U of M Research Update

Energy Value of DDGS for Turkeys

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Background

Removal of a portion of the oil in the manufacture of corn derived distillers grains with solubles (DDGS) has become common place. As oil in DDGS is removed, both nutritive and non-nutritive components will be concentrated in the DDGS, including protein and fiber, respectively. The potential exists for a greater negative impact of de-oiling on ME for poultry due to decreased ability to digest fiber as compared to swine. The main of objective of this study was to determine the metabolizable energy content of DDGS samples that varied in ether extract (crude fat) content using two different methodologies in young turkeys.

Methods

Six samples of DDGS were obtained from the dry milling industry that was reflective of different particle sizes and composition. Comprehensive chemical analysis was conducted at USDA-ARS (Ames, IA). Nitrogen corrected apparent metabolizable energy (AME_n) content was determined using the methodology as published by Rochell et al. (2011) and true metabolizable energy (TME_n) using the Sibbald method adapted for young turkeys (7 wk old). Determined AME_n and TME_n (DM) were statistically analyzed and treatment means were separated by the LSD procedure when treatment effect was significant (P<.05).

Results

The range in fat content (dry matter basis, DM) was 6.99 to 13.31% with an average crude fat content of 9.9% (**Table 1**). Samples varied in crude protein, lysine, fiber, and mineral contents.

Table 1. Composition of test distillers dried grains with solubles (DM basis).

	Sample ID: Distillers Dried Grains w/solubles					
Component (%)	A	B	C	D	E	F
Dry Matter	88.7	88.9	89.3	89.8	90.5	91.3
Crude Protein	29.6	32.0	31.6	30.6	32.2	29.8
Lysine	1.07	1.14	1.13	1.18	1.15	1.10
Total Dietary Fiber	31.5	31.6	31.1	32.4	32.8	32.1
NDF	38.3	38.5	39.6	31.0	31.1	27.8
ADF	11.5	12.1	11.6	8.9	8.55	8.55
Hemicellulose	26.8	26.4	28.0	22.0	22.5	19.3
Ash	4.8	4.7	5.4	5.6	5.5	5.5
Crude fat	13.3	10.4	9.1	8.0	7.0	11.4

Results of the TME_n assays are presented in **Table 2**. No differences were observed among AMEn content. Correlations (Pearson's) of composition to TMEn content were determined with calculated probability. Weak correlations were found with crude protein (-.30, P<.0004), crude fat (.24, P <.02),

gross energy (.25, P<.02), and lysine digestibility coefficient (.36, P<.0005). Prediction models using different subsets of composition did not generate a predictive equation with an R^2 greater than .12.

Table 2. Metabolizable energy content of test distillers dried grains with solubles for young turkeys determined as apparent metabolizable energy (AME_n) and true metabolizable energy (TME_n) (dry matter basis).

	Metabolizable energy (kcal/kg)	
DDGS Sample ID	Apparent metabolizable energy (AME_n)	True metabolizable energy (TME_n)
A	3526	2947[ab]
B	3453	2747[b]
C	3175	2784[b]
D	2923	2761[b]
E	3486	2810[b]
F	3094	3138[a]
P-value	NS	.007

Summary

The results of the research indicated that extraction of oil from DDGS resulted in DDGS with varying chemical composition and TME_n. Metabolizable energy value tended to decrease with decreasing oil content, but the decrease in TME_n was not strongly associated to any particular DDGS chemical component including crude fat content. Predictive equations for metabolizable energy could not be generated using chemical composition.

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