

True ileal amino acid digestibility of ingredients in broilers in the presence or absence of a mono component protease



M. Iwaniuk^{1*}, R. Angel¹, S. Vieira², and N. E. Ward³

¹Department of Animal and Avian Sciences, University of Maryland, College Park, MD, USA

²Departamento de Zootecnia, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil

³DSM Nutritional Products, Parsippany, NJ, USA



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INTRODUCTION

Protein feedstuffs have been increasing in cost, a trend that has only been exacerbated in recent years. In parallel, increased public concerns regarding the environmental impact of animal agriculture has increased the need for reducing waste nutrients generated by animal production. Research on the use of exogenous enzymes in broiler diets has been ongoing for many years. The wide range of endogenous proteases synthesized and released in the gastrointestinal tract is generally considered to be sufficient to optimize feed protein utilization (Niban and Mahgna, 1993; Le Heuron et al., 1993). However, crude protein and amino acid (AA) digestibilities reported for poultry indicate that valuable amounts of protein pass through the gastrointestinal tract without being completely digested (Wang and Parsons, 1998; Lemme et al., 2004). This undigested protein represents an opportunity for the use of supplemental exogenous proteases in broiler feeds.

OBJECTIVE

To evaluate the effects of the inclusion of a mono component serine protease on the true amino acid (TAA) digestibility of individual ingredients for broilers.

MATERIAL AND METHODS

Straight run Ross 708 broilers were raised to 17 d in floor pens and assigned to battery pens in a completely randomized design of 12 treatments (Trt). Each Trt was replicated 8 times with 7 birds per replicate. A nitrogen free diet (NFD) was formulated with 0.3% TiO₂ as a marker. The corn-starch, sucrose and Solka-Flock® in the NFD diet were replaced in part by the ingredients being tested such that all the protein in the diet came from the test ingredient. Ingredients were added to achieve 20% protein for the high protein ingredients or to a maximum of 96% of the diet for the low protein ingredients. Ingredient inclusions in the final diets were: 42% soybean meal (48%), 40% meat and bone meal, 75% corn distiller dried grains with solubles (DDGS; Dakota Gold, Sioux Falls, SD), 96% corn and 96% bakery by-product meal. Each Trt was supplemented or not with 200 ppm (15,000 protease units/kg) of a mono component serine protease (RONOZYME ProAct™ CT, DSM Nutritional Products, containing 75,000 protease units/g of Product). Birds were fed the diets for 4 d after which they were euthanized and the distal half of the ileal content collected, pooled by pen and freeze dried. Diet and ileal content were analyzed for Ti, N, and amino acids. Statistics were done with a two way ANOVA (5 ingredients with or without protease) and contrasts between diets with Student's T-Test.

CONCLUSIONS

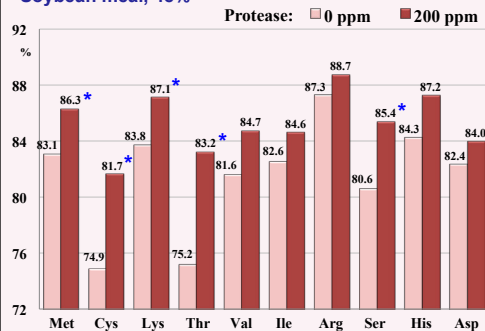
- 1.-The protease improved true ileal digestibility of N, Met, Cys, Lys, Thr, Val, Ile, Arg, Ser, His and Asp (main effect).
- 2.-The effect of protease and the magnitude of the effect varied between amino acids and ingredients.

REFERENCES

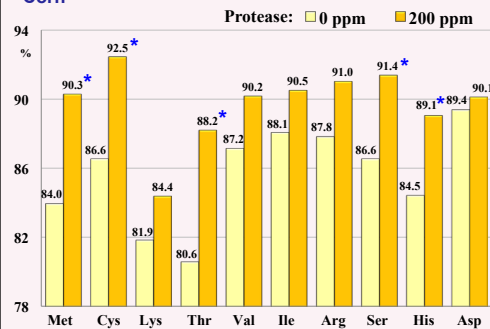
Le Heuron, I., E. Lhote, C. Wicker-Planquart, N. Dakka, R. Toullier, T. Corring, P. Guilloteau, and A. Paigservert. 1993. *Proc. Nutr. Soc.* 52:301-313.
 Lemme, A., V. Ravindran, and W. L. Bryden. 2004. *World Poultry Sci. J.* 60:423-437.
 Niban, Z., and M. Mahgna. 1993. *Br. Poultry Sci.* 34:523-532.
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RESULTS

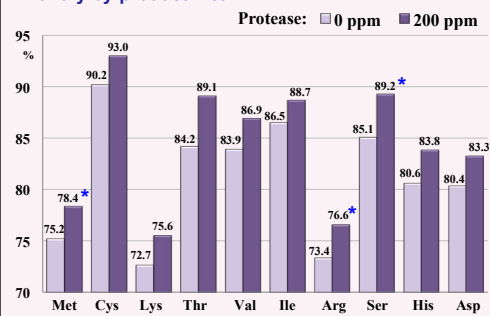
Soybean meal, 48%



Corn

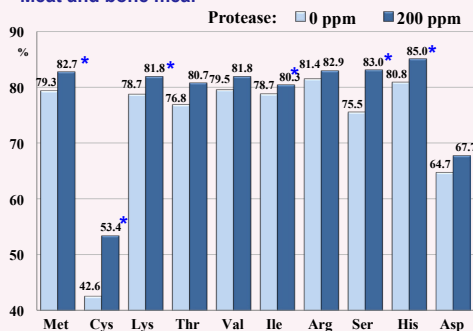


Bakery by-product meal

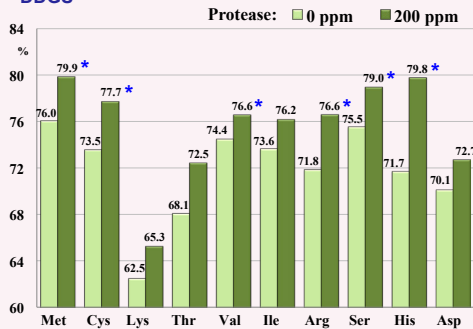


* Means within an ingredient and AA with a * differ ($P < 0.05$) based on Student's T-Test

Meat and bone meal



DDGS



Nitrogen	SEM n=8	Ingredient (Diet)	Protease	Ingredient × Protease
AA	0.90	< 0.0001	< 0.0001	0.094
Met	0.92	< 0.0001	< 0.0001	0.382
Cys	1.21	< 0.0001	< 0.0001	0.019
Lys	0.97	< 0.0001	< 0.0001	0.994
Thr	1.38	< 0.0001	< 0.0001	0.837
Val	1.10	< 0.0001	< 0.0001	0.996
Ile	1.16	< 0.0001	0.0042	0.995
Arg	1.11	< 0.0001	< 0.0001	0.403
Ser	0.85	< 0.0001	0.0036	0.378
His	1.27	< 0.0001	< 0.0001	0.265
Asp	1.11	< 0.0001	0.004	0.082
Trp	1.93	< 0.0001	0.004	0.785
Phe	1.59	< 0.0001	0.061	0.998
Leu	1.17	< 0.0001	0.289	0.982
Tyr	1.17	< 0.0001	0.555	0.979
Glu	1.16	< 0.0001	0.901	0.899
Gly	2.09	< 0.0001	0.343	0.290
Ala	1.13	< 0.0001	0.523	0.968