115 Effects of corn processing method and dietary inclusion of wet distillers grain with solubles on carbon-nitrogen balance of finishing cattle. K. E. Hales*[1], N. A. Cole[1], and J. C. MacDonald[2], *[1]USDA-ARS-CPRL, Bushland, TX, [2]Texas Agrilife Research Center, Amarillo.*

The growing ethanol industry in the Southern Great Plains has increased the use of wet distillers grains with solubles (WDGS) in beef cattle finishing diets. Effects of corn processing method and WDGS on carbon (C) and nitrogen (N) balance were evaluated in 4 Jersey steers using respiration calorimetry chambers. A 2 × 2 factorial arrangement of treatments was used in a Latin square design. The factors consisted of corn processing method (steam flaked corn [SFC] or dry-rolled corn [DRC]) and inclusion of corn-based WDGS (0 or 30% on a DM basis). Thus, the 4 treatment combinations consisted of: (1) SFC-based diet with 0% WDGS (SFC-0); (2) SFC-based diet with 30% WDGS (SFC-30); (3) DRC-based diet with 0% WDGS (DRC-0); and (4) DRC-based diet with 30% WDGS (DRC-30). Diets were balanced for DIP and fat. Total C (including gaseous-C) excretion ($P < 0.01$) and methane-C ($P < 0.04$) were greater for cattle consuming DRC than SFC-based diets, and cattle consuming SFC diets retained a greater ($P < 0.01$) quantity of C than those consuming DRC diets. Inclusion of WDGS did not affect ($P > 0.52$) C balance, except that cattle consuming diets containing 30% WDGS excreted more ($P < 0.01$) C in the urine than cattle consuming diets with no WDGS. No differences in N balance were detected ($P > 0.19$) between grain processing methods, although apparent N digestibility was greater ($P = 0.02$) for cattle consuming DRC- than SFC-based diets and N retained tended ($P = 0.10$) to be greater for cattle consuming DRC than SFC-based diets. Due in part to greater N intake, cattle consuming diets containing 30% WDGS excreted more ($P = 0.01$) total N and excreted a greater ($P < 0.01$) quantity of N in the urine. Apparent N digestibility (g/d and % of N intake; $P < 0.03$) and N retained ($P < 0.05$) were also greater in cattle consuming 30 compared with 0% WDGS. From these results we conclude that finishing cattle excrete a greater amount of C when fed DRC compared with SFC-based diets, and that dietary inclusion of 30% WDGS increases urinary N excretion when diets are balanced for equal DIP concentration.

Key words: distillers grain, corn processing, nitrogen

116 Effects of corn processing method and dietary inclusion of wet distillers grain with solubles on energy metabolism and enteric methane emissions of finishing cattle. K. E. Hales*[1], N. A. Cole[1], and J. C. MacDonald[2], *[1]USDA-ARS-CPRL, Bushland, TX, [2]Texas Agrilife Research Center, Amarillo.*

Few studies have used steam-flaked corn (SFC)-based diets to evaluate the effects of wet distillers grains with solubles (WDGS) in finishing cattle diets, and a reliable estimate of the net energy value of WDGS has yet to be determined. Effects of corn processing method and WDGS on energy metabolism and enteric methane (CH_4) production were evaluated in 4 Jersey steers using respiration calorimetry chambers. A 2 × 2 factorial arrangement of treatments was used in a Latin square design. The factors consisted of corn processing method (SFC or dry-rolled corn [DRC]) and inclusion of corn-based WDGS (0 or 30% on a DM basis). Thus, the resulting 4 treatment combinations consisted of: (1) SFC-based diet with 0% WDGS (SFC-0); (2) SFC-based diet with 30% WDGS (SFC-30); (3) DRC-based diet with 0% WDGS (DRC-0); and (4) DRC-based diet with 30% WDGS (DRC-30). The diets were balanced for DIP and fat. Each Latin square period consisted of 14 d diet adaptation and 7 d of fecal, urine, and gas (oxygen consumption, and carbon dioxide and CH_4 production) collections. As a proportion of gross energy (GE) intake, grain processing method did not affect ($P > 0.12$) fecal, digestible, urinary, and metabolizable energy or heat production. In contrast, retained energy tended to be greater ($P = 0.09$) for cattle consuming SFC- than DRC-based diets. Inclusion of WDGS did not affect ($P > 0.17$) fecal, digestible, urinary, metabolizable, and retained energy, or heat production as a proportion of GE intake. Steers consuming SFC diets produced less ($P < 0.04$) CH_4 (L/kg of DMI, % of GE intake) than steers consuming DRC diets. No differences were noted ($P > 0.55$) for CH_4 production between inclusion levels of WDGS. Results suggest that cattle consuming SFC diets produce less CH_4 and retain more energy than cattle fed DRC diets; however, dietary inclusion of WDGS at 30% seems to have little effect on CH_4 production and energy metabolism when diets are balanced for DIP and fat.

Key words: distillers grain, corn processing, methane

117 Effects of spoilage of wet distillers grains plus solubles on feedlot performance. J. L. Harding*, B. N. Nuttleman, K. R. Rolfe, T. J. Klopfenstein, and G. E. Erickson, *University of Nebraska-Lincoln.*

A study was conducted using 60 individually fed crossbred steers (399 ± 30 kg initial BW) in a CRD to evaluate the impact of spoilage of wet distillers grains plus solubles (WDGS) on feedlot performance. The 3 treatments included a dry-rolled corn based diet (control) and 2 diets containing 40% WDGS replacing DRC. The WDGS was purchased from the same ethanol plant on the same day and split equally within semi-load into either an uncovered bunker (spoiled WDGS) or into a silo bag and stored anaerobically (non-spoiled WDGS). Storage occurred 38 d before the initiation of the experiment. To ensure representative quality, samples of both WDGS were collected daily after allowing the WDGS to mix alone in the truck before diet mixing. Samples were composited by week for nutrient analysis. Composition of non-spoiled WDGS was 33.4% DM, 5.6% ash, 14.8% fat, 31.7% NDF, 30.8% CP, and a pH of 4.2. Composition of spoiled WDGS was 35.2% DM, 6.4% ash, 14.1% fat, 33.3% NDF, 30.8% CP, and a pH of 4.8. Nutrient analyses on the non-spoiled and spoiled WDGS samples were used to calculate nutrient loss for the spoiled WDGS. Calculations suggest 12% of DM was lost during storage of spoiled WDGS, with 16% fat and 8% NDF also lost compared with non-spoiled WDGS. No differences were observed in mycotoxins between spoiled and non-spoiled WDGS. Feeding control, non-spoiled WDGS, or spoiled WDGS did not affect DMI ($P = 0.50$). No differences ($P \geq 0.26$) in ADG (1.39 ± 0.30 kg), final BW (571 ± 46 kg), or G:F were observed between non-spoiled and spoiled WDGS treatments with 0.135 and 0.140 observed for G:F, respectively. However, both WDGS treatments were greater ($P \leq 0.04$) in ADG, final BW, and G:F compared with control (1.17 ± 0.24 kg ADG, 550 ± 43 kg final BW, and 0.117 G:F). No differences were observed for LM area ($P = 0.35$), fat ($P = 0.86$), marbling ($P = 0.57$), or yield grade ($P = 0.67$). Even though spoiled WDGS changed in nutrient composition, it did not affect feedlot performance of finishing steers.

Key words: cattle, spoilage, wet distillers grains plus solubles