

Effect of Incorporation of DDGS and Canola Meal to Turkey Diets on Dietary Electrolyte Balance, Performance, and Litter Moisture

M. Farahat^{1,2}, E. Hassanein², W. Abdel-Razik², and S. Noll¹

¹Department of Animal Science, University of Minnesota, St. Paul

²Department of Nutrition and Clinical Nutrition, Faculty of Veterinary Medicine, Zagazig University, Zagazig, Egypt

Poultry nutritionists include distillers' dried grains with solubles (DDGS) and canola meal in poultry diets to reduce diet and production cost. However, higher levels of such ingredients could disturb the electrolyte balance of the diet by decreasing diet content of potassium and increasing chloride and sulphur. Such changes may induce diet acidosis. Although the optimal dietary electrolyte balance (DEB) for turkeys is not well established, values around 250 mEq/kg diet are considered optimum for broiler performance. The following study was conducted to determine if inclusion of alternative ingredients (DDGS and canola meal) and/or supplemental chloride to turkey diets shifts the dietary electrolyte balance to levels that could adversely affect the growth performance and litter moisture. A total of 990 Nicholas turkey toms were used in a study conducted during 2-14 wks of age. The poults were arranged at random into 99 pens (10 poults/pen). In a factorial design, there were three diet sets (corn-soy (CS), CS+20% DDGS, CS+20% DDGS+10% canola meal) and three chloride levels (0.22, 0.32, 0.42%) making nine dietary treatments distributed in 11 replicate blocks. Diets were formulated to be isocaloric with similar level of digestible amino acids. There were four feeding phases (2-5, 5-8, 8-11, and 11-14 wks of age). The DEB and chloride levels in the diets were altered by adding sodium chloride, sodium sesquicarbonate, and/or ammonium chloride. The levels of DEB lowered with the age, and ranged from 360-195 mEq/kg diet. Individual BW and pen feed residues were measured at each phase to determine the average BW, ADG, daily feed intake, and feed conversion ratio (F/G). Samples of litter were collected at end of 11th and 14th wks of age for measuring moisture. ANOVA was conducted to determine statistical significance of diet set, chloride level, and their interaction on the performance and litter moisture. During 2-14 wks, no differences were observed in BW and ADG attributable to diet set ($P < 0.05$). Birds fed diets containing DDGS or DDGS with canola meal consumed 6.0 % more feed daily ($P < 0.05$) than those fed CS diet. No differences were found for chloride or diet x chloride interaction for BW, ADG, or feed intake. Feed conversion ratio was higher ($P < 0.05$) for birds fed diets containing DDGS or DDGS with canola meal in comparison to those fed CS diet. A diet by chloride interaction was found for the feed conversion, during 8-14 wks of age. In diets containing DDGS with canola meal, increasing the chloride level more than 0.22% significantly increased the feed conversion by 3.0 %. The litter moisture (average of 11th and 14th wks of age) was increased by 6.4 and 7.9 % in diets containing DDGS or DDGS with canola meal respectively in comparison to CS diet ($P < 0.05$). Turkeys fed diets containing 0.42% Cl increased the litter moisture by 7.4% in comparison to diet containing 0.22% Cl. It can be concluded that considerable attention should be paid to the chloride level and dietary electrolyte balance with incorporation of both DDGS with canola meal in turkey diets as chloride levels higher than 0.22% or DEB lower than 252 mEq/kg in such diets could be detrimental to the feed conversion during the second half of the rearing period.

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