

## Frequently Asked Questions About DDGS

### **What is the average protein content of high quality DDGS?**

In a University of Minnesota DDGS sampling survey evaluating 32 different DDGS sources, the average crude protein content was 27.6% on an as fed basis, with a range from 25.6-29.4%. Recently, a few ethanol plants are using new processes to produce ethanol and higher protein DDGS which may contain as much as 40-50% crude protein.

### **Is there DDGS available that has crude protein levels of 40% or more?**

No. Only a few ethanol plants still make high protein DDGS, but this small amount of production is not conducive to meet potential demands in the international market.

### **Why are U.S. ethanol plants extracting oil from DDGS?**

The current market price and demand for crude corn oil is very attractive as another revenue source for ethanol plants and the availability and relatively low cost of adding oil extraction equipment to existing ethanol plants makes this process very profitable.

### **How does reduced-oil DDGS affect its feeding value?**

Removal of some of the oil in DDGS reduces its energy value but slightly increases its protein content. Research is underway to determine the impact of oil removal from DDGS on energy value for various livestock and poultry species. Refer to the Chapters in this Handbook for the most current information available.

### **Are there antibiotic residues in DDGS?**

Recent research conducted at the University of Minnesota indicates that many DDGS samples contain very small amounts of one or more antibiotic residues. However, due to the processing conditions used to produce ethanol and DDGS in ethanol plants, these antibiotic residues do not have biological activity. Therefore, even though antibiotics are used in ethanol production, DDGS is safe to feed to animals based on current U.S. FDA regulations.

### **Can any DDGS replace soybean meal on a one-to-one basis in a layer/broiler/swine/ruminant diet? Why or why not?**

No. Each individual feed ingredient is a package of nutrients in various quantities and proportions. The three most expensive nutrients in livestock and poultry feeds are energy, amino acids and phosphorus. Depending on relative ingredient prices, DDGS *partially replaces* some of the energy, amino acid and phosphorous sources in commercial livestock

and poultry diets. In typical corn/soybean rations DDGS can partially replace corn and soybean meal. But where a greater variety of energy and protein sources are available, DDGS may replace other ingredients without reducing the soybean meal in the ration.

The trade-off between soybean meal and DDGS in swine and poultry rations is complex:

- The energy value of DDGS is equal to, or greater than, dehulled soybean meal in livestock and poultry diets.
- The protein content of DDGS typically averages about 27% whereas soybean meal contains 44-48% crude protein.
- The amino acids most likely to be limiting in corn-soybean meal based swine and poultry diets are lysine, methionine, threonine and tryptophan. Soybean meal is substantially higher in these essential amino acids – and they are more digestible – than in DDGS.
- Soybean meal contains about the same concentration of phosphorus as DDGS, but the majority of the phosphorus in DDGS is in a chemical form that is easily digested and utilized by swine and poultry compared to the indigestible form of phosphorus (phytic acid) found in soybean meal. This nutritional advantage for DDGS allows nutritionists to significantly reduce the amount of inorganic phosphorus supplementation needed in the diet, diet cost and phosphorus concentrations in manure, while supporting optimum swine and poultry performance.

## **Does DDGS need to be treated with propionic acid or mold inhibitors in order to extend its shelf life?**

Preservatives and mold inhibitors are commonly added to **wet distiller's grains** (~50% moisture) to prevent spoilage and extend shelf life. However, since the moisture content of **DDGS** is usually between 10-12%, there is minimal risk of spoilage during transit and storage unless water leaks into transit vessels or storage facilities. No research studies have been conducted to demonstrate that preservatives and mold inhibitors are necessary to prevent spoilage and extend shelf life of DDGS.

In a U.S. Grains Council field trial, DDGS was shipped from an ethanol plant in South Dakota in a 40 ft. container to Taiwan. Upon arrival in Taiwan, DDGS was put into 50 kg bags and stored in a covered steel pole barn for 10 weeks during the course of the dairy feeding trial on a commercial dairy farm located about 20 km south of the Tropic of Cancer. Environmental temperatures averaged 90+ degrees F and humidity was in excess of 90% during this storage period. Samples of DDGS were collected upon arrival at the farm and again after the 10 week storage period. There was no change in peroxide value (measure of oxidative rancidity of oil) during this trial.

## **How do you value DDGS in relation to cost?**

The best method of determining DDGS value in various types of livestock and poultry diets is to obtain a complete nutrient profile and the digestibility coefficients of the source being considered, the price at which it can be purchased and offering it as an ingredient to compete with the nutrient profiles and prices of other ingredients being used in a least cost diet

Alternatively, value can be calculated by knowing the protein (amino acid), fat and phosphorus content per ton of DDGS and using the cost and concentrations of these nutrients in competing ingredients commonly used (e.g. soybean meal, choice white grease and dicalcium phosphate). However, this approach does not account for digestibility of nutrients which may be lower or higher in DDGS compared to other nutrient sources.

## **What should be written in the certificate of analyses of DDGS?**

Typically, DDGS is traded on a protein, fat or “pro-fat” combination for nutrient guarantees. However, more DDGS customers are asking for additional guarantees depending upon the intended feeding application. Additional guarantees are negotiated between the buyer and seller. It is extremely important to agree on the laboratory and testing method that will be used for any nutrient analysis being guaranteed or checked because the testing procedure can have a significant influence on whether or not a guarantee is met.

## **Are aflatoxins present in DDGS?**

Most of the corn used to produce DDGS is grown in the upper Midwest of the United States where there is minimal risk of aflatoxin production except under unusual growing conditions (high temperature and high humidity). When these growing conditions occur, they are usually in relatively small, isolated regions. On average, growing conditions conducive to aflatoxin production in the upper Midwest occur 1 out of 10 years. If aflatoxin is detected in a given area, most ethanol plants receiving corn from that area will use a “black light” to screen incoming corn and many will set maximum allowable levels to avoid concentrating aflatoxin in DDGS. If corn containing aflatoxin or other mycotoxins is used to produce ethanol and DDGS, those mycotoxins are concentrated by three-fold compared to the initial level found in the corn.

## **How do you manage the caking of DDGS in containers?**

Research studies have been conducted to determine the factors that cause flowability problems and potential solutions to reduce these problems. It appears that several factors contribute to whether or not DDGS “sets up” in a container including: fine particle size, warm temperature when loading, moisture content, proportion of solubles added to the grains fraction before drying and the number of times it has been handled and unloaded during transit.

## **Does DDGS improve egg yolk and poultry skin pigmentation when it is added to the diet?**

Yes. Several studies have been conducted in the past few years showing that egg yolk and poultry skin pigmentation improves when DDGS is added to the diet. Currently, there are limited data on xanthophyll content of DDGS but initial sampling indicates it can range from very little (dark colored DDGS) to approximately 40-50 parts per million (ppm) (light golden colored DDGS). Although the level of xanthophyll is significantly less than found in corn gluten meal (180 to 200 ppm), it still contributes a significant amount of pigment to poultry diets and as a result, less synthetic pigment must be added to the diet to achieve the desired level of pigmentation. This can represent a significant savings in diet cost.

## **Does DDGS contain alcohol?**

No. The distillation process used in ethanol plants is very complete and, because alcohol is very volatile (evaporates easily), any alcohol remaining is lost during the drying process used to produce DDGS.

## **How can I qualify a DDGS supplier?**

Due to the variability in processes used by ethanol plants to produce ethanol and DDGS, there can be significant variation in nutrient content and digestibility among sources. This variation in nutrient content and digestibility makes it unwise for nutritionists to formulate diets using “typical” nutrient values. Therefore, many DDGS users have chosen to contact direct marketers of DDGS, request nutrient information and samples from specific ethanol plants of interest, develop a “preferred supplier” list of ethanol plants that meet their quality criteria, and purchase and use only DDGS from those sources.