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INFLUENCE OF DIETARY CHLORELLA VULGARIS AND CARBOHYDRATE-ACTIVE ENZYMES ON GROWTH PERFORMANCE, MEAT QUALITY AND LIPID COMPOSITION OF BROILER CHICKENS

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RESUMO

We hypothesized that the incorporation of high levels of *Chlorella vulgaris* is an effective strategy to partially replace conventional, but unsustainable, protein sources, particularly soybean meal, in poultry nutrition. Additionally, we expected that the use of exogenous Carbohydrate-Active enZymes (CAZymes) would degrade the recalcitrant microalga cell wall and improve the bioavailability of its nutrients in poultry diets. Thus, the effect of feeding 10% *C. vulgaris*, supplemented or not with two mixtures of CAZymes, on growth performance, meat quality, fatty acid composition, oxidative stability and sensory traits in broiler chickens was investigated. 120 Ross 308 male birds were randomly assigned to one of the four experimental diets ($n=30$): corn-soybean meal basal diet (Control), basal diet with 10% *C. vulgaris* (CV), CV supplemented with 0.005% of a commercial CAZyme cocktail (Rovabio® Excel AP), (CV+R), and CV supplemented with 0.01% of a 4-CAZyme mixture previously selected (CV+M). Body weight gain and feed conversion rate of broilers were not affected by *C. vulgaris* but digesta viscosity increased more than two-fold ($P < 0.001$) relative to the control. In addition, neither cooking loss, shear force, juiciness, flavor nor off-flavor were impaired by dietary treatments. In contrast, the dietary *C. vulgaris* increased tenderness, yellowness (b^*) and total carotenoids in breast and thigh meats. *C. vulgaris*, independently of CAZymes, had a minor impact on meat fatty acid composition but improved the proportion of some beneficial fatty acids. In summary, our data indicate a slight improvement of broiler meat quality and lipid nutritional value, without impairment of broilers' growth performance, thus supporting the usefulness of this microalga in poultry diets, up to this high level of incorporation. In contrast, the selected CAZyme mixtures used do not significantly improve the release of microalga nutrients in poultry diets, through the disruption of microalga cell wall, which warrants further research.

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PALAVRAS-CHAVE: Chlorella vulgaris, CAZymes, growth performance, meat quality