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"Filling gaps and removing traps
for sustainable resource management"

Crude Protein Digestibility of Mixed Legume-Grass Diets Depending on the Quality of the Substituted Grass

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Abstract

Legume forages are promoted in ruminants feeding because of their high crude protein (CP) and an alleged higher digestibility than grasses, especially in tropical regions. It is assumed that increasing the CP supply in the diet via legumes, proportionally increases the amount of digestible CP (digCP). However, evidence exists that diet CP digestibility (CPD) may decrease with increasing proportion of legumes in the diet, particularly if they substitute a basal grass of high quality. Therefore, the objective of this study was to explore the changes in digCP depending on the quality of the grass substituted.

For this, 60 studies where legumes substituted grasses without any additional feedstuff were classified into three categories depending on the CP of the grass: Low (CP<51.0 g kg^{-1} dry matter (DM)), Medium (51.0<CP< 93.1 g kg^{-1} DM) and High (CP>93.1 g kg^{-1} DM). Then within each category digCP and CPD were regressed on the amount (g kg^{-1} DM) of CP from legumes in the diet. The slopes of the regressions were compared among the three categories as indicators of the contribution of legumes to digCP and CPD.

Based on the intercepts of the regressions, grasses supplied 16.2, 38.2 and 68.1 g digCP kg^{-1} DM for the Low, Medium and High category, respectively. On the other hand, slopes increased from 0.432 to 0.493 when legumes substituted grasses of Low or Medium, respectively. This indicates an increased digestibility in the legumes CP when these are combined with a medium quality grass. But for the High category the slope decreased to 0.305, showing that the contribution of legumes to digCP decreases when substituting grasses of High quality. This was confirmed when the CPD was regressed on the amount of CP from legumes, where slopes were 1.13, 1.18 and –0.18 for the Low, Medium and High category. Even though some of these results might be due to the increasing CP concentration in the diet, these findings still highlight the contrasting effects of legumes on the diet's CP digestibility depending on the nutritional value of the substituted grass, an effect that needs further research and consideration depending on the production system targeted for legumes utilisation.

Keywords: Crude protein digestibility, legumes, ruminants feeding, tropical grasses

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