

## **Efficacy of phytase superdosing on growth performance, pancreatic response and nutrient digestibility of broilers with a high trypsin inhibitor diet**

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A battery study was conducted to evaluate the efficacy of phytase superdosing in improving growth performance, pancreatic response, and nutrient digestibility of broilers with a high trypsin inhibitor model. There were 5 dietary treatments: positive control (PC), negative control 1 (NC1), NC1+ 1500 U/kg phytase, negative control 2 (NC2), and NC2 + 1500 U/kg phytase. In NC1 and NC2, the SBM was substituted with full fat extruded soybeans to target the trypsin inhibitor level at 2.5 mg/g diet. The formulated Ca and non-phytate P (nPP) for PC, NC1 and NC2 were: 0.93% and 0.45% (normal), 0.93% and 0.45% (normal), and 0.78% and 0.30% (marginal deficiency), respectively. The source of phytase was CIBENZA® PHYTAVERSE® (Novus International Inc, St. Charles, MO). Each diet was fed to 9 replicate pens of 8 birds from 8 to 15 d in mash form. On d 14, samples from 1 bird/pen were collected for activities of trypsin and chymotrypsin in jejunal digesta. On d 15, all birds were sacrificed for pancreas weight, and ileal digesta for nutrient 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. Compared to PC, trypsin inhibitors (NC1) significantly decreased feed intake, reduced digestibility of DM, CP and AA, inhibited trypsin activity in jejunal digesta and increased pancreas weight; phytase supplementation to NC1 significantly increased P digestibility and had no significant effect on other measurements. Compared to NC1, P deficient diet (NC2) decreased body weight gain and feed intake, increased feed to gain ratio, decreased DM digestibility and decreased chymotrypsin activity in jejunal digesta. Phytase superdosing significantly reversed all the changes induced by P deficiency, and also increased P digestibility, decreased the pancreas weight and increased digestibility of Cys (4.5%) and Met (2.2%) compared to NC2. Overall, with a high trypsin inhibitor model, phytase superdosing significantly increased P digestibility, regardless of P deficiency; and it also improved growth performance, pancreatic response and digestibility of DM, Cys and Met at marginal P deficiency.

**Keywords:** Phytase, trypsin inhibitor, phosphorus digestibility, amino acid digestibility, pancreatic response