AI at first insemination, and services per conception. Following calving, milk yield, milk composition and reproductive function (pregnancy to first service, services per conception, and days open) will be recorded. After funding was approved, the experimental design was expanded to include three groups - feeding of a control supplement, feeding of a supplement containing rumen-protected methionine, and feeding of a supplement containing rumen-protected choline.

Results

The project was initiated in spring 2024 but we rapidly ran into problems. First cows did not eat the top dress, regardless of how it was prepared. Thus, it was considered impractical to deliver methionine for 8 days around the time of breeding using that approach. As an alternative, we developed gelatin capsules containing rumen-protected methionine that could be delivered by bolus daily for 8 days. This approach too was found to be inadequate because the procedure was stressful to the cows and potentially damaging to the headlocks. The current plan is to replace methionine with another methyl donor - choline. There is a product on the market that is a bolus of rumen-protected choline that claims to release choline into the rumen for 5 days. We have initiated an experiment in which cows received a single choline bolus to see whether this claim is true. Blood samples have been obtained and sent to Cornell University for measurement of plasma concentrations of choline and its metabolites. If results are promising, we will initiate the experiment described above with the choline bolus replacing top-dressed rumen protected methionine