

β -hydroxybutyrate, calcium and non-esterified fatty acids in blood and their relationships with milk yield losses

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Introduction

Animal health and herd productivity are the most difficult challenges that dairy producers facing on a regular basis. The period around calving is critical due to the reduction in dry matter intake (DMI), increases in the demand of energy and calcium (Ca²⁺) for the maintenance and synthesis of milk. Due to the reduction in DMI, the requirements cannot be met, and the deficit allows the animal to fall into negative energy balance (NEB).

Aim

The objectives were to study the associations of concentrations of β -hydroxybutyrate acid (BHBA), Calcium (Ca²⁺) and non-esterified fatty acids (NEFA) in blood serum seven days prepartum with losses in milk yield (MY), and metabolic dysfunctions at seven and fourteen days of lactation.

Methods

One hundred and twelve Holstein-Friesian (780 \pm 36 kg BW; which had lactated more than twice) were sampled by coccygeal venipuncture.

Results

When BHBA levels were high seven days before parturition and were related to MY at day seven postpartum, it was observed that 11.00% of the cows lost 0.370 kg d⁻¹ of milk. In contrast, no relationship was observed between BHBA prepartum and MY on day fourteen of lactation. Likewise, we did not observe any association between high NEFA and low calcium levels prepartum and MY postpartum. NEFA blood serum concentrations \geq 0.5 mmol L⁻¹ on d 7 before calving were 7.6 more susceptible for lameness incidence ($P < 0.01$), and when BHBA \geq 0.8 mmol L⁻¹ cows were 2.4 times more likely to develop ketosis ($P < 0.05$) in the first 60 days in milk.

Conclusion

Data indicate that a high proportion of cows are above the thresholds of β -hydroxybutyrate and non-esterified fatty acids, and are also deficient in calcium, when determined one week before parturition. The risk thresholds for each metabolite were not associated with the amount of milk lost at day fourteen after calving.