579 Feeding two corn milling co-products to dairy cattle: Intake and milk production. A. M. Gehman* and P. J. Kononoff, *University of Nebraska*, *Lincoln*.

The objectives of this experiment were to examine the effects of feeding dairy cattle different types of corn milling co-products, modified wet distillers grains plus solubles (WDGS) and wet corn gluten feed (WCGF). Multiparious (n = 20) and primiparious (n = 20) cows averaging 93 ± 29 DIM were used in a replicated 5 × 5 Latin square in which cows were blocked by parity and milk production. During each 20–d period, cows were offered one of 5 rations: 1) CONT, 0% co-products; 2) 15WDGS, 15% DM WDGS; 3) 15WCGF, 15% DM WCGF; 4) 15MIX, 7.5% WDGS and 7.5% WCGF; and 5) 30MIX, 15% WDGS and 15% WCGF. Rations were formulated to be similar in crude protein and metabolizable energy and protein allowable milk. Milk production and DMI were averaged for d 14 – 20 of each period for each cow, and milk components were measured on d 19 – 20 of each period. Dry matter intake was greatest ($P < 0.01$) for cows consuming 30MIX (25.5 kg/d) and lowest for CONT and 15 WCGF (22.7 and 23.2 kg/d). Milk production tended ($P = 0.08$) to be higher for 15MIX and 30MIX as compared to CONT (41.9 and 41.8 vs. 39.9 kg/d). 4% fat corrected milk (40.6 kg/d), fat percent and yield (3.92% and 1.59 kg/d), and milk urea N (14.5 mg/dL) were not different among treatments. Milk protein percent was increased ($P < 0.01$) for all rations containing co-products as compared to CONT (3.03 vs. 2.95 %). Protein yield also tended ($P = 0.07$) to be higher for co-products rations as compared to CONT (1.26 vs. 1.20 kg/d). Cows consuming 30MIX were ($P = 0.02$) the least efficient in producing milk from feed consumed (1.64 kg milk/ kg DMI) while 15MIX was the most efficient (1.83). This research demonstrates that WDGS and WCGF can be fed in combination up to 30% DM with an improvement in DMI, milk production, and protein percent and yield and no negative effect on milk fat.

Key Words: Corn Milling Co-Product, Milk, Intake

580 Endosperm type of dry ground corn grain affects ruminal and total tract digestion of starch in lactating dairy cows. M. S. Allen*, R. A. Longuski, and Y. Ying, *Michigan State University*, *East Lansing*.

Our objective was to determine effects of dry corn grain varying in endosperm type and particle size on ruminal digestion kinetics and ruminal and total tract digestibility of starch in lactating cows. Eight ruminally and duodenally cannulated Holstein cows (132 ± 42 DIM; mean ± SD) were used in a duplicated 4 × 4 Latin square design with a 2 × 2 factorial arrangement of treatments. Main effects were corn grain vitreousness (floury or vitreous) and particle size (medium or fine). Endosperm was 25% vitreous for floury treatment and 66% vitreous for vitreous treatment. The fraction of ground corn passing through a 1.18 mm sieve was 43% for medium, vitreous; 42% for medium, floury; 57% for fine, vitreous; and 62% for fine, floury. Diets included alfalfa silage, corn treatments, protein supplement, minerals and vitamins and contained 29.2% starch, 27.6% neutral detergent fiber and 18.3% crude protein. Corn grain treatments supplied 86.2% of dietary starch. No interactions were detected for any measure of starch digestion. Floury treatment increased rate of starch digestion (19.2 vs. 9.9 %/h, $P < 0.01$) and decreased rate of starch passage (16.1 vs. 25.7 %/h, $P < 0.001$), increasing apparent ruminal starch digestibility (53.7 vs. 24.6 %, $P < 0.001$). Total tract starch digestibility was increased by floury treatment (92.2 vs. 85.1 %, $P < 0.0001$) despite greater post-ruminal starch digestion (% of starch intake) for the vitreous treatment (60.7 vs. 38.4 %, $P < 0.01$). Fine grinding increased rate of starch digestion (19.5 vs. 9.51 %/h, $P < 0.01$), which increased apparent ruminal digestibility (47.2 vs. 31.1 %/h, $P = 0.03$) compared to medium treatment. However, total tract starch digestibility was not affected by fineness of grind (mean = 22.2 %/h) because of greater post-ruminal starch digestibility (% of starch intake) for medium compared to fine treatment (57.2 vs. 41.9 %, $P = 0.02$). Endosperm type greatly affects ruminal and total tract starch digestibility independent of corn grain grind size.

Key Words: Vitreous, Digestion Kinetics, Particle Size

581 Effects of two dietary non-fiber carbohydrate levels on ruminal fermentation and animal metabolism of lactating cows. M. Blanch*[1], S. Calsamiglia[1], M. Devant[2], and A. Bach[2,3], [1]*UAB*, *Spain*, [2]*IRTA*, *Spain*, [3]*ICREA*, *Spain*.

Sixty-two lactating Holstein cows (BW = 654 ± 14 kg, DIM = 186 ± 6.8, 40 multiparous and 22 primiparous), fitted with rumen cannulas (5 multiparous and 3 primiparous) were used to study the effects of two dietary NFC levels on ruminal fermentation and animal metabolism following a cross-over design with 2 periods of 30 d. Treatments were: a traditional ration (**TR**, 16.5% CP, 33.8% NDF, and 41.8% NFC, on a DM basis), and a high-NFC ration (**HC**, 17.6% CP, 27.1% NDF, and 47.9% NFC, on a DM basis). Milk yield and feed intake were recorded daily and milk composition biweekly. Animals were blood sampled to determine blood glucose, insulin, and urea concentrations within the first hour after the morning feeding in 2 separate days in each treatment. Fecal samples were taken 1 d in each treatment within the first hour after the morning feeding to determine total tract starch digestibility using lignin as an internal marker. Samples of ruminal contents were collected during 3 d in each treatment at 0, 4 and 8 h post-feeding to determine VFA and ammonia-N concentrations. Rumen pH was recorded electronically at 22-min intervals during 6 d in each treatment. Milk yield was greater (34.4 and 31.9 kg/d), milk fat % was lesser (3.03 and 3.64), and concentrate intake at the milking unit was lesser (2.63 and 3.72 kg/d) in HC compared with TR, respectively. Blood glucose concentration was lesser in TR compared with HC (61.8 and 67.2 mg/dL, respectively), and HC resulted in a lesser total tract starch digestibility (94.7 and 95.9% for HC and TR, respectively) and a greater blood urea level (33.3 and 30.1 mg/dL for HC and TR, respectively). Rumen pH of HC primiparous cows fell below 5.6 for longer periods of time than that of TR cows (6.76 and 0.812 h/d, respectively), but no changes in mean pH were observed (5.93 and 6.26 for HC and TR, respectively). These results indicate that feeding high NFC diets for short periods of time may increase milk yield without incurring in strong negative repercussions to the animal.

Key Words: Dairy Cows, Non-Fiber Carbohydrates