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Low protein degradability and precision protein feeding improve nitrogen efficiency of dairy cows

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The low efficiency of nitrogen (N) intake in dairy cows can increase feed costs and ammonia emissions. At the rumen level, decreasing degradable N to improve the urea reuse in microbial protein synthesis, can increase N efficiency (Neff=N<sub>milk</sub>/N<sub>intake</sub>). Moreover, at the animal level, the metabolisable protein (MP) efficiency varies greatly between dairy cows. Applying precision feeding, with adjustment of the diet according to individual observations, could increase this MPeff. The objective of this study was to improve both N and MP efficiencies by combining a reduction in rumen degradable protein (RDP, factor N) with an individual adjustment of MP content in the diet (factor E) in a 2×2 factorial design with 4 groups of 11 cows for 12 weeks fed maize-based diet. Factor N was either at the reference level of INRA for RDP (N0) or at a reduced level (N-10) of -1.4 g of degradable protein per MJ of net energy for lactation (NEL). Factor E was either constant with 14.8 g of MP per MJ NEL (EC), or variable (EV), from 12.0 to 15.5 g MP/MJ NEL and calculated for each cow according to its MPeff on a 4-week reference period. The lower the efficiency was, the lower the applied MP/NEL ratio was. No interaction occurred between the 2 factors. The decrease in RDP had no significant effect on intake and production. The milk production of EV was 1.7 kg/day lower than EC, but the energy efficiency (kg of milk/kg of DMI) was unchanged. The RDP reduction improved Neff (35.7 vs 32.2%) and individual protein feeding mainly improved MPeff (69.1 vs 59.3%). Between extreme treatments (N0\_EC vs N-10\_EV), crude protein content decreased from 14.9 to 12.5%, Neff varied from 32.1% to 36.4%, and estimated urine urea-N excretion was reduced by 56%. Reducing degradable N content of the diet and applying precision feeding to dairy cows fed indoors is thus a way to better use proteins and to reduce ammonia emissions.

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## Session 48

## Theatre 5

Animal performance and carcass characteristics of cattle fed different levels of yerba mate

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Animal performance and carcass characteristics of cattle fed diets containing different levels of yerba mate (*Ilex paraguariensis*, St. Hilaire) were evaluated in order to obtain a healthier and higher oxidative stability meat. Forty-eight Nelore steers with an average age of 21 months and an initial weight of 419 kg were individually fed during 94 days with the same base diet, differing only by yerba mate levels (0, 0.5, 1.0 and 1.5% w/w). Diets were composed of maize silage and concentrate (60:40 w/w) with 11% crude protein and 72% of total digestible nutrients. Diets were balanced using 0, 0.5, 1.0 and 1.5% w/w of Kaolinite (kaolin), an inert ingredient. The experimental design was completely randomized with 4 treatments and 12 replications, with diet as a fixed factor. Dry matter intake (DMI) was calculated by weighting offer and leftover daily. Animal live weights were obtained every 28 days. Hot carcass weights were collected immediately after slaughter and the rib eye area and backfat thickness were measured in longissimus muscle between the 12<sup>th</sup> and 13<sup>th</sup> ribs. Statistical data treatment was performed using XLSTAT statistical program with a significance level, P-value, at 0.05. There were no significant differences (P-value>0.05) between diets in DMI, average daily gain, feed conversion, fasted slaughter weight, hot carcass weight, carcass yield, backfat thickness and rib eye area. The addition of yerba mate extract, at varying levels from 0.5 to 1.5% w/w, in the diet of feedlot cattle did not affect performance and carcass characteristics of the animals, showing expected values for feedlot-finished Nelore cattle. These results were positive as the use of the yerba mate is recent and there is a lack of information about the use of yerba mate as an antioxidant in diets for beef cattle.