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## Distillers Grains for Dairy Cattle

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Feeding distillers grains is nothing new; such products have been fed to cattle for more than a century. What is new, however, are the many ethanol plants now in the upper Midwest and the increased interest in feeding their co-product, distillers grains. This report is an overview of the nutritional value of distillers grains and gives some guidelines for feeding.

### Nutrient composition

Distillers grains available today contain more protein and energy than those produced a number of years ago. For instance, most distillers grains available in the upper Midwest today contain 30% or more protein, more than the old “book values” of 23 to 26%. Today’s distillers grains are a good source of protein and energy for dairy rations (Table 1).

Protein content is similar for both distillers grains and distillers grains plus solubles (DDGS). Distillers grains are a good source of ruminally undegradable protein (RUP), with the RUP value being slightly less for wet (WDG) than for dried distillers grains (DDG). The protein in distillers grains is fairly good quality; lysine is its first limiting amino acid, a situation typical for all corn products.

As for energy, research at SDSU demonstrates that today’s distillers grains contain about 10% more energy (NEL = 1.0 Mcal/lb) than the old “book values” and that distillers grains contain more energy than corn. The product contains approximately 10% fat and a lot of readily digestible fiber.

Distillers grains—especially DDGS—is a good source of phosphorus, an advantage or disadvantage depending on phosphorus needs in the diets. Distillers solubles or syrup contain more than 1% phosphorus compared to less than 0.83% phosphorus in the dry material of DDG.

Most DDG have the solubles added, making it DDGS. WDG are usually—but not always—without solubles.

### Production response when fed distillers grains

Research at SDSU and elsewhere shows that production, when distillers grains are in the ration, is the same as or greater than when soybean meal is the protein supplement.

Production did not always increase when distillers grains diets were supplemented with ruminally protected lysine and methionine.

Table 1. Composition of distillers grains

Item	% of DM
Crude protein	28-36
RUP <sup>1</sup> , % of CP	47-63
NEL, Mcal/lb	1.0
Fat	8.2-11.7
Acid detergent fiber	19-24
Neutral detergent fiber	38-44
Calcium	0.10-0.15
Phosphorus	0.43-0.83

<sup>1</sup>Ruminally undegradable protein

We obtained the same milk production from cows fed distillers grains as the supplemental protein as when they were fed a blend of soybean meal, fish meal, and distillers grains.

Condensed corn distillers solubles can also be fed directly to cattle even though the distillers solubles are often blended with distillers grains as DDGS. SDSU research demonstrated increased milk production when cows were fed 5% of the diet dry matter as condensed distillers solubles.

Thus, distillers grains are a good quality protein supplement which cannot be readily improved.

### Wet vs. Dried Distillers Grains

The nutrient content of the dry matter is similar for both WDG and DDG. Thus, cost, availability, feed handling,

and other factors may determine whether you feed wet or dried products.

DDG can be stored for long periods of time. WDG can usually be stored only 5 to 7 days without experiencing some spoilage. Scientists at SDSU and elsewhere are working to extend the "shelf life" of WDG by ensiling, adding preservatives, or blending with other feeds such as soy hulls.

Because WDG are only 30 to 35% dry matter, economical hauling distances are less than for DDG. The high water content may also limit total dry matter intake and milk production, especially if ensiled forages are also fed. Aim for a total ration dry matter at 50% or higher.

At least one of the newer ethanol plants in South Dakota is offering a 50% dry matter distillers grains product by blending distillers solubles with DDG.

#### **How Much Distillers Grains Can be Fed?**

We recommend feeding a maximum of 20% of the total ration dry matter as distillers grains.

This means 10 to 13 lb per cow daily of DDG or 30 to 40 lb per day of WDG for most lactating cows. At this 20% level, you can usually formulate nutritionally balanced diets in a variety of forage programs and not limit feed intake.

In fact, distillers grains may be the only supplemental protein needed with a 50:50 blend of alfalfa and corn silage as the forages.

At 30% or more of ration dry matter as distillers grains, total dry matter intake may be decreased, especially if feeding WDG. At this level, the diet would likely contain excess protein if legumes are in the diet.

If the forages are mostly corn silage, you may be able to go up to 30% or more of the ration dry matter as DDG, but additional ruminally degradable protein and lysine may be needed and you will need to prevent excessive amounts of dietary phosphorus for good environmental nutrient management.

Beef cattle have been fed as much as 40% of the ration dry matter in Nebraska research, but dry matter intake decreased at more than 30% of ration dry matter, especially with WDG. Such diets, particularly the DDGS, supplied excessive amounts of protein and excessive phosphorus.

However, feedlot cattle experienced fewer cases of acidosis, laminitis, and liver abscesses when fed high distillers grains diets instead of high corn diets. This was likely because the ruminal fermentation of the fiber in distillers grains maintains a better rumen environment than does fermentation of the starch in corn and other grains. Distillers grains may also provide some protection against acidosis for dairy cows, although research data are not available to prove that.

#### **Distillers Grains for Growing Heifers**

Distillers grains can be used as a protein and energy source in diets for replacement heifers. Fifteen percent or less of the ration dry matter will often supply their protein needs.

WDG are not recommended for calves less than 6 months old, primarily because the high water content of the co-product may limit dry matter intake. Distillers grains are appropriate to feed to growing heifers when needed and priced right, but growing heifers will need smaller amounts than you would feed to lactating cows or feedlot steers.

#### **Combining Distillers Grains with Other Byproducts**

Distillers grains, either wet or dry, can be combined with other feedstuffs to increase their nutrient content.

SDSU research has shown that WDG can be preserved by ensiling alone or in combination with soy hulls. Soy hulls were combined with WDG at 0, 15, and 30% of the total weight and ensiled. The pH increased from 3.2 in WDG alone to 4.3 when soy hulls were blended with WDG in the 30% treatment. It has to be pointed out, however, that WDG has an intrinsically initial low pH (less than 3.7) due to the processing at the ethanol plant and not as a result of fermentation in the silo.

The 70:30 WDG:SH blend was further field tested in silo bags. Conservation was good when it was fed out daily. Acceptability of the new feed by dairy cattle was excellent.

The feasibility of pelleting DDG is also currently under study at SDSU. Pelleting offers the advantage of less feed wastage, as well as decreased transportation cost. Although straight DDG will not pellet due to high fat content, when soy hulls were included on a 50:50 mix by weight, the consistency of the pellets was adequate.

The analysis of the DDG:SH pellets on a dry matter basis was 21.6% crude protein, 7.7% crude fat, 29.2% acid detergent fiber, and 42.1% neutral detergent fiber.

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