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Soy Phytoestrogens

Genistein, a soy phytoestrogen, is a powerful antioxidant found in soybean. A study was conducted to determine the effects of dietary genistein supplementation on Japanese quail (Coturnix coturnix japonica) laying performance and egg yolk contents of malondialdehyde (MDA), vitamin A, and vitamin E. Malondialdehyde is an indicator of lipid peroxidation, whereas vitamins A and E have antioxidant properties. One hundred and fifty birds, five weeks of age, were randomly assigned to one of three treatments consisting of 50 birds (five replicates of ten) and were fed a basal diet or the basal diet supplemented with either 400 or 800 mg of genistein/kg of diet. The experimental period lasted 90 days with a 17 hour light and 7 hour dark photoperiod schedule. Dietary genistein supplementation (800 mg/kg) increased feed intake, egg production, egg weight, Haugh unit, shell thickness, and shell weight and improved feed efficiency at a greater extent than the other levels (0 and 400 mg/kg). Egg yolk genistein concentration was increased ($P < 0.0001$), whereas egg yolk MDA concentration was decreased ($P < 0.0001$) at the highest level of genistein supplementation. However, genistein supplementation did not affect egg yolk daidzein, vitamin A, and vitamin E levels. There was an inverse relationship between egg yolk genistein and MDA concentration ($R2 = 0.74$, $P < 0.0001$). Results of the present study indicate that supplementing with dietary genistein (800 mg/kg) improved performance, egg quality, and egg yolk genistein content and decreased egg yolk MDA concentration in quail. (Note-the real significance of this study was that feeding ultra-high levels of a soy phytoestrogen did not cause production problems in this model system and the results should apply to other poultry species).

Akdemir, K. and K. Sahin. 2009. Genistein supplementation to the quail: Effects on egg production and egg yolk genistein, daidzein, and lipid peroxidation levels. Poultry Sci. 88:2125-2131.

DDGS Use in Poultry Feeds

Two recent papers have discussed the increasing use of distillers dried grains with solubles (DDGS) in poultry feed formulations. With the increasing cost of feed ingredients, the nutritionist is seeking alternative ingredients that can lower feed cost without impacting production performance. In a paper by Dr. Amy Batal (University of Georgia) it was pointed out that DDGS do not just replace corn in the poultry diet, rather it will replace corn, soybean meal, meal and bone meal, phosphorus, methionine and other ingredients. Its use will depend on the relative price of all of these ingredients and other constrains. Dr. Batal cited the main issue with DDGS is price, availability, logistics/transportation and nutrient availability. The lower energy value for DDGS compared to corn (1,280 vs. 1,540 kcal/lbs.) has a major impact on the value of the two ingredients. She indicates that combinations of raw material and ethanol plant processing conditions result in variation in the nutrient composition of DDGS (see following table).

Average Nutrient Composition of DDGS

Component (%)	Mean	Range	CV (%)
TME (kcal/kg)	2,863	2,607-3,054	3.6
Lysine-total	0.78	0.59-0.89	11.6
Lysine-digestible	72	46-84	11.2
Methionine-total	0.49	0.41-0.60	9.7
Methionine-digestible	88	85-92	1.9
Theonine-total	0.98	0.85-1.14	6.0
Theonine-digestible	76	69-83	4.8
Crude Fat	10	4-16	4.3
Calcium	0.03	0.02-0.04	38.4
Phosphorus-total	0.73	0.62-0.77	5.3
Phosphorus-available	70	64-100	x
Sodium	0.25	0.05-0.45	32.8

The potential variation in nutrients is of concern. Dr. Batal concludes that reliable nutrient values are important when using DDGS in poultry diets, especially when high levels of inclusion are used, as the risk associated with nutrient variability becomes greater.