164 Predictions of N use efficiency from natural 15N abundance in periparturient dairy cows are impaired by the protein mobilization.

M. Correa-Luna*1, M. Larsen2, C. Chantelauze1, L. Bahloul3, and G. Cantalapiedra-Hijar1, 1Université Clermont Auvergne, INRAE, France, 2Aarhus University, Denmark, 3Adisseo France S.A.S., France.

The natural 15N enrichment of animal proteins over the diets (Δ15N) is negatively correlated to N use efficiency (NUE) in ruminants and enables to capture animal-to-animal variation. This may represent a tool for genetic selection and precision feeding. However, the potential of Δ15N as biomarker of NUE in periparturient dairy cows may be hampered by the strong protein mobilization supplying amino acids rich in 15N compared with dietary substrates. Our objective was to examine the relationship between Δ15N and NUE in the peripartum period. Plasma samples from 8 multiparous Holstein cows along with TMR feeds were collected in pre-calving (d-14) and in post-calving (d4, 15, 29 and 50) and analyzed for 15N abundance by EA-IRMS. Values of Δ15N from each cow and time (n = 39) was calculated as the 15N difference between plasma and diets. In each instance NUE was calculated as the ratio of milk N from the N intake. Data were analyzed in R with Pearson correlations coefficients. A similar pattern was observed for the 8 cows immediately after calving, with a sharp increase in Δ15N from d-14 toward d4 postpartum followed by an uninterrupted decrease from d4 to d50 postpartum ending closer to the pre-calving Δ15N level. The peak in Δ15N at d4 matched with the body weight loss (r = 0.77; P = 0.04) and with the expected high protein mobilization in this period. In addition, Δ15N values at d4 were positively rather than negatively correlated with NUE (r = 0.88; P = 0.01). As the lactation progressed the relationship between Δ15N and NUE became non-significant with slopes approaching zero. Given that protein mobilization does not generally occur beyond the very first weeks of lactation, we would have expected a negative correlation between NUE and Δ15N in d50 but this was not observed. This study confirms the effect of lactation stage on the relationship between NUE and ?15N. This suggests that, at least, in the first 50 d of lactation the biomarker has limitations to predict NUE. Moreover, this study confirmed that Δ15N perceived the protein mobilization occurring during the early lactation.

Key Words: 15N enrichment, N use efficiency, peripartum