

## **T151, Impact of dietary phosphorus and calcium level on phytase efficacy in improving phosphorus and calcium digestibility and growth performance of broilers**

**Roger Davin, Frances Yan\*, Colwayne Morris, David Ledoux, Mercedes Vazquez-Anon Novus International Inc.**

A battery trial was conducted to evaluate the effect of phytase on ileal P and Ca digestibility and growth performance of broilers. Five corn SBM based diets were formulated to contain different levels of non-phytate P (nPP) and Ca: 0.45 and 0.93% (normal), 0.30 and 0.93% (marginal P normal Ca), 0.30 and 0.78% (marginal P and Ca), 0.13 and 0.93% (deficient P normal Ca), and 0.13 and 0.78% (deficient P marginal Ca). The five diets were supplemented without or with 500 U/kg phytase (CIBENZA® PHYTAVERSE®, Novus International Inc, St Charles, MO) resulting in 10 treatments. Each diet was fed to 16 replicate pens of 5 birds from 17 to 22 d in mash form. On d 22, all birds were sacrificed to collect digesta from the distal 2/3 of the ileum to calculate ileal P and Ca digestibility. Data were analyzed by one-way ANOVA and means were separated by protected Fisher's LSD test with a value of  $\leq 0.05$  considered significantly different. In the absence of phytase, P digestibility decreased in a nPP-dependent fashion: 54% at nPP = 0.45, 49% at nPP = 0.30, and 32% at nPP = 0.13. Phytase increased P digestibility in all diets; the magnitude was greater for P deficient diets (22 and 18% increase for normal and marginal Ca) than for P marginal diets (7 and 13% increase for normal and marginal Ca) and P normal diet (7% increase). Without phytase, lowering nPP from 0.30 to 0.13% reduced Ca digestibility by 11 and 10% at normal and marginal Ca, whereas, phytase increased Ca digestibility by 15 and 18% respectively. Although birds fed 0.30% nPP performed similarly to birds fed 0.45% nPP, phytase increased weight gain regardless of Ca level, and improved FCR when dietary Ca was marginal. Broilers on 0.13% nPP had inferior growth performance compared to birds fed 0.30 or 0.45% nPP; phytase improved performance and the magnitude was greater when Ca was marginal. In summary, phytase improved growth performance when P level was marginal or deficient with the improvement being greater at deficient P levels, and marginal dietary Ca level could facilitate phytase response on growth performance of broilers. Phytase increased P digestibility regardless of dietary P level, with the magnitude being greater at the lower P level, and increased Ca digestibility only when dietary P was deficient.

**Key words:** phytase, phosphorus, calcium, digestibility, broiler