Milking frequency and milk production in pasture-based lactating dairy cows

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The objective of this study was to test the effect of modified milking frequency (MF) during early lactation on milk production in grazing dairy cattle. Multiparous Holstein-Friesian cows (n=150) were randomly assigned to one of five treatments at parturition: milked once daily (1X) for 21 d (1X21), milked 1X for 42 d (1X42), milked twice daily (2X), milked thrice daily (3X) for 21 d (3X21), and milked 3X for 42 d (3X42). All cows were milked 2X post treatment until wk 24 in lactation. Animals were offered a generous allowance of fresh pasture and supplemented with 4 kg DM/d of concentrate during the first 16 wk in milk and 2 kg DM/d for 8 wk thereafter. Effects of MF, duration of MF, and interactions during treatment and post treatment periods were tested using mixed models (GenStat 12.1). During the treatment period, a MF x duration interaction was detected for milk, protein, and fat yields. Relative to 3X21, 3X42 failed to increase milk production further. However, 1X42 had lower (P<0.05) milk (2.4 kg/d), protein (0.10 kg/d), and fat (0.12 kg/d) yields compared with 1X21 during the treatment period. Relative to 2X, 3X cows produced more milk (1.5 kg/d; P<0.05); however, protein and fat yields were not different during or after the treatment period. There was no MF x duration interaction post treatment. An adverse effect in production occurred for 1X in the post treatment period; however, 3X cows failed to sustain increased production compared with 2X. Relative to 2X, 1X cows had lower yields of fat (0.1 kg/d; P<0.01) and protein (0.05 kg/d; P<0.05) post treatment. Body weights were reduced in 2X cows compared with 1X during the treatment (476 vs. 484 kg; P<0.05) and post treatment periods (500 vs. 512 kg/d; P<0.01). In summary, 1X for the first 21 or 42 DIM impaired milk production and the losses continued for the remainder of the lactation. Relative to 2X, 3X in early lactation did not improve milk production beyond the period of increased milking frequency.

Haptoglobin mRNA expression in bovine adipose and liver tissue: physiological and conjugated linoleic acids (CLA)-induced changes throughout lactation

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Haptoglobin (Hp) is the most relevant acute phase protein in cattle, secreted mainly by the liver. Hp in mammary gland and neutrophiles is reported for cattle and has importance in local inflammatory processes. In rats, supplementation with CLA affects Hp in serum, but not Hp mRNA abundance in liver. For dairy cows, mRNA expression (exp) of Hp in liver has not yet been comprehensively characterized during an entire lactation period; for adipose tissue (AT) no data were available until now. We thus aimed to investigate Hp mRNA exp in subcutaneous fat (ScF) and liver during lactation, considering additionally potential effects of CLA. Holstein Frisian cows were grouped as control (n=10) or CLA (n=11, receiving 10 g each of the cis-9,trans-11- and the trans-10,cis-12-CLA isomers from d 1 in milk (DIM) until d 182). Biopsies were collected from ScF and liver at -21 and 1, 21, 70, 105, 182, 196, 224, 252 DIM. Hp mRNA was quantified by real-time RT-PCR (for CLA only d -21, d 21, 105, 196 and 252). Data were analyzed using repeated measurement analysis (SAS 9.2, P<0.05). At calving, Hp mRNA abundance in liver increased (P<0.05) from prepartal values by a factor of 9 and then decreased again to precalving values. Between DIM 182 and 196, Hp mRNA increased again [5.3 fold, P<0.05]. In AT, the amount of Hp mRNA was 2×10^6 fold lower than in liver and was detectable in 49% of the samples only. No time-related differences were observed throughout lactation for Hp mRNA in AT and CLA did neither affect liver nor AT Hp mRNA abundance. The peak in liver Hp mRNA after calving corresponds to Hp serum concentrations and confirms the liver as main source for systemic acute phase reactions. In contrast, the role of Hp exp in AT might rather be related to local inflammatory reactions and requires further investigation.

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