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Effects of Unblanched Normal-Oleic Peanuts in the Diets of Layers on Performance, Egg Quality and Nutritional Content.

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In this 8-week study we aimed to identify the optimal inclusion levels of unblanched conventional normal-oleic peanuts (NOPN) in the diets of layers at varying inclusion levels (0%, 5%, 10%, 15%, 20%) for the improvement of layer performance, egg quality and egg nutritional content. To meet these objectives, two hundred Hy-Line Brown hens (75 weeks of age) were housed individually and randomly assigned to 5 treatments (5 replicates per treatment, 8 birds per replicate). One ton of #1 unblanched whole aflatoxin-free non-roasted conventional normal-oleic Runner peanuts were donated by Hampton Farms/Jimbo Jumbos (Edenton, NC) and were processed into peanut granules using a Roller Mill at the NCSU Educational Feed Mill (Raleigh, NC). Peanut granules were incorporated into five different experimental diets, at varying inclusion levels (0%, 5%, 10%, 15%, 20%) in a complete layer ration also formulated with defatted solvent extracted soybean meal and yellow corn. Layer diets were formulated using Concept 4 software to meet and/or exceed the nutrient requirements for laying hens. The experimental diets were designed to be isonitrogenous (18% crude protein) and isocaloric (3080 kcal/kg). Hens were provided feed and water freely for 8 weeks. Layer body weights were collected at week 0 and week 8 and feed weights were collected weekly. Eggs were collected daily, weighed, and enumerated weekly. Bi-weekly eggs were analyzed for quality parameters, grading, and lipid analysis. At termination, liver samples were collected for histology, total glycogen and total cholesterol content. Blood samples were collected at termination (10am week 8) for the determination of plasma estradiol and progesterone levels. All data were analyzed using analysis of variance, with t-test mean comparisons at $P < 0.05$ in GraphPad Prism® (version 10.5.0).

There were no significant differences in body weights between the treatment groups at the onset or termination of the study ($P > 0.05$). Hens fed the 0%, 5%, 10% and 20% treatments produced more eggs (total # eggs, total dozen eggs, hen day egg production) over the 8- week period as compared to hens fed the 15% treatment ($P < 0.0001$). Hens fed the 15% and 20% dietary treatments had significantly reduced 8-week feed intake relative to the 0%-control and 5% treatment groups ($P < 0.0001$). While the 8-week feed conversion ratios (kg feed consumed/dozen eggs produced) were similar between the treatment groups, hens fed the 10% and 20% NOPN diets tended to have improved (lower) feed conversion ratios as compared to the 0%-control, 5% and 15% treatment groups ($P < 0.10$). Vitelline membrane strength was best in eggs produced by hens fed the 5%, 10% and 20% diet as compared to the 0% controls ($P < 0.01$). Yolk color was significantly reduced in eggs produced by hens fed the 10%, 15% and 20% treatments as compared to the 0% controls ($P < 0.0001$), while egg weights and Haugh Units (measure of freshness) were similar between all treatments. Other parameters (egg lipid chemistry, liver histology, liver glycogen, liver cholesterol, plasma estradiol, plasma progesterone) are currently being analyzed to also determine the dietary effects of the inclusion of conventional normal-oleic peanuts in layer diets at varying levels. In summary, feeding layers varying dietary levels of conventional normal-oleic peanuts did not adversely impact layer performance, egg quality (exception of egg yolk color) or animal health. These studies suggest that conventional normal-oleic peanuts may serve as a suitable alternative source of dietary protein and energy in commercial poultry feed formulations.