

Tuesday June 27th: Ruminant Nutrition: Protein and Amino Acids 2

Effects of rumen-protected methionine on the plasma amino acid profile of F1 Holstein × Gyr cows grazing intensively managed Mombaça grass.

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The objective of this study was to evaluate the effect of rumen-protected Met (RPM; Smartamine M; Adisseo Inc., France) supplementation on plasma amino acid (AA) profile of lactating grazing cows. Twenty-four multiparous F1 Holstein × Gyr cows (31.0 kg/d, 100 DIM) were used in a randomized block design for 9 weeks to evaluate the supplementation of a control diet with RPM to adjust Lys:Met ratio from 3.1 to 2.8 (CNCPS). The supplementation of RPM varied from 10 to 15 g/d, depending on the production of the cow. Cows grazed as a group and were allotted to a new paddock of Mombaça grass every day using sward height as the target entry criteria. Cows were milked twice daily, and individually fed a concentrate mixture three times a day, after each milking and at 11:00 am. Blood samples were collected from a coccygeal vessel into heparinized test tubes at 11:00 am, before concentrate was fed, on the last day of weeks 3, 6 and 9. The samples centrifuged and plasma was stored at -20°C until analysis. Plasma AA concentration was analyzed by isotopic dilution, liquid chromatography, and electrospray ionization mass spectrometry after derivatization. The model included treatment, week and week × treatment interaction as fixed effects, in addition to block as random effect. Least square means were compared using Tukey's test. The supplementation of RPM did not increase plasma Met concentration (35.7 vs. 31.4 μmol/L, P = 0.22). Plasma concentration of essential AA tended to increase for the RPM treatment (878.4 vs 811.4 μmol/L, P = 0.06), while concentration of non-essential AA tended to decrease for RPM (1229.0 vs 1307.2 μmol/L, P = 0.08). More specifically, RPM reduced plasma concentration of Glu (46.6 vs. 50.9 μmol/L, P = 0.05), Gly (308.3 vs. 350.0 μmol/L, P = 0.03) and tended to decrease plasma concentration of Gln (194.8 vs. 215.0 μmol/L, P = 0.07). Milk protein yield was higher (894 vs 835 g/d, P = 0.01) for RPM. These results suggested that Met was a deficient AA in the control diet and that an increase in plasma Met is not necessary for a positive production effect of RPM supplementation.

Keywords: Protein, tropical pasture

Adisseo Message:

There are a limited number of research trials feeding RP-Met in grazing systems with tropical grasses in South America during the summer season. The leaves contain high levels of crude protein, up to 25%, depending on growth stage and nitrogen supply. To our knowledge, this is the first report of plasma amino acids concentration of lactating cows fed Smartamine M on pasture systems.

The results of this work underscore the importance of the methionine's metabolic elasticity. The points to rescue from the results from this trial are:

- 1) The reported plasma concentration of methionine is relatively high on Girolando cows in pasture fed cows.
- 2) Cows fed Smartamine had numerically higher plasma methionine concentration, however its concentration was not statistically higher than cows not supplemented with Smartamine M.
- 3) Despite the cows fed the basal diet had relatively high plasma methionine concentrations, when supplemented with Smartamine M, responded with higher milk protein production.