

Effect of electron beam irradiated barley grains on viscosity, microbial population, digestive enzyme activities, histomorphometry structure of intestine in broiler chickens

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Abstract

This experiment was conducted to evaluate the effect of electron beam-irradiated barley on viscosity, microbial population, digestive enzyme activities, histomorphometrical structure of broiler chicks. Treatments were barley at levels of 25% and 50% (raw and irradiated at 40 kGy) and corn-soya bean meal diet (as control, without barley) that used with five dietary treatments, four replicates and 12 birds of each for 42 days in a completely randomized design. Increasing levels of barley to 50% (raw or irradiated) in the diet significantly increased ileal viscosity compared to the other treatments. Broilers fed 50% irradiated barley diet had significantly lower viscosity compared to the broilers fed 50% raw barley. The inclusion of barley in the diet resulted in significantly decreased ileal pH when compared with a control diet. However, radiation of barley had no significant effect on ileal pH of broilers. Caecal populations of *Coliform*, *E. coli* and total aerobic bacteria were not influenced by the experimental treatments. Also the caecal population of *Lactobacillus* was decreased in broilers fed on 50% raw barley compared to 25% irradiated barley and control diet. No significant differences were observed among dietary treatments on amylase and protease activities of the jejunal digesta and in pancreatic tissue. Broilers fed 50% barley (raw or irradiated) diet had significantly higher lipase activities in pancreatic tissue compared to the other treatments. The villus height, villus width, crypt depth, crypt width, the ratio of villus height to crypt depth, epithelial thickness, muscle thickness, number of goblet cells and a total wall thickness of the duodenum and jejunum were not affected by the experimental treatments. The results of this study showed that radiation significantly decreased viscosity at the level of 50% barley. However, radiation was no significant effect on pH, microbial population, enzyme activities, histomorphometry of duodenum and jejunum.

Key words: Irradiated barely grain, Microbial population, Enzyme, Histomorphometry, Broilers

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