

437P Effect of microbial phytase on apparent ileal digestibility of amino acids: Meta-analysis approach. Maroua Zouaoui, Frédéric Guay, and Marie-Pierre Montminy*, *Laval University, Quebec, QC, Canada.*

Although majority of amino acid (AA) digestibility studies showed a positive effect of phytase, underlying mechanisms, interfering factors and equivalencies are not well-known. The objective of this study was to evaluate the effect of microbial phytase supplementation on AA apparent ileal digestibility (AID) in broilers taking into account main factors affecting AA digestibility, such as dietary AA, calcium (Ca), neutral detergent fiber (NDF) and phytic P (PP) through meta-analysis approach. Thirty-one articles published between 1997 and 2016 and including 198 experiments were included in our database. Multiple regression models were fitted with the GLM procedure of Minitab software with the fixed effect of the experiment. Models are accurate with R^2 varying from 0.76 for Ser to 0.90 for Arg. Microbial phytase supplementation increases linearly ($P < 0.05$) and quadratically ($P < 0.05$) AID of all essential AA. Dietary AA increased linearly their AID ($P < 0.05$) except for Leu and Trp. Dietary PP affected negatively the AID of all essential AA ($P < 0.05$) except Arg, Lys and Trp. However, when analysis was done with sub-database containing values of PP less than 0.5% diet, PP has no effect on AA AID. No interactions between microbial phytase and other variables were found regardless of the databases. Based on these models, supplementation of 500 FTU/kg diet generates an improvement of all AA (Arg, $1.3 \pm 0.2\%$; Lys, $1.4 \pm 0.2\%$; Trp, $1.7 \pm 0.7\%$; Val, $1.7 \pm 0.4\%$; Ile, $1.9 \pm 0.4\%$; Leu, $1.9 \pm 0.3\%$; Phe, $1.9 \pm 0.3\%$; His, $2 \pm 0.4\%$; Asp, $2 \pm 0.4\%$; Ser, $2.4 \pm 0.5\%$, and Thr, $2.7 \pm 0.5\%$). The highest effect of phytase on Thr, Ser and Asp and their high concentration in mucin and pepsin support the thesis that the degradation of PP decreases secretion of these proteins. The current study showed that microbial phytase supplementation affected positively the AID of essential AA and this effect was not modified by other dietary components such as AA, Ca, fiber and PP. The current models allow quantifying the effect of microbial phytase on AA which is important to use phytase feed enzyme accurately in diet formulation.

Key Words: broiler, amino acid, apparent ileal digestibility, phytase, meta-analysis