

Effect of protease and reduced amino acids on performance and ileal amino acid digestibility in laying hens

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Proteases have been used as a part of multi-enzymes until recently, when they have been evaluated alone. There is very little protease research in layers (done about 20 years ago) on egg size, egg production, and digestibility of some primary amino acids (AA). The overall goal of the research was to determine the role of protease and different levels of amino acids in egg production, egg quality, and AA digestibility at the end of the early phase (30-50 weeks of age) and late phase (50-70 weeks of age). The effect of supplementing exogenous protease enzyme on egg size, egg solids, performance, and digestibility of crude protein (CP) and AA in laying hens was determined. Hens were fed the corn-soybean meal-based layer feed in all mash forms. The study was a complete randomized design with a 2 x 4 factorial arrangement of protease (yes and no) and AA levels (100, 95, 90, and 85% of breeder recommendation). In a 30-50 weeks study, the significant interaction of AA levels and protease was observed for the hen day egg production (HDEP) and egg mass, where both 95% and 90% AA levels showed similar production compared to 100%. However, the production lowered at 85%, both with or without protease. We observed the lowest coefficient of apparent ileal digestibility (CAID) for dThr and dVal at 95% without protease. We did not observe any interaction or main effect of protease and CP/AA on the number of downgrade eggs, albumen and yolk solids, and economic return. In a 50-70 weeks study, the significant interaction of AA levels and protease was observed for the HDEP, percent yolk, and CP, dMet, dThr, dlle, and dVal. 85% AA had the lowest HDEP. FCR was significantly higher in 85% AA with or without protease. The lowest CAID was observed for dMet. Egg weight and eggshell weight were lowest at 85% AA. However, no effects were found for feed intake, specific gravity, shell thickness, percent albumen, total solids, or CAID of Lys or Trp. The impact on egg size was less promising. In conclusion, the lowest level of AA diets had poor laying performance and economic return. Overall, the effect of the protease was beneficial in understanding the AA digestibility in both the early and late lay phases of laying hens. Although this study did not show the direct impact of protease in reducing the egg size, future studies might need to be conducted that will probably include a higher inclusion of protease level in the diet and a different feed substrate.

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