DIURNAL VARIATION OF GLUCOSE, NON-ESTERIFIED FATTY ACIDS AND INSULIN IN PLASMA AFTER A RESTRICTED FEEDING CHALLENGE IN DAIRY COWS IN EARLY LACTATION

R Jorritsma1, S. G. A. van der Drift1, C. A. J. Roos2, A. T. M. van Knegsel2

1Faculty of Veterinary Medicine, Utrecht University, Utrecht, 2Adaptation Physiology Group, Wageningen University, Wageningen, The Netherlands

The present study was performed at Utrecht University to investigate the effect of a restricted feeding challenge on the diurnal variation of glucose, non-esterified fatty acids (NEFA) and insulin concentrations in plasma of multiparous dairy cows in early lactation. Two different feeding regimes were applied, in which cows were either fed according to recommendations (n=6, CON) or ad libitum during the dry period, fasted for 8h directly after parturition and restrictedly fed for the next 5 days (n=10, RES). After this experimental period, all animals were fed the same TMR ad libitum twice a day. Blood was sampled hourly for 24 hours from all cows once in the follow-up period (between days 5 to 11 after calving). Plasma samples were analyzed for glucose, NEFA and insulin and data were analyzed using the mixed procedure (PROC MIXED, SAS 9.1) to study treatment and time effects and an F-test to study within-day and within-cow variation. Values are presented as means ± SD. NEFA concentrations were higher in the 8 hours between feedings in both groups (p < 0.05). Average diurnal NEFA concentrations were higher for RES cows (1.03 ± 0.45) than CON cows (0.49 ± 0.25) (p < 0.01). In addition, the variation (SD) in the diurnal NEFA concentrations per individual cow (within-cow variation) tended to be greater in RES cows (p = 0.06). Restricted feeding had no effect (p > 0.05) on average diurnal concentrations of glucose and insulin, which were similar for CON cows (2.72 ± 0.31 and 2.33 ± 1.45, respectively) and RES cows (2.48 ± 0.53 and 2.18 ± 2.09, respectively). Sampling day after calving had no effect on plasma metabolite concentrations (p > 0.05). The variation (SD) between cows in plasma glucose concentrations at each time point was greater for RES cows (p < 0.01). In conclusion, cows that were restrictedly fed directly after calving had higher and more fluctuating diurnal NEFA concentrations than control cows, which implies that a suboptimal feed intake around parturition can have carry-over effects on metabolism of cows in early lactation.