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EFFECTS OF THE DIETARY SUPPLEMENTATION WITH GRAPE POMACE AND CHESTNUT EXTRACTS ON GROWTH PERFORMANCE AND INTESTINAL MUCOSA OF BROILER CHICKENS

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During the last years, poultry production has been moving towards antibiotic-free production systems in which tannins can be used as feed additives to improve animal immune response and health, due to their anti-microbial, anti-oxidant, and anti-inflammatory activities. Results widely vary according to tannins source and structure, however. Thus, the present study assessed the effects of the dietary supplementation in broiler chickens with two vegetal extracts containing tannins, from grape pomace (GP) or chestnut (CN), on growth performance and morphology and immune response of intestinal mucosa. A total of 864 chickens (both sexes) in collective pens (24 birds/pen, 12 pens/group) were assigned to three experimental groups fed a control diet (C) or the same diet added with 0.2% CN extract (diet CN) or 0.2% GP extract (diet GP). At 14 d and 34 d of age, 12 chickens per diet were slaughtered to sample jejunum. Serial sections of 4 µm were stained with hematoxylin/eosin for morphometric evaluation and with antibodies against intraepithelial CD3+ T-cells and CD45+ leukocytes (only samples of the first slaughtering) to evaluate the anti-inflammatory activity. Data were submitted to ANOVA using a mixed model with diet as the main effect and pen (growth data) or animal (intestinal mucosa data) as a random effect. The diet GP significantly increased daily weight gain (DWG) in the whole trial (70.5 g/d vs. 69.4 g/d and 67.1 g/d; P<0.01) and final live weight (3148 g vs. 3099 g and 3084 g; P<0.01) compared to diets C and CN, with no effect on feed intake (on average 111 g/d), feed conversion ratio (1.59), and mortality (3.4%). Indeed, the diet GP promoted DWG in the second (+1.7%, P<0.001; 14-28 d) and in the third period of growth (+2.1%, P<0.05; 28-45 d) compared to diet C and, mostly, diet CN. The diets CN and GP decreased villi height compared to diet C (954 µm and 934 µm vs. 1033 µm; P<0.01), whereas crypt depth and villi-to-crypt ratio did not change. Regarding intestinal immune status, chickens fed diet GP showed higher densities of both CD3+ (2302 vs. 2116 cells/mm2; P<0.001) and CD45+ (2198 vs. 2040 cells/mm2; P<0.05) compared to those fed diet CN, whereas chickens fed diet C exhibited intermediate results. In conclusion, GP dietary supplementation improved chicken performance and promoted immune response in intestinal mucosa. Further insights are required to define the action mechanisms at the intestinal level.