In vitro digestion and fermentation characteristics and in vivo digestibility of canola co-products in the pigs

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A study was conducted to determine in vitro degradation and fermentation characteristics of Brassica juncea CM (JCM) and Brassica napus CM (NCM) in comparison to soybean meal (SBM). Samples were first hydrolyzed using pepsin and pancreatin. Subsequently, residues were incubated in a buffer with fresh pig feces as inocula in a randomized complete block design providing 12 replicates per feedstuff per run for 2 runs. Accumulated gas production was measured for 72 hours and modeled to estimate kinetics of gas production. Concentration of volatile fatty acids per unit weight of feedstuff was measured in fermented solutions. In previous studies, ileal and hindgut energy digestibility values for feedstuffs were obtained from ileal-cannulated barrows (~50 kg body weight) fed cornstarch-based diets containing 50% feedstuffs for 5 days. On dry matter basis, SBM, JCM, and NCM contained 50.6, 44.0, and 38.1% crude protein; and 8.5, 22.3, and 30.6% neutral detergent fibre, respectively. The in vitro dry matter digestibility and Ileal energy digestibility were greatest for SBM followed by JCM and then NCM. Total gas production for SBM was greater ($P < 0.05$) than that of JCM, which was greater ($P < 0.05$) than that for NCM. Total volatile fatty acid production was lower ($P < 0.05$) for SBM (0.73 mmol/g dry matter) than for NCM (1.05 mmol/g dry matter), which was lower ($P < 0.05$) than that of JCM (1.37 mmol/g dry matter). A similar trend was observed for hindgut energy digestibility (as percentage) for feedstuffs; 15, 21.4, and 24.4% for SBM, NCM, and JCM, respectively. In conclusion, the NCM or JCM can contribute more energy to the pig via hindgut fermentation than the SBM. Also, JCM can contribute more energy to the pig via hindgut fermentation than the NCM.

Implications: Canola co-products contribute dietary energy to pig via hindgut fermentation, and hence they can serve as a source of both protein and energy in swine diets. However, the amount of dietary energy that the canola co-products can contribute varies depending on the species of canola from which the canola co-products are derived.