Influence of microbial phytase and xylanase on broiler performance

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The influence of phytase produced by solid–state fermentation (Allzyme SSF®) and xylanase (Allzyme® PT) on the performance of male broilers and the apparent metabolizable energy (AME) of their wheat–soy diets containing adequate phosphorus was investigated in a 3 week trial. Experimental diets were additions of xylanase (1000 XU/kg) and phytase (500 PU/kg) singly or in combination to the control diet based on wheat (67.3%) and soybean meal and containing 0.45% non–phytate P. Each diet was fed to 5 pens of 8 birds. Toe samples were obtained on day 21; AME was determined from total collection of excreta during week 3.

Supplemental phytase improved weight gains and feed efficiency by 17.5 and 2.9% respectively, and xylanase by 16.5 and 4.9% ($P<0.05$; Table 1). In combination, compared with the basal diet, they improved weight gains by 19.8% ($P<0.05$) and lowered feed/gain by 5.4% ($P<0.05$). The improvement in the performance of birds given xylanase was expected and is consistent with previous reports (Annison and Choct 1991; Bedford and Classen 1992). That phytase was as effective as exogenous xylanase, especially in diets containing adequate P, was unexpected. This may be because the phytase used in the present study contained relatively high levels of β–glucanase, xylanase and protease, and that may also explain why phytase and xylanase together had no further beneficial effects on broiler performance. Treatments had no effect on toe ash contents because dietary P in the present study was adequate (0.45%). It appears that the performance responses from supplemental phytase are not related to a P effect, but are likely to reflect the enzyme effects on other nutrients.

Improvements in AME from individual additions of xylanase and phytase were not significant ($P>0.05$), but were significant with the combined addition ($P<0.05$) which confirms a previous finding (Ravindran *et al*. 1999).

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Table 1 Influence of enzyme treatments on broiler performance (1–21 days)[1].

Treatment	Gain (g/bird)	Feed/gain (g/g)	Toe ash (% dry matter)	AME (MJ/kg dry matter)
Basal	726[a]	1.516[a]	12.28	14.19[a]
Basal + xylanase	847[b] (+16.5)[2]	1.442[bc] (–4.9)	11.94	14.43[ab] (+1.7)
Basal + phytase	853[b] (+17.5)	1.472[b] (–2.9)	12.08	14.39[ab] (+1.4)
Basal + xylanase + phytase	871[b] (+19.8)	1.434[c] (–5.4)	12.20	14.68[b] (+3.5)
Pooled SEM	24.8	0.0105	0.221	0.116

[a,b] Means in a column with different superscripts differ ($P<0.05$)
[1] Values are means of five replicates
[2] Values in parentheses refer to percentage changes over the basal diet from the addition of enzyme