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MACRO ALGAE ULVA LAETEVIRENS AND SOLIERIA CHORDALIS CO-PRODUCTS IN BROILER DIETS: IN VITRO AND IN VIVO DIGESTIBILITY AND HEALTH RELATED EFFECTS

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Novel feed ingredients for the production of meat, milk and eggs are needed, which do not compete for currently used resources. Seaweed could be such a novel feed ingredient. This study aimed to determine nutrient digestibility and health-related effects of desalted seaweed co-products, and evaluate the effects of enzymatic hydrolysis (proteases Alcalase and Neutrase) on nutrient digestibility. A 2 x 2 experimental design (Seaweed species x Enzymatic hydrolysis) plus added control was conducted. In total, 360 14-day old Ross308 male broilers were housed in 30 floor pens (0.96m²) with 12 birds per pen and 6 replicate pens per treatment. The basal diet (control) was diluted with 100 g/kg of one out of four seaweed products. Feed and water were available ad libitum and intake and bird weight were measured weekly. Faeces was collected qualitatively at pen level at d 26-27-28. At d 28, birds were euthanized and ileal digesta was collected. The villus height: crypt depth ratio (VL:CD) was analysed in duodenal tissue, IL13 and haptoglobin levels were analysed in blood plasma and jejunal content pH and gizzard weight were measured. Data were analysed using ANOVA with pen as experimental unit and significance stated at P=0.05. Body weight was not affected, but the feed conversion ratio (d14-21) was lower in birds fed untreated U. laetevirens (1.77) vs all other diets (1.84-1.94, P=<0.001). For all nutrients, the apparent pre-caecal digestibility of the basal diet vs seaweed containing diets was higher (P<0.001), with a higher digestibility for U. laetevirens vs S. chordalis products. The enzymatic hydrolysis decreased digestibility of ash, nitrogen and multiple amino acids (P<0.05). Gizzard weight, jejunal pH and cytokine levels were not significantly affected by inclusion of seaweed products. Numerically, a 59% lower IL-13 level was observed in birds fed the untreated U. laetevirens diet vs the basal diet. Birds fed U. laetevirens vs S. chordalis diets had 11% shorter villi (P<0.001) and 10% lower VL:CD (P=0.006). Birds fed the treated vs untreated U. laetevirens diet had 8% deeper crypts, whereas the opposite was observed for birds fed S. chordalis diets (-4%; Seaweed x Enzyme effect, P=0.035). The seaweed digestibility coefficients indicate that these products interacted with the basal diet. Based on this experiment U. laetevirens is more suitable for inclusion in broiler diets, and the enzymatic treatment was not suitable for increasing digestibility.