WRINKLE
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Identifying Differences in Distillers Grains for Poultry Formulations

Ingredients like dried distillers grains with solubles (DDGS) have more variability than ingredients like soybean meal because 1) nutritional characteristics of the grain varies and 2) ethanol production processes can vary. How many differences do we see between DDGS sources and do these differences affect the nutritional value of the DDGS? Research from the Journal of Applied Poultry Research (Caldas, et al., 2020) provides some data to answer these questions.

BACKGROUND

Researchers collected 8 corn DDGS samples from dry-grind ethanol plants located in Missouri, Kansas, Indiana, Iowa, and Georgia. They then conducted extensive analyses on these samples which included proximate characteristics, energy determination, and amino acid digestibility. The analysis also included a physical description of the ingredients which included color, bulk density, and particle size.

RESULTS

Measured AMEn varied by almost 13% between the 8 DDGS sources (Figure 1). Values ranged from sample 3 which had an AMEn value of 2,588 kcal/kg to sample 5 which only had 2,292 kcal/kg.

For additional insights into the relationship between fat and energy, we can compare the fat and energy value for each DDGS (Figure 2).

Interestingly, fat (as measured by acid hydrolyzed ether extract) had very little relationship to measured energy. This relationship only had an r-squared value of 0.0314 which suggests that fat only explained 3% of the variability we saw with measured energy.

What did affect energy? Researchers actually found very few strong correlations in this small data set (Table 1).

Of all the nutrient and physical characteristics measured, ash and particle size had the greatest correlation to energy. Ash content had a negative relationship which suggests that as ash content decreases, energy increases. Meanwhile particle size had a positive correlation which suggested that as particle size increases, energy also increases.

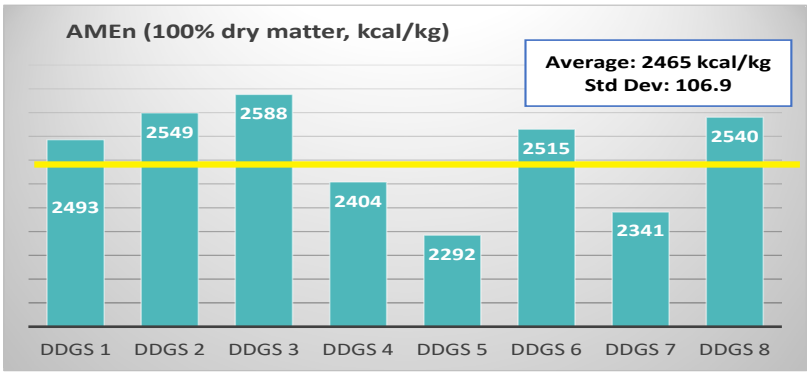

Figure 1. Apparent metabolizable energy - nitrogen corrected of DDGS sources.

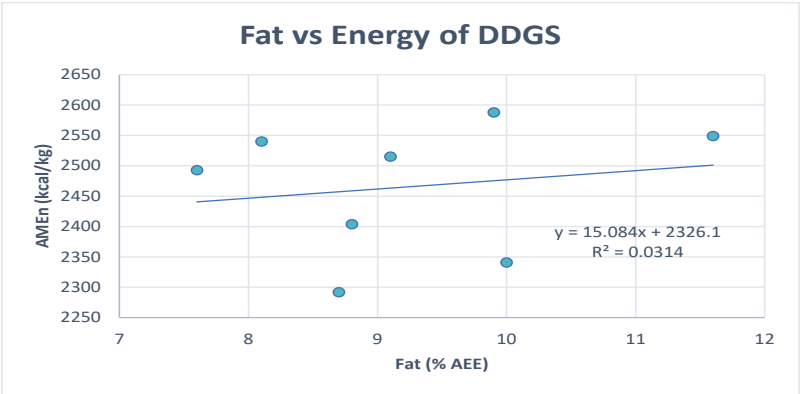

Figure 2. Apparent metabolize energy and fat of DDGS sources.

ITEM	Density	GE	CP	AEE	Ash	NDF	ADF	HC	Starch	PS	Color
AMEn	-0.04	0.07	-0.10	0.18	-0.35	-0.12	-0.04	-0.12	0.22	0.56	0.27

Table 1. Correlation coefficients for apparent metabolizable energy - nitrogen corrected.

*These results are not a guarantee of nutritional value, as laboratory results are influenced by factors beyond the control of POET Nutrition.

LAB VARIABILITY

The accuracy of any type of ingredient evaluation should include a discussion on possible variability with the laboratory or the methods used to assay the nutrients. The researchers reported results from several different laboratories for selected nutrients. Figure 3. shows the lab variability observed for crude fat.

Reported crude fat values varied considerably between labs. For example, Lab A reported much greater fat contents for DDGS 1 and DDGS 5 compared with the other labs. Meanwhile reported crude fat from Lab A for the remaining samples match very closely with the other labs.

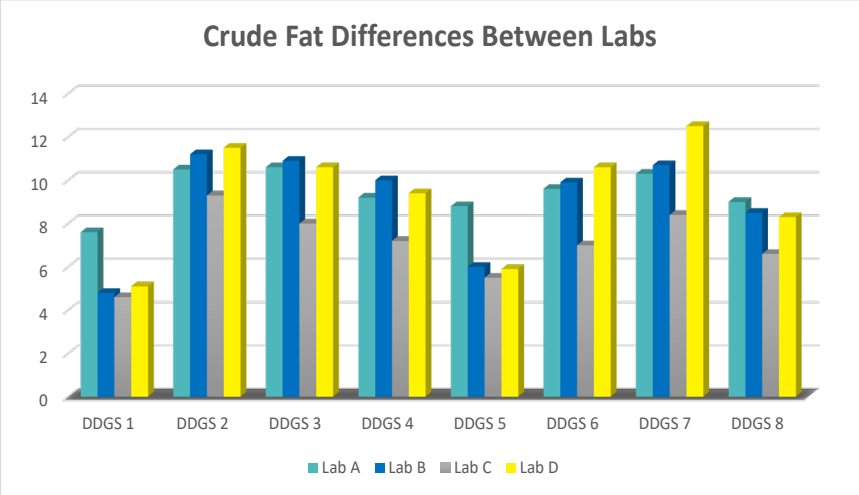

Figure 3. Variability in reported crude fat for different labs.

CONCLUSIONS AND KEY POINTS

- Despite the relatively small sample size in this study, researchers identified significant differences between the DDGS sources. This highlights how corn variability and ethanol production process can affect DDGS quality.
- Crude fat did not correlate with measured energy values. In fact, several of the DDGS source with the lowest acid hydrolyzed ether extract concentration had the greatest measured energy values. This highlights the fact that other characteristics like digestibility affect energy of DDGS.
- Nutrient results varied considerably between different labs. This highlights the importance of using a single laboratory for all ingredients when determining the value in formulation. Laboratory bias could have a significant impact on value determination.

We can use this data to reinforce several key concepts related to DDGS value. First of all, producers and nutritionists should recognize that value between DDGS differ. In order to capture the most value, they need to identify these differences. Secondly, the industry needs to question the accuracy of using a single predictive energy equation for all DDGS sources. Current equations fail to capture these differences. Predictive energy equations generated from DDGS produced through the same process will have significantly more precise values.

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