UTILIZATION OF GLYCERIN AS A SOURCE OF ENERGY IN TURKEY DIETS

Sally Noll and Jeanine Brannon
Department of Animal Science
University of Minnesota

Glycerin is produced as a co-product of the conversion of fats (triglycerides) into biodiesel. The product is referred to as crude glycerin and contains about 80-88% glycerol (Dozier et al., 2008a). The glycerin can be metabolized and utilized as a source of energy by poultry although its value as an energy source will be less than that of a fat source. The energy value of crude glycerin was estimated to be 1558 kcal/lb in broilers and 1726 kcal/lb in egg layers (Dozier et al., 2008b; Lammers et al., 2008). Cerrate et al. (2006) found that inclusion of 10% glycerin depressed growth possibly due to reduced feed flow rate while inclusion of 5% did not have any negative effects on broiler performance. The objective of this research was to examine glycerin as a source of energy in market turkey diets for heavy tom production in diets of low and high nutrient density (LND vs. HND). Glycerin was added at levels of 2, 4, 6, and 8% with concurrent adjustments in corn levels. As glycerin replaced corn, levels of lysine, methionine, and threonine were adjusted to the control diet for each nutrient density series. The base diet contained corn, soybean meal, poultry byproduct meal, and distillers dried grains with solubles (20%). There were 10 dietary treatments in total. Diets were fed as mash.

At 19 wks of age, LND decreased body weight by 2.9% (1.2 lbs). The LND regimen had the least effect during 8- 11wks and the most during 17-19 wks of age. Differences in gain between the HND and LND diet series paralleled that of body weight. Glycerin addition in the HND series had no affect on gain except during 17-19 wks where glycerin addition at all levels resulted in decreased ADG. For the LND series, glycerin addition at 4, 6, and 8% decreased gains during 17-19 wks of age and the 6 and 8% level of addition decreased cumulative gains significantly. Differences in feed/gain for the HND and LND diets were noted immediately during the first feeding period of 8-11 wks of age. Feed efficiency was increased by 6% during 8-11 wks of age and by 14% during 17-19 wks of age (LND vs. HND). Glycerin addition in the HND diet series had no effect through 14 wks of age. During 17- 19 wks of age, feed efficiency was increased with glycerin addition. In the LND series, glycerin addition had no effect on feed efficiency with the exception of addition of 4 and 6% levels which increased feed efficiency during 17-19 wks.

In summary, nutrient density had about a seven times greater effect on feed conversion as compared to body weight. Glycerin addition to 4% of the diet had no negative effect on performance but higher levels of 6 and 8% tended to be detrimental especially during 17-19 wks of age. Carcass and parts yield was not altered with addition of glycerin with the exception of yield of wings and abdominal fat. The results indicate that crude glycerin can be added to turkey diets up to a 4% level of inclusion.

Acknowledgment: Research support provided by the Midwest Poultry Research Consortium, Minnesota Turkey Research and Promotion Council, Agricultural Utilization Research Institute, Commodity Specialists Corporation, and Central Bi. Technical support-UM support staff – Fred Hrbek, Igor Radovic, Terrance Yourchuck; MTGA Nutrition Subcommittee-Dick Nelson, Gary Johnson, Jim Halvorson, and Greg Engelke.