

# Measurement of Digestible Phosphorus Content in Feed Ingredients for Poultry

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A study was conducted to investigate the usefulness of regression method to determine the true ileal phosphorus (P) digestibility of common feed ingredients for poultry. Four semi-purified diets were formulated from each ingredient to contain graded concentrations of total P. In all test diets, the test ingredient was used as the sole dietary source of P and the calcium: non-phytate P ratio was maintained at 2:1. Total P output in ileal digesta [expressed as g/kg dry matter intake (DMI)] at each level of inclusion were calculated and regressed against dietary P contents (g/kg DM) in a linear regression. True P indigestibility and endogenous P losses were calculated from the respective slope and intercept of the regression equation. True ileal phosphorus (P) digestibility coefficients of maize, canola meal, wheat, sorghum, soybean meal (SBM) and maize-distiller's dried grains with solubles (maize-DDGS) for broiler chickens were calculated to be 0.676, 0.469, 0.464, 0.331, 0.798 and 0.727, respectively. The endogenous P loss of maize, canola meal, wheat, sorghum, SBM and maize-DDGS were 0.020, -0.464, 0.080, -0.087, 0.609 and 0.418, respectively. For plant-based feed ingredients, the determined true digestible P contents were consistently higher than corresponding non-phytate P contents (Maize, 1.72 vs. 0.75; canola meal, 4.55 vs. 2.82; wheat, 1.49 vs. 1.11; sorghum, 0.78 vs. 0.55; SBM, 5.16 vs. 2.15; maize-DDGS, 5.94 vs. 4.36 g/kg, as fed basis, respectively). True ileal digestibility coefficients of P of three meat and bone meal (MBM) samples ranged from 0.420 to 0.693. The endogenous P loss of three MBM samples (MBM-1, MBM-2 and MBM-3) were determined to be 0.049, 0.142 and -0.370, respectively. Total and true digestible P contents of MBM-1, MBM-2 and MBM-3 were determined to be 37.5 and 26.0; 60.2 and 36.6; and 59.8 and 25.1 g/kg, as fed basis, respectively. The data suggested that the use of regression method to estimate true ileal P digestibility in feed ingredients has number of drawbacks. Overestimation of true ileal P digestibility as a result of using calcium and P-deficient diets and the negative endogenous P losses observed for some feed ingredients (canola meal, sorghum and MBM-3) were main concerns. Negative ileal endogenous P losses were also shown to be associated with low true ileal P digestibility in these feed ingredients.

**Keywords:** Digestibility, ileal, phosphorus, poultry