

188 Effects of physicochemical characteristics of feed ingredients on total tract digestibility of dry matter, energy, fiber, and protein by growing pigs.

D. M. D. L. Navarro^{1,*}, E. M. A. M. Bruininx²,
L. de Jong², H. H. Stein¹, ¹*University of Illinois at
Urbana-Champaign, Urbana*, ²*Agrifirm Innovation
Center, Royal Dutch Agrifirm, Apeldoorn, Netherlands*.

An experiment was conducted to determine the effects of physicochemical characteristics of feed ingredients on the concentration of DE and ME and apparent total tract digestibility (ATTD) of DM and nutrients in corn, wheat, soybean meal (SBM), canola meal, distillers dried grains with solubles (DDGS), corn germ meal, copra expellers, sugar beet pulp, solka floc, and pectin fed to growing pigs. Correlation among the physical characteristics, concentration of DE and ME, and ATTD of energy and nutrients in feed ingredients, and apparent total tract digestibility (IVATTD) of DM from an in vitro experiment using the same ingredients was determined. Results indicated that ATTD of GE was greater ($P < 0.05$) in wheat than in canola meal, DDGS, corn germ meal, copra expellers, sugar beet pulp and solka floc, but not different from corn, SBM, and pectin. The concentration of DE and ME (DM basis) were greater ($P < 0.05$) in wheat than in canola meal, DDGS, corn germ meal, sugar beet pulp, solka floc, and pectin, but not different from corn and copra expellers. Soybean meal had the greatest ($P < 0.05$) concentration of DE and ME (DM basis) among all ingredients. Swelling was positively correlated ($P < 0.05$) with ATTD of NDF ($r = 0.75$), ADF ($r = 0.80$), IDF ($r = 0.89$), and TDF ($r = 0.84$). Viscosity was also positively correlated ($P < 0.01$) with ATTD of NDF ($r = 0.92$), ADF ($r = 0.86$), and IDF ($r = 0.79$). Water binding capacity was also positively correlated ($P < 0.05$) with ATTD of IDF ($r = 0.67$) and TDF ($r = 0.68$). The concentration of TDF, but not the concentrations of ADF and NDF, was negatively correlated ($P < 0.01$) with ATTD of GE ($r = -0.80$) and the concentration of DE ($r = -0.86$) and ME ($r = -0.85$), which indicates that TDF is a better estimate of DE and ME than NDF and ADF. The IVATTD of DM was positively correlated ($P < 0.05$) with ATTD of DM ($r = 0.79$) and the concentration of DE ($r = 0.74$) and ME ($r = 0.72$), indicating that the in vitro procedure may be used to estimate digestibility of DM and energy. However, physical characteristics of feed ingredients were not correlated with the concentration of DE and ME, which indicates that these parameters may influence fiber digestibility but not energy digestibility in feed ingredients in vivo.

Key Words: dietary fiber, energy, physicochemical characteristics

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