

## Evaluation of ruminal fermentability of corn milling co-products using in vitro gas production.

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The kinetics of ruminal fermentation influences the feeding value of corn milling co-products. The objective of this study was to evaluate kinetics of gas production in vitro and fermentability of 7 corn milling co-products. For each feed, the concentration of NDF with sodium sulfite, lignin, starch, and sugar (%DM) were: Germ = 30.1, 4.4, 28.8, 9.2 %, Bran = 21.2, 2.85, 32.0, 5.0 %, High Protein Corn Distillers Grains (HPDDGS) = 22.5, 4.55, 9.50, 0.85 %, Dried Distillers Grains (DDGS1) = 30.2, 4.4, 7.4, 3.5 %, Dried Distillers Grains (DDGS2) = 33.9, 10.1, 6.9, 4.8 %, Wet Corn Gluten Feed (WCGF) = 36.9, 3.2, 9.8, 4.5 %, and Wet Distillers Grains (WDGS) = 30.8, 5.9, 3.7, 3.0 %. Feed samples (200 mg each) were inoculated with rumen fluid and media in an anaerobic condition and fermented in vitro for 48 h. Gas production was continuously measured using a computerized system and data was fitted to an exponential model:  $y = a \times (1 - \text{Exp}(-b \times (\text{time} - c)))$ , where  $y$  = gas production (ml),  $a$  is the asymptote of gas production (ml),  $b$  is the rate of degradation (1/h), and  $c$  is the lag time. The asymptote ( $a$ ) of gas production was different among feeds ( $P = 0.04$ ), with a mean and SEM of  $52.1 \pm 3.9$  ml for Germ,  $50.1 \pm 3.4$  ml for Bran,  $37.5 \pm 3.4$  ml for HPDDGS,  $38.6 \pm 3.4$  ml for DDGS1,  $40.1 \pm 3.0$  ml for DDGS2,  $39.0 \pm 3.4$  ml for WCGF, and  $40.7 \pm 3.4$  ml for WDGS. The lag ( $c$ ) of gas production was not different among feeds ( $P = 0.15$ ), with a mean and SEM of  $1.42 \pm 0.34$  h for Germ,  $1.25 \pm 0.29$  h for Bran,  $0.65 \pm 0.30$  h for HPDDGS,  $0.38 \pm 0.30$  h for DDGS1,  $0.60 \pm 0.27$  h for DDGS2,  $0.89 \pm 0.30$  h for WCGF, and  $0.35 \pm 0.30$  h for WDGS. Fractional gas production rates ( $b$ ) were significantly different among feeds ( $P < 0.01$ ), with a mean and SEM of  $19.3 \pm 1.8$  for Germ,  $16.2 \pm 1.5$  for Bran,  $16.1 \pm 1.5$  for HPDDGS,  $14.6 \pm 1.5$  for DDGS1,  $10.3 \pm 1.4$  for DDGS2,  $11.9 \pm 1.5$  for WCGF, and  $9.1 \pm 1.5$  for WDGS. Results of this study demonstrate that corn milling co-products differ in chemical composition and that differences also exist in the pattern of ruminal fermentation and nutrient availability.

Key Words: gas production, rumen fermentation, corn milling co-products