



## Feeding Distiller's Grains to Beef Cattle

Justin Sexten  
Extension Specialist  
Animal Systems/Beef

According to the Renewable Fuel Association (2003) nearly half of the U.S. fuel alcohol production occurs in Illinois and states immediately adjacent. In 2001 approximately 1.8 billion gallons of ethanol were produced in the U.S. and ethanol production is projected to reach four billion gallons this year. Distiller's grains plus solubles (DGS) is a feed co-product produced in wet and dry forms as a result of ethanol production. As ethanol production continues to increase optimizing DGS utilization in beef, dairy and swine rations will benefit Illinois livestock, corn and alcohol producers.

Beef cattle are typically maintained on forage diets, which may require protein, energy and phosphorus supplementation. Most forage protein is degraded in the rumen therefore cattle also require undegraded protein supplementation. Distiller's grains plus solubles provides undegraded protein and phosphorus in a high-energy supplement that will not depress forage digestion due to its low starch content.

Regardless of nutrient content feedstuffs must be economical for use in beef cattle diets since feed costs are the largest factor influencing profitability in beef herds (Miller et al., 2001). Feeds must be compared on a dry matter basis to evaluate economic feasibility.

$(\$ / \text{ton}) / \% \text{ dry matter} = \$ / \text{ton of feed dry matter}$

$(\$180 / \text{ton}) / 0.90 = \$200 / \text{ton DM}$ , Soybean meal (SBM)

$(\$96 / \text{ton}) / 0.90 = \$107 / \text{ton DM}$ , Dry distiller's grains plus solubles (DDGS)

$(\$32 / \text{ton}) / 0.45 = \$71 / \text{ton DM}$ , Modified wet distiller's grains plus solubles (MWDGS)

$(\$70 / \text{ton}) / 0.90 = \$78 / \text{ton DM}$ , Corn gluten feed (CGF)

Transportation is a significant expense associated with co-product feeding. Determining the cost per unit dry matter delivered to the farm will further aid in deciding which feedstuff to utilize.

$(\text{Round trip transportation cost}) / (\text{tons transported} \times \% \text{ dry matter}) = \text{Transportation cost} / \text{ton DM}$

$(\$3 \text{ mile} \times 90 \text{ miles}) / (20 \text{ tons} \times 0.90) = \$15 / \text{ton DM} = \text{Transportation cost} / \text{ton DM}$ , SBM

$(\$3 \text{ mile} \times 30 \text{ miles}) / (20 \text{ tons} \times 0.90) = \$5 / \text{ton DM} = \text{Transportation cost} / \text{ton DM}$ , DDGS

$(\$3 \text{ mile} \times 30 \text{ miles}) / (20 \text{ tons} \times 0.45) = \$10 / \text{ton DM} = \text{Transportation cost} / \text{ton DM}$ , MWDGS

$(\$3 \text{ mile} \times 90 \text{ miles}) / (20 \text{ tons} \times 0.90) = \$15 / \text{ton DM} = \text{Transportation cost} / \text{ton DM}$ , CGF

Add feed cost and transportation cost per ton of dry matter to determine total cost of feed dry matter delivered to the farm.

(Feed DM cost) + (DM transportation cost) = \$ / ton DM delivered

\$200 / ton DM + \$15 / ton DM = \$215 / ton DM delivered, SBM  
\$107 / ton DM + \$ 5 / ton DM = \$112 / ton DM delivered, DDGS  
\$ 71 / ton DM + \$10 / ton DM = \$ 81 / ton DM delivered, MWDGS  
\$ 78 / ton DM + \$15 / ton DM = \$ 93 / ton DM delivered, CGF

These calculations aid in determining the base price producers can use to determine the feedstuff delivery cost to the farm. Determining the most economical feedstuff requires additional calculations to determine actual nutrient costs. Since protein is generally the most expensive feed nutrient, a cost analysis evaluating each feedstuff on a protein basis is appropriate.

(\$ / ton DM delivered) / (% crude protein) = \$ / ton crude protein DM delivered

(\$215 / ton DM delivered) / 0.48 = \$448 / ton CP DM delivered, SBM  
(\$112 / ton DM delivered) / 0.28 = \$400 / ton CP DM delivered, DDGS  
(\$ 81 / ton DM delivered) / 0.28 = \$289 / ton CP DM delivered, MWDGS  
(\$ 93 / ton DM delivered) / 0.21 = \$443 / ton CP DM delivered, CGF

In this example modified wet distiller's grains plus solubles (MWDGS) is the most economical protein source, however, if storing and feeding wet products do not fit into your operation then the comparison above suggests dry distiller's grains plus solubles are more economical than soybean meal and corn gluten feed. These simple formulas do not illustrate is the additional rumen undegraded protein and energy provided by DGS compared to soybean meal and corn gluten feed thus making distiller's grains plus solubles more economical than demonstrated by the example. Co-product nutrient composition and transportation costs will vary therefore producers should evaluate the variable costs of co-product feeding for their unique operations.

Distiller's grains plus solubles are suitable for use in several phases of beef production. Due to the high protein needs of the growing animal including DGS in creep diets provides supplemental protein and energy to nursing calves without sacrificing forage digestibility. In addition, supplementing DGS to cattle grazing high and low quality forage has increased ADG and reduced forage intake, providing producers the opportunity to increase cattle performance while extending pasture or providing opportunities to stockpile pasture for future use.

Feedlot research has indicated DGS has approximately 120% the energy value of corn allowing for substitution of DGS in feedlot diets beyond protein supplementation. Beef producers utilizing corn stalk residue or other poor quality forages can supplement protein and energy needs of the gestating and lactating cow using DGS without sacrificing forage digestibility.

Feeding recommendations for DGS generally limit intake to 20% of the daily diet dry matter, for growing calves (500-700 lbs) that is a maximum of 5.5-7 lbs of modified wet DGS or 3 lbs of dry DGS. Finishing cattle (900-1200 lbs) can be fed 9-12 lbs of modified wet DGS or 4-6 lbs of dry DGS while cows (1200-1500 lbs) can be fed 10-12 lbs of modified wet DGS or 5-7 lbs of dry DGS. Increased feeding levels of

DGS are possible. However, producers must consider increased nitrogen and phosphorus excretion in waste management plans.

High concentrations of phosphorus and sulfur in DGS require management to prevent mineral imbalances. Diets utilizing DGS must be balanced to maintain a calcium to phosphorus ratio of 1.5 to 1. In addition dietary sulfur levels in excess of 0.4% of the dry matter can lead to polioencephalomalacia, (PEM) which is a result of over-production of sulfides in the rumen. Feeding diets high in dietary sulfur may require thiamine supplementation.

As the Illinois ethanol industry continues to expand so will DGS availability. The combination of high protein, fat and phosphorus concentrations in a low starch feedstuff makes DGS an excellent choice for beef producers interested in reducing feed costs without sacrificing animal performance. When considering incorporating DGS into a feeding program beef producers need to consider nutritional characteristics, transportation costs, storage options and feeding methods. For additional information or questions regarding DGS visit <http://ilift.traill.uiuc.edu/distillers/> or contact Justin Sexten, Extension Specialist Animal System/Beef at (618) 242-9310 or at [sexten@uiuc.edu](mailto:sexten@uiuc.edu).

##

Justin Sexten, 618-242-9310, [sexten@uiuc.edu](mailto:sexten@uiuc.edu)

Date: Updated February 7, 2006