

# ANR FIELD SUCCESS STORY

## (POW 2007-2011)

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**Position/Title:** Livestock Field Specialist  
**Administrative Area:** Northwest  
**Fiscal Year Accomplished:** July 1, 2007 – June 30, 2008

**POW Title and Number:** 140 Iowa Beef Center

**Title of Success Story:** Evaluation and observations of total Sulfur intake with corn co-product diets in feedlot cattle

**Problem Statement:** Iowa is the center of a large and rapidly growing corn processing industry. These plants produce large quantities of co-products that can be successfully utilized by Iowa beef producers as a relatively inexpensive feed alternative. Polioencephalomalacia (PEM) in cattle was thought at one time to be caused exclusively by a thiamine deficiency. Sulfur intake can occur in the feed or water so the total dietary sulfur intake is needed to evaluate the risk of developing PEM. Corn milling co-products may contain high concentrations of sulfur. According to NRC 2005, the maximum tolerable dietary sulfur concentration is 0.30% (3000 mg/kg or ppm) in a low-forage (<40%) ration on a dry matter basis (DMB). NRC 2005 states the maximum tolerable dietary sulfur concentration is 0.50% (5000 mg/kg or ppm) in a high-forage (>40%) ration on a DMB. Not all cattle consuming these sulfur levels or more will develop clinical PEM.

**Programmatic Response:** Feedlot managers, veterinarians, feed company representatives and extension staff collected a corn co-product sample, a total mixed ration (TMR) sample and a water sample from the cooperating feedlots for laboratory analysis of sulfur content. Selected cooperators were feeding higher levels of corn co-products and/or have had PEM diagnosis. Dairyland Laboratories, Inc., Arcadia, Wisconsin used wet laboratory chemical analysis of the corn co-product and the TMR to determine dry matter, crude protein, neutral detergent fiber, fat, ash, calcium, phosphorous, potassium, magnesium, sulfur and diet cation-anion balance (DCAB). The water sample was analyzed for sodium (+Na), potassium (+K), sulfur (-S) & chloride (-Cl) at Ajinomoto USA, Inc, Eddyville, Iowa.

**Impact/Outcome:** Thirteen feedlots sampled the corn co-products, TMR and feedlot water for wet laboratory chemical analysis. Four complete feedlot rations between 41 & 48 Mcal/cwt Net Energy Gain (NEg) containing corn co-products were analyzed to determine total percent sulfur on a DMB. Ration sulfur level averaged 0.37% and ranged from 0.28-0.50%. Water sulfur content averaged 134 ppm and ranged from 98-205 ppm. The College of Veterinary Medicine spreadsheet to determine total sulfur intake calculated that the 650 pound steer consuming 20 pounds of a 44 Mcal/cwt NEg ration with 0.37% sulfur and water with 134 ppm sulfur was consuming 0.46% total sulfur intake. Twenty percent of the total sulfur comes from the water. Nine complete feedlot rations containing corn co-products were analyzed between 50 & 58 Mcal/cwt NEg to determine total percent sulfur on a DMB. Ration sulfur averaged 0.33% and ranged from 0.21-0.46%. Water sulfur content averaged 32 ppm and ranged from 5-83 ppm. The College of Veterinary Medicine spreadsheet to determine total sulfur intake calculated that the 800 pound steer consuming 24 pounds of a 55 Mcal/cwt NEg ration with 0.33% sulfur and 32 ppm sulfur water was consuming 0.35% total sulfur intake.

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