

## CURRENT CONCEPTS OF PROTEIN DIGESTION AND ABSORPTION IN THE PIG REVIEW

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**Abstract.** It is generally agreed that in the pig the amount of amino acids absorbed in the small intestine up to the terminal ileum gives a more reliable estimate of the amount available to the animal than does the conventional fecal analysis method, particularly if the diet contains protein of low quality. Due to microbial metabolism of nitrogenous material in the large intestine, only a relatively small proportion of the amino acid excretion in feces is directly related to the amino acids recovered at the distal ileum. Thus, depending on the amino acid and on the feedstuff, digestibility values obtained by the fecal analysis method overestimate (which is usually the case) or underestimate those obtained by the ileal analysis method. Therefore, it is now recognised that the ileal analysis method should be considered as an improvement over the fecal analysis method. If one accepts that the determination of amino acid digestibility values should be based on the ileal analysis method, one should consider that ileal digesta contains variable amounts of endogenous protein originating mainly from digestive secretions, sloughed-off epithelial cells and mucins. In order to get a "true" estimate of digestibility, correction should be made for the non-dietary component. True digestibility estimates should more closely describe the uptake of amino acids from the digestive tract. True digestibility has the advantage over apparent digestibility in that it is a fundamental property of the feedstuff, being independent of dietary conditions. For a given amino acid, the apparent digestibility increases exponentially with the ingested quantity, because endogenous excretion, as a percentage of total excretion, decreases proportionally. In contrast, true amino acid digestibility is not affected by the ingested quantity. Therefore, using true digestibility data allows raw materials to be accurately compared, even if they are ingested in different quantities. Endogenous protein and amino acid recoveries in ileal digesta can be divided in a non-specific and specific fraction. The non-specific recovery - also referred to as basal recovery - is related to the dry matter intake but independent of the type of feedstuff or diet. In contrast, the specific recovery - also referred to as extra recovery - is related to the composition of the feedstuff or diet (e.g. presence of inherent factors such as lectins, trypsin inhibitors and tannins). The flow of basal endogenous protein and amino acids at the ileal level can be considered as an inevitable loss for the pig. Data on the flow of basal endogenous protein and amino acids can be used to calculate true ileal digestibility values of feed ingredients for pigs. In conclusion, the use of true ileal digestible amino acids in diet formulation for pigs will contribute to (1) a more accurate evaluation of the cost/benefit value of ingredients, (2) an improved additivity of digestibility values in least cost formulation programs, (3) a more efficient use of alternative feedstuffs, (4) an improved utilization of protein (nitrogen) and amino acids for maintenance and protein deposition, (5) a better prediction of growth performance of pigs and, finally, (6) a more cost effective swine production.

**Keywords:** Pigs, Amino acids, Endogenous protein, True digestibility.