

**FEASIBILITY OF ELEVATING SERUM INSULIN IN EARLY LACTATION COWS BY FEEDING LESS FREQUENTLY**

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**INTRODUCTION:** Prolonged negative energy balance (NEB) in high-merit cows imposes tremendous costs to dairy farmers worldwide. Feasible feeding strategies are final frontiers for artist farmers to attenuate metabolic pressures and NEB without compromising health. The objective of this study was to determine if feeding frequency (FF) affects early lactation cows ability to maintain adequately high blood insulin and thus to attenuate NEB.

**MATERIALS AND METHODS:** Eight early lactation multiparous Holstein cows housed in free individual boxes (4 × 3 m) were offered a total mixed ration (TMR) either once daily (1×) at 0700 h, or 4 times daily (4×) at 0100, 0700, 1300 and 1900 h. The experimental design was a crossover with 2 periods of 20 days, each with 14 days of adaptation. The TMR was based on chopped alfalfa hay, with a barley-corn grain concentrate at 63% of diet dry matter. The TMR had 81% dry matter, 17.6% crude protein, and 27.3% neutral detergent fiber. Water in known amount was spread on TMR to minimize particular particle selection. Venous blood was sampled at 0 and 4 h post-morning-feeding and assayed for insulin and metabolites. Data were analyzed as linear mixed models with fixed treatment and period effects, and random cow (period) and residual effects.

**RESULTS AND DISCUSSION:** Once instead of four times feeding increased dry matter intake (21.1 vs. 20.0 kg/d,  $P=0.05$ ) without affecting milk energy output (21.7 vs. 21.4 Mcal/d,  $P=0.72$ ). The first meal length (FML, starting from feed delivery until the first non-eating bout of  $\geq 20$  min) was 106 min in the 1× cows and 49 min in the 4× cows ( $P<0.01$ ). As such, serum insulin was elevated (11 vs. 7  $\mu\text{IU/ml}$ ) and NEFA decreased (0.45 vs. 0.56 mmol/L) with 1× instead of 4× feeding ( $P<0.05$ ). Therefore, under non-competitive individual feeding and housing, less frequent feeding of a mixed ration elongated the first meal, increased feed intake, and reduced serum NEFA. These changes enabled cows to maintain higher circulating serum insulin levels that contributed to attenuated NEB.

**Keywords:** Dairy cow, Feeding frequency, Negative energy balance, Serum insulin

**References**

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