



LOWER COST,
HIGHER
QUALITY DIETS



ILLUMINATE®



ILLUMINATE®

DISCOVERING AND OPTIMALLY USING THE HIGHEST VALUE DDGS.

ETHANOL AND DDGS OVERVIEW

- 98% of Dried Distillers Grains with Solubles (DDGS) in North America is produced from Ethanol plants for oxygenated fuels
- 33+ million metric tons of DDGS are produced in North America each year with 33% of the DDGS exported

DRIED DISTILLERS GRAINS WITH SOLUBLES (DDGS)

- By-product of the ethanol production process
- A high nutrient feed ingredient valued by the livestock industry
- When ethanol plants make ethanol, they use only starch from corn and grain sorghum

REMAINING COMPONENTS AND NUTRIENTS:

- Amino Acids
- Oil
- Phosphorus
- Fiber



AN EVOLVING ETHANOL INDUSTRY

AS A BY-PRODUCT, DDGS IS FREQUENTLY ALTERED AS ETHANOL PRODUCERS ARE CONSTANTLY CHANGING PROCESSING FOCUSED ON IMPROVING THE YIELD OF THEIR PRIMARY PRODUCT - ETHANOL

- Removing corn oil
- Removing the germ portion
- Variable levels of solubles added

THE DDGS CONUNDRUM

DDGS IS AN EXCELLENT SOURCE OF NUTRIENTS

- Energy
- Amino acids
- Phosphorus

DDGS IS NOT A SINGLE INGREDIENT

- Plant to plant variation - raw material and processing differences
- Within plant variation - changes in raw material quality, processing, biological process

Most producers do not effectively capture the full nutrient and financial value of DDGS.

USE OF DDGS AS A FEED INGREDIENT

THE DRAW BACK: VARIABILITY

- Variability results in less than optimal use of DDGS, higher diet cost and reduced profitability

Variations Observed from the ILLUMINATE® Database (as-is basis)

Nutrient	Average	Low	High
Dry Matter, %	89.30	86.80	94.20
Crude Protein, %	26.60	19.70	39.70
Crude Fat, %	9.90	6.00	12.60
Swine ME, kcal/kg	3190	2700	3540
Swine NE, kcal/kg	2152	1910	2670
Total Lys, %	0.80	0.60	1.30
Total Met, %	0.50	0.40	0.80
Total Phos, %	0.70	0.39	1.00
Av. Phos, %	0.50	0.29	0.70

IDENTIFYING HIGH QUALITY DDGS IS A DIFFICULT TASK

USING COLOR TO DETERMINE THE VALUE OF DDGS

Color does not always determine the quality of DDGS. High amounts of liquid solubles added back to DDGS can darken the color with no negative effect on nutrient value.



USING BASIC LAB MEASUREMENTS IS NOT ENOUGH

Basic laboratory measurements of fat and protein levels provide an incomplete nutrient profile and can lead to under-informed buying decisions and errors in ration formulation.

UNDERSTANDING THE RELATIVE VALUE



THE ILLUMINATE® SERVICE

ILLUMINATE® offers a database of DDGS nutrient loadings from over 140 ethanol plants in the United States to more accurately estimate nutritional value and economics which allows producers to select the highest value sources, maximize use and improve performance and profitability.

ILLUMINATE® SERVICE ADVANTAGE

- Assessment of available DDGS sources
- Estimate of available nutrients
- Monitor and adjust nutrients as processes change at ethanol plants
- Allows procurement managers to make better buying decisions
- Allows nutritionists to fully capitalize on this variable but valuable feed ingredient

ILLUMINATE® EQUATIONS

NUTRIQUEST's proprietary code that unlocks the nutrient values

- Critical tool to formulate for animal nutrition
- Unique
- Proprietary
- Research proven

The ILLUMINATE® process is an ongoing and rapid analysis of DDGS samples. The ILLUMINATE process provides continually updated and validated nutritional reports to our customers.

CURRENT MEASURES AND EQUATIONS AVAILABLE FROM ILLUMINATE®

Particle Size
Dry Matter
Crude Protein
Starch
Crude Fat
Crude Fiber
ADF
NDF
Iodine Value Product
Ash
Phosphorus
Sulfur
ME Swine
NE Swine
AME Poultry
TME Poultry

AMINO ACIDS (TOTAL & TRUE ILEAL DIGESTIBLE)

LYSINE
METHIONINE
THREONINE
TRYPTOPHAN
VALINE
ISOLEUCINE
LEUCINE
ARGININE
HISTIDINE
PHENYLALANINE
CYSTINE

CALCULATING RELATIVE VALUE

The purpose of calculating relative value is to understand the opportunity value of different sources of DDGS. Relative value is based on the current “shadow price” (ingredient replacement value) of DDGS based on formulated diets from the Midwest.

ILLUMINATE® uses a combination of basic corn/soy diets and current feed ingredient pricing

- Swine – Finishing, Gestation and Lactation Rations
- Broiler – Finishing Ration
- Layers – Base Layer Ration

DDGS VALUE DIFFERENCE BETWEEN ETHANOL PLANTS

SWINE

Average of Top 25% Plants vs. Average of Bottom 25% Plants

*\$298 vs. \$222 / ton DDGS

20% Inclusion = \$4.14 / pig

30% Inclusion = \$6.21 / pig

40% Inclusion = \$8.29 / pig



BROILERS

Average of Top 25% Plants vs. Average of Bottom 25% Plants

*\$298 vs. \$222 / ton DDGS

10% Inclusion = \$26 / 1,000 birds

20% Inclusion = \$53 / 1,000 birds

30% Inclusion = \$80 / 1,000 birds



FEATURES & BENEFITS OF ILLUMINATE®

FEATURES

- Analyses of DDGS from most ethanol plants in the United States
- Combination of NIR analyses, wet chemistry, and physical property tests
- NUTRIQUEST – adjusted digestibility assays
- NUTRIQUEST proprietary equations developed in conjunction with expert nutritionists for nutrient and energy loadings
- Weekly generation of nutrient profiles and comparative relative DDGS values
- Plant-specific nutrient loadings
- Routine variance analysis of DDGS from the same plant

BENEFITS

- Provides a wide range of plants for consideration of optimal DDGS sources and nutrient loadings for the specific source you choose
- Generates accurate, low-cost assay results
- Provides accurate estimates of digestible nutrients and energy
- Provides assessment of within-plant variability and more timely adjustment of nutrient loadings
- Reduces diet cost and maintains desired performance through optimal use of DDGS

DISCLAIMER: NUTRIQUEST® provides ILLUMINATE® Services with the care and diligence that are normally reflective of industry standards and practices. Users of ILLUMINATE Services recognize that the nature of analysis performed are by their nature estimating processes which are limited in their accuracy and subject to variation. **THERE ARE NO WARRANTIES RELATING TO THE SERVICES OF NUTRIQUEST OF ANY KIND OR NATURE, EXPRESSED OR IMPLIED, AND ALL SUCH WARRANTIES ARE EXPRESSLY DISCLAIMED.**

*(USD/ Ton) Current value based on the following replacement ingredient values:
Corn - \$6.50/bu, Soybean meal - \$350/ton, Fat - \$1,040/ton



ILLUMINATE®

The ILLUMINATE® Services process is a comprehensive tool developed to help producers reduce cost and achieve targeted animal performance. Employing the ILLUMINATE Services process allows multiple sources of DDGS to be evaluated for identification of the best value source and aggressive use in diets to minimize cost while obtaining desired animal performance.



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