Agriculture & Natural Resources
TIMELY INFORMATION
ANIMAL SCIENCE SERIES

Dried Distillers Grains Plus Solubles

This Timely Information Sheet provides an overview on feed value and use of dried distillers grains in beef cattle and horse diets.

What are Dried Distillers Grains Plus Solubles (DDGS)? Distillers grains are by-products of the dry-milling industry, typically from ethanol production or alcohol distilleries. Distillers grains are most often derived from corn but can come from a variety of grains. While the nutrient content of distillers grains can be variable, they are typically high in energy and protein value.

Feeding Value and Considerations: On average, DDGS contain 85% total digestible energy, 30.0% crude protein (CP), 12% fat, 0.8% phosphorous, and 0.7% sulfur (NRC, 2016). Dried distillers grains have a high percentage of rumen undegradable protein, partly due to the drying process. This increased undegradable protein allows more protein to bypass the rumen to the animal and can increase protein use efficiency. The energy from DDGS comes from fat and fermentable fiber. Unlike corn, there is very little starch in DDGS. This reduces the risk of acidosis compared to feeding corn. With a competitive cost and high nutrient content, DDGS have become increasingly used as a protein and energy supplement for beef cattle and other livestock on forage-based diets.

Sulfur and phosphorous content of DDGS can be highly variable. Providing a mineral low in phosphorous or calcium supplementation (such as calcium carbonate or feed grade limestone) may be needed to keep the calcium to phosphorous ratio within a 1:1 to 2:1 ratio.

Conducting a forage and feed analysis ensures that the nutrient needs of livestock are met closely and can help develop a least-cost supplementation strategy.

Feeding Practices – Cows: Dried distillers grains plus solubles can provide needed protein and energy to cows in late gestation and early lactation consuming low quality forage or hay. Providing DDGS to late-gestation cows may help maintain body condition score compared with cows that consume free-choice hay alone. Daily hand-feeding of cows is recommended, and producers should not bulk feed every-other-day to prevent digestive tract problems.

Creep Feeding Calves: Dried distillers grains plus solubles can be included in a creep feed alone or in a mixture. While DDGS can be creep-fed to calves alone free-choice, calves will eat 30 to 50% more than when hand-fed and results in a less efficient feed-to-gain ratio. In a mixture, is it recommended that DDGS be included at a maximum of 35 to 40 percent in order to achieve 16 % CP in the creep feed (Lardy and Anderson, 2014).

Feeding Practices - Stocker Cattle: Stocker cattle need high levels of protein and energy to ensure adequate growth. Most of these requirements can be met through high quality pasture or stored forage. However, additional energy and protein needs can be supplied through DDGS. Cattle grazing wheat pasture were reported to have an ADG of about 3 lb/day when supplemented with DDGS at 0.5% of their body weight per day (Buttrey et al., 2012).

Table 1. General feeding guidelines for dried distillers grains with solubles.

Class of Livestock	Amount Per Head Per Day (lb)
Mature cows†	Up to 8 lb as-fed
Stocker cattle (steers and/or heifers)*	Up to 6 lb as-fed

†Estimated for a 1,200 lb cow or as 0.75% of body weight

*Estimated for a 600 lb calf or as 1.0% of body weight

Feeding Practices - Horses: Dried distillers grains can be fed to horses. However, they must be formulated to meet any deficiencies in the diet. In a feed preference trial for horses, DDGS was considered highly palatable, with horses preferring diets containing up to 20% DDGS (Pagan, 1991). For weanlings, DDGS may be added at levels up to 15% of the diet (Bonoma, 2008). DDGS serve as an energy source via fat, are higher in protein, and contain less starch and sugars (non-structural carbohydrates) when compared to corn. Some precautionary measures should be used when considering supplementation with DDGS for horses. Conduct or request a feed quality analysis to ensure a minimum calcium-to-phosphorous ratio of 1:1 is maintained in the diet. When phosphorus levels are too high, bone development issues may occur in younger horses. Horses fed diets containing DDGS as a sole source feed ingredient may require additional vitamin A, D, E, selenium, manganese, copper, and zinc supplementation. Finally, each feed batch should be tested for fumonisin to ensure levels are below 5 parts per million.

References:

Bohnert, D.W., L.A. Stalker, R.R. Mills, A. Nyman, S.J. Falck, and R.F. Cooke. 2013. Late gestation supplementation of beef cows differing in body condition score: effect on cow and calf performance. J. Anim. Sci. 91: 5485-5491.

Bonoma, T.A., A.C. Brogren, K.H. Kline, and K.M. Doyle. 2008. Effects of feeding distillers dried grains with solubles on growth and feed efficiency of weanling horses. J. Equine Vet Sci. 28:12.

Buttrey, E.K., F.T. McCollum, K.H. Jenkins, J.M. Patterson, B.E. Clark, M.K. Leubbe, T.E. Lawrence, and J.C. MacDonald. 2012. Use of dried distillers grains throughout a beef production system: effects on stocker and finishing performance, carcass characteristics, and fatty acid composition of beef. J. Anim. Sci. 90: 2381-2393.

Dahlke, G.R. and D.R. Strohbehn. 2012. Dry distillers grain as a creep feed for claves. Iowa State Extension Pub. AS 658.

Davis, T.E., E.B. Kegley, K.P. Coffey, W.K. Coblentz, R.K. Ogden, and J.A. Hornsby. 2006. Effects of grain by-products as supplements for stocker cattle grazing bermudagrass. University of Arkansas Discover 7: 19-46.

Lardy, G. and V. Anderson. 2014. Feeding coproducts of the ethanol industry to beef cattle. NDSU Extension Pub. AS1242.

NRC. 2016. Nutrient Requirements of Beef Cattle. 8th ed. Natl. Acad. Press, Washington DC.

Pagain, J.D. 1991. Distillers dried grains as an ingredient for horse feeds: Palatability and digestibility study. Distillers Feed Conference. 46:83-86.

Radunz, A.E., F.L. Fluharty, M.L. Day, H.N. Zerby, and S.C. Loerch. 2010. Prepartum dietary energy source fed to beef cows: I. effects on pre- and postpartum cow performance. J. Anim. Sci. 88: 2717-2728.

Prepared by: Phillip Gunter, Graduate Research Assistant, Kim Mullenix, Ph.D., Extension Beef Cattle Specialist, and Courteney Holland, Extension Equine Specialist, Department of Animal Sciences, Auburn University, AL.

February 2017. MKM-17-1.