Feed enzymes and amino acid digestibility of feed ingredients

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During the last decade, the inclusion of non-starch polysaccharide degrading enzymes, with predominantly xylanase activity, in wheat-based poultry diets has become routine (1). More recently, the acceptance of microbial phytase feed enzymes has increased in response to increasing concerns over phosphorus (P) pollution in the environment. The hydrolysis of phytate by phytase increases the utilisation of phytate-bound P (phytate-P) and reduces P excretion but increasingly research suggests that phytase also improves protein and energy utilisation (2). Possible interactions between phytase and xylanase following their simultaneous inclusion in wheat-based broiler diets have attracted interest in recent years (Ravindran *et al* (1999). Despite the increasing likelihood of phytase and xylanase being used simultaneously in practice, published reports on their combined application are limited.

The object of this study was to determine the influence of a commercial xylanase (Natugrain Blend™; BASF, Ludwigshafen, Germany), and a microbial phytase (Natuphos®; BASF) alone and in combination, on the apparent amino acid digestibility of feed ingredients commonly used in the poultry industry, namely: wheat, sorghum, soyabean meal, canola meal, cottonseed meal, and lupins (*L. angustifolius*).

The amino acid digestibility bioassay was conducted as described (3). The 25 experimental diets were fed in a mash form to three replicate pens (6 male birds per pen) for 5 days. On day 42, ileal digesta was collected for digestibility determination and the average values appear in the table.

Ingredient	Control	Xylanase	Phytase	Xylanase + Phytase	SEM
Sorghum	0.78	0.82	0.79	0.78	0.022
Wheat	0.72^{c}	0.79^{a}	0.75^{bc}	0.77^{ab}	0.010
Soyabean meal	0.86	0.84	0.86	0.84	0.010
Canola meal	0.72^{b}	0.74^{b}	0.76^{a}	0.74^{ab}	0.009
Cottonseed meal	0.73	0.73	0.74	0.75	0.017
Lupins	0.82^{a}	0.77^{b}	0.82^{ab}	0.80^{ab}	0.015

^{abc} Means within rows with different superscripts differ significantly ($P < 0.05$).

Enzyme supplementation was without effect of sorghum, soybean meal and cottonseed meal. Xylanase had a positive effect ($P < 0.05$) on wheat digestibility but a negative effect ($P < 0.05$) with lupins. Phytase significantly ($P < 0.05$) improved canola meal digestibility. In studies (2) with wheat-based diets, synergistic responses were observed with simultaneous inclusion of xylanase and phytase.

References

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Key words: feed enzymes, amino acids, poultry