

# **Buying and Feeding Ethanol Co-Products to Beef Cattle In Missouri**



## Distillers Grains Production

Distillers grains are produced as a co-product of the dry mill ethanol industry. Dry mill ethanol production uses corn to produce ethanol, carbon dioxide and distillers grains. For each bushel of corn (56 lb.) fermented into ethanol, approximately 18 pounds of distillers grains are produced.

## Distillers Grains Products

Several distillers grains co-products are available to livestock producers depending on the ethanol production system, marketing objectives and proximity to the livestock feeding operations. Distillers grains products differ due to variation in production and drying methods, the largest difference relating to the dry matter of the finished product.

Distillers Grains product (common abbreviation)	Dry matter %
Dry distillers grains + solubles (DDGS)	88-90
Modified distillers grains + solubles (MDGS)	45-51
Wet distillers grains + solubles (WDGS)	32-35
Condensed distillers solubles (CDS or syrup)	25-40

Based on field samples, Extension reports and industry publications.

## Missouri Ethanol Plants

Listed below are the majority farmer-owned ethanol plants located within Missouri. Telephone numbers provided are a way to connect with distillers grains marketers within each company.



- 1 Golden Triangle Energy**  
Craig, Missouri  
(888) 220-5646  
ext. 11,15 or 19
- 2 Lifeline Foods**  
St. Joseph, Missouri  
(816) 279-1651  
ext. 162
- 3 Show-Me Ethanol**  
Carrollton, Missouri  
Ray-Carroll County  
Grain Growers  
(800) 722-4407  
or (816) 766-3213
- 4 Mid-Missouri Energy**  
Malta Bend,  
Missouri Bartlett  
and Company  
(800) 801-7279
- 5 POET Biorefining**  
Macon, Missouri  
POET Nutrition  
(888) 327-8799
- 6 POET Biorefining**  
Ladonia, Missouri  
POET Nutrition  
(888) 327-8799





# DISTILLERS GRAINS



## Distillers Grains Nutrient Value

Distillers grains provide energy, protein and phosphorus for cattle. Starch serves as the substrate for fermentation in corn-based ethanol production, so the remaining energy in distillers grains is derived from unfermented fiber and fat. Low-starch feedstuffs like distillers grains can be used as energy and protein supplements for beef cattle without negatively affecting fiber digestion. Distillers grains also provide energy to cattle from fat concentrated during the ethanol production process.

The protein in distillers grains (with the exception of CDS) is approximately 55% rumen undegraded protein. Rumen undegraded protein bypasses the rumen and is digested in the lower digestive tract. As such, protein from distillers grains can be beneficial in addressing situations such as low feed intake or high performance cattle where rumen undegraded protein may be limiting.

Additionally, distillers grains can provide a significant source of phosphorus in beef cattle diets. Phosphorus content of corn is concentrated three times during the production of ethanol. Depending on the level of supplementation, beef producers may be able to reduce or eliminate other sources of phosphorus.

## Distillers Grains Feeding Precautions

Nutrient concentration during ethanol production improves feed value; however, good management is required to prevent excess sulfur, phosphorus, fat and mycotoxin intake.

First, grain-based rations should not exceed 0.3% sulfur, while forage-based rations should not exceed 0.5% sulfur. Restricting total dry matter sulfur content to these levels will prevent polioencephalomalacia

(polio). Operations with high sulfate water must consider total sulfur intake when feeding distillers grains.

Maintaining a calcium (Ca) to phosphorus (P) ratio in the range of 1.5:1 to 2:1 is important in cattle rations. Feeding distillers grains without considering Ca:P can result in urinary calculi in growing cattle, whereas inadequate dietary calcium in mature cows may contribute to milk fever. Evaluate dietary P levels and add sufficient Ca to maintain 2:1 Ca:P.

Total dietary fat intake should not exceed 5-6% of the dry matter. Excessive dietary fat reduces feed intake and can impair fiber digestion. Maintain total diet fat content when using distillers grains less than or equal to 6% of dry matter.

Finally, as with other nutrients, mycotoxins in corn are concentrated three fold in distillers grains. Ruminants are more tolerant of mycotoxins than non-ruminants and finishing animals have greater tolerance than pregnant cows. Work with veterinarians and/or nutritionists to determine thresholds for specific situations.

With sound management, each of these factors can be controlled, allowing producers to effectively utilize high quality co-products to their advantage.

## Feeding Limitations

Distillers grains dry matter inclusion rates of 15-20% result in the most efficient use of protein and energy. Depending on the price and availability of alternative feedstuffs, greater inclusion rates may be used. Condensed distillers solubles can be included up to 10% of the diet dry matter. Dry, modified and wet distillers grains with solubles can be included at up to 30% of the diet dry matter.

## Maximum recommended "as fed" feeding rates for distillers grains products (in pounds)

	Growing cattle			1200-1500 lb cow	
	500 lb	800 lb	1200 lb	Gestating	Lactating
DDGS	4.2	6.3	8.8	8.0-9.5	10.0-11.5
MDGS	7.7	11.5	16.2	14.7-17.4	18.4-21.1
WDGS	11.4	17.1	24.0	21.8-25.9	27.3-31.4
CDS	4.2	6.3	8.8	8.0-9.5	10.0-11.5

Assuming: DDGS 90% DM, MDGS 49% DM, WDGS 33% DM, CDS 30% DM  
Distillers grains products will vary in dry matter and nutrient content; test feedstuffs to adjust feeding levels for specific situations.

## Storage Considerations

Distillers grains should be placed in flat storage. Field reports indicate DDGS stored in bulk bins may bridge and flow poorly, possibly due to fat content and small particle size.

Wet and modified distillers grains can be stored in piles but need to be used in 7-10 days to prevent mold formation. A storage manual for wet distillers products can be accessed online at [www.mocorn.org](http://www.mocorn.org) by clicking on the market development tab and then distillers grains.

## Pricing Distillers Grains

To determine the price delivered to farm, follow the formula below to calculate dollars per ton of nutrient (such as protein or energy) delivered to operation:

$$\text{Delivered } \$/\text{ton} \div \% \text{ Dry matter (DM)} \\ \div \% \text{ Nutrient} = \$/\text{ton}$$

The example below compares the crude protein (CP) cost in two different DM products:

$$\begin{aligned} \$150/\text{ton} \div 0.90 \text{ DM} \div 0.28 \text{ CP} &= \$595/\text{ton CP} \\ \$60/\text{ton} \div 0.49 \text{ DM} \div 0.28 \text{ CP} &= \$437/\text{ton CP} \end{aligned}$$

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## **Missouri Cattle and Corn**

USDA Value-Added Producer Grant

Prepared by the Missouri Corn Merchandising Council and the University of Missouri Extension Commercial Agriculture Program.

For more information, contact Justin Sexten, University of Missouri Extension Commercial Agriculture Program, state extension specialist-beef nutrition, at (573) 882-8154 or [sextenj@missouri.edu](mailto:sextenj@missouri.edu).

Additional copies of this brochure are available online at [www.mocorn.org](http://www.mocorn.org) or by calling the Missouri Corn office at (800) 827-4181.