

Dose response to phytase inclusion in diets for growing swine

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The supplementation of swine feeds with phytase allows the formulation of diets with less total P, decreasing the amount of P excreted in the manure. The enzyme increases the bioavailable P, therefore its use requires a re-evaluation of the Ca concentration in the diet to ensure an optimal Ca:P ratio.

Sixty-three barrows (40.3±1.9 kg) were fed corn-soybean meal based diets for a 28-d growth and digestibility trial. Diets were formulated with either 0.50%, 0.60% or 0.70% Ca and supplemented with 0 to 2000 U/kg phytase.

Neither performance nor P digestibility was affected by the dietary Ca concentration ($P>0.1$). Phytase inclusion in the diet increased ADG ($P=0.04$, linear); ADFI ($P=0.02$, quadratic), and feed efficiency ($P=0.01$, linear); however, the improvement beyond the 250 U/kg inclusion level was marginal. Conversely, P digestibility continued to increase ($P=0.001$) in a linear manner up to the 2000 U/kg level suggesting that P availability was limiting for other activities such as bone deposition.

| Enzyme (U/kg) | ADG, kg/d | ADFI, kg/d | FCE | P digestibility, % |
|---------------|-----------|------------|------|--------------------|
| 0 | 0.88 | 2.55 | 0.38 | 18.06 |
| 250 | 1.03 | 2.66 | 0.39 | 34.28 |
| 500 | 0.94 | 2.63 | 0.36 | 39.54 |
| 1000 | 1.05 | 2.69 | 0.39 | 46.86 |
| 2000 | 1.03 | 2.51 | 0.41 | 54.42 |

Implications

The inclusion of phytase improved P digestibility up to 2000 U/kg, but had only marginal effects on performance beyond 250 U/kg. Supplementing diets with greater than 250 U/kg could potentially allow the formulation of diets containing less inorganic P. A pig consuming 2.5 kg/d of a diet containing 0.36% total P excretes 7.4 g/P per day into the faeces if digestibility is only 18%. However, less than 4 g/d would be excreted into the faeces if digestibility improved to 54%. Dietary Ca does not appear to influence the efficacy of this phytase.