Effect of microbial phytase on performance and apparent digestibility of amino acids in male broiler chickens

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Introduction Phytic acid is present in grains and seeds as a mixed salt, complexed with various cations, proteins and lipids (Cosgrove, 1966). The phytate-protein complexes may reduce the utilization of the amino acids. Additionally, phytate may form complexes with proteases, such as trypsin and pepsin (Singh and Kricorian, 1982) in gastrointestinal tract. These complexes may reduce the activity of digestive enzymes with a subsequent decrease in the digestibility of dietary proteins. It has been reported that microbial phytase improves the utilization of amino acids in broilers (Ravindran et al., 1999a). The objective of the present study was to evaluate the effect of microbial phytase on performance and apparent digestibility of amino acids in broiler chickens.

Materials and methods Three hundred day-old male chicks of a commercial strain (Hisex) were wing banded, weighted and randomly allocated to five treatment groups with five replicates of 12 chicks in each floor pen. The treatments involved supplementation of 0, 250, 500, 750 and 1000 FTU microbial phytase/ kg of a commercial diet (adequate in phosphorus and calcium) from 0 – 28 days of age. During days 21 to 24, excreta from 4 birds of each replicate was totally collected after transferring to battery cages. The feces stored at -20 C, freeze-dried and analyzed for amino acids using HPLC. Live body weight, feed intake and feed efficiency were recorded weekly. Analysis of variance and Duncan's new multiple range test were conducted using the General Linear Models procedure of SAS (SAS Institute, 1990) appropriate for a completely randomized design.

Results Microbial phytase had a significant effect ($P<0.05$) on apparent digestibility of amino acids. As shown in Table 1, 500 FTU of phytase / kg of diet significantly increased digestibility of studied amino acids. Higher levels of phytase caused poorer digestibility. Phytase had no significant effect ($P>0.05$) on live body weight, feed intake and feed efficiency. Body weight was numerically higher in 250 FTU and decreased insignificantly as level of phytase increased.

Table 1 Effect of phytase on fecal digestibility of amino acids in male broiler chickens

Treat	LYS	LEU	ILE	PHE	VAL	ALA	ARG	THR	HIS
0	87.8^{b}	85.7^{b}	84.0^{ab}	86.4^{b}	77.4^{b}	92.2^{a}	90.6^{c}	82.2^{b}	88.0^{c}
250	91.7^{a}	89.4^{a}	87.2^{a}	90.0^{a}	85.4^{a}	84.4^{ab}	93.7^{ab}	86.3^{ab}	91.9^{a}
500	91.2^{a}	89.3^{a}	87.0^{a}	90.0^{a}	85.5^{a}	83.9^{ab}	94.4^{a}	87.4^{a}	91.4^{a}
750	87.9^{b}	85.7^{b}	83.4^{b}	86.4^{b}	80.5^{ab}	79.2^{b}	90.8^{bc}	82.3^{b}	88.7^{bc}
1000	89.7^{ab}	87.4^{ab}	85.0^{ab}	88.6^{ab}	82.8^{ab}	82.3^{b}	93.2^{abc}	85.3^{ab}	90.3^{ab}
SE	0.75	0.94	1.04	0.92	1.94	2.88	0.93	1.24	0.64

^{abc} Means in the same column with a different superscript are significantly different ($P<0.05$)

Conclusion The results under the conditions of this study indicated that supplementation of 500 FTU phytase /kg of a commercial diet increased apparent digestibility of amino acids in male broiler chickens. Supplementation of Phytase had no significant effect ($P>0.05$) on feed intake and feed efficiency.

References

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