

## AMINO ACID COMPOSITION OF GRASS SILAGES CONTAINING DIFFERENT LEVELS OF TRUE PROTEIN IN TOTAL CRUDE PROTEIN

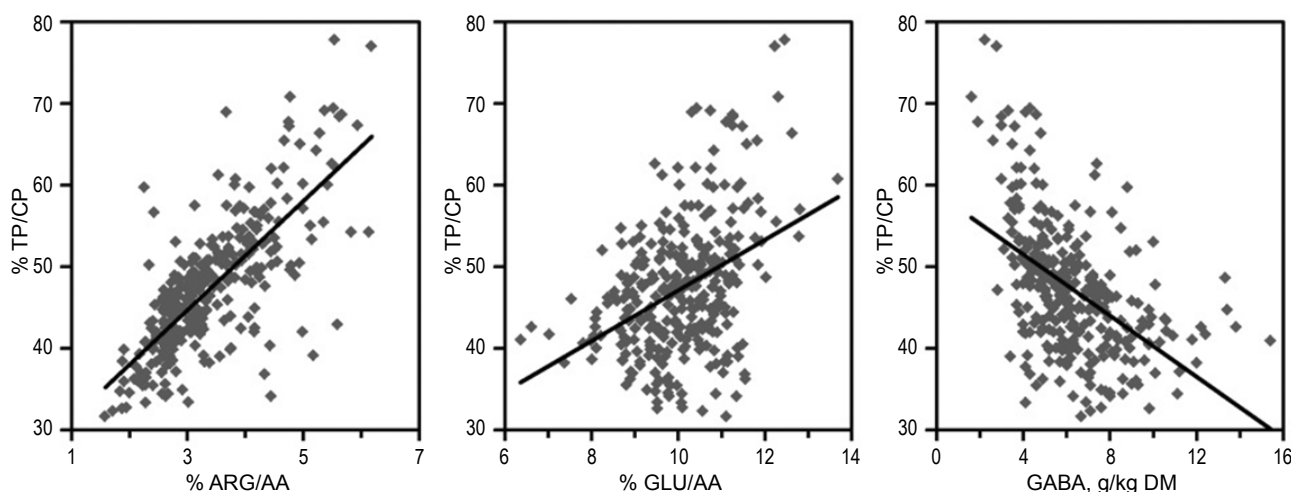
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Grass silage is an often used compound in the diet of dairy cattle. However, its quality and composition may be influenced by numerous factors. It is well known that after harvesting grass for silage production, plant enzymes like proteases degrade the true protein (TP). As long as the grass is not wilted yet, enzymes in the plant cells can still function, hence the percentage of TP in total crude protein (CP) decreases. Simultaneously, the amino acid (AA) composition of the grass changes. 311 grass silages were analyzed for their contents of AA, TP and CP. The aim of the present study was to investigate whether the AA profile changes with different percentages of TP in CP.

The AA composition of all 311 grass silages was analyzed via VDLUFA III, method 4.11.1 by *Evonik Nutrition & Care GmbH*, Hanau, Germany. Assayed AA were: MET, CYS, LYS, THR, ARG, ILE, LEU, VAL, HIS, PHE, GLY, SER, PRO, ALA, ASP, GLU as well as the biogenic amine GABA ( $\gamma$ -aminobutyric acid). The Institute for Animal Nutrition, University of Veterinary Medicine Hannover Foundation, analyzed TP and total CP contents. TP contents were determined using the Barnstein method, corresponding to VDLUFA III, method 4.4.1. The amount of total CP was analyzed via KJELDAHL according to VDLUFA III, method 4.1.1. The concentration of every single assessed AA was converted into a percentage of the sum of all measured AA. Statistics were evaluated via Spearman rank correlation (src).

Statistics revealed a highly significant correlation ( $P < 0.001$ ) between the contents of arginine (src = 0.73), glutamate (src = 0.36), GABA (src = -0.52) and the respective percentages of TP in CP in the grass silages, as can be seen in fig. 1–3. The other AA were not or had only low correlations with TP and CP.



Correlation between arginine (*fig. 1*, left), glutamate (*fig. 2*, center) and GABA (*fig. 3*, right) and the percentage of TP in total CP

As opposed to the literature, a change in AA composition was only noticeable for arginine, glutamate and GABA. Deficiencies of arginine or glutamate in the forages or higher concentrations of ornithine and/or biogenic amines [e.g. GABA (from GLU), putrescine, spermidine, spermine and thermospermine (from ARG)] could be a result of plant protein degradation. This information may aid in finding an answer to the question: How are sensorially ordinary grass silages with low TP in CP a cause of dairy herd diseases?

**Keywords:** COWS, GRASS SILAGES, AMINO ACID PROFILES, HERD DISEASES