PIMPISUT MANASSILA : EFFECTS OF LOW MOLECULAR WEIGHT DUCK BLOOD PROTEIN HYDROLYSATE AS A FEED ADDITIVE ON THE INTESTINAL MICROBIOME, ANTIOXIDANT ACTIVITY, AND HUMORAL IMMUNE RESPONSES IN FLOWERHORN FISH. THESIS ADVISOR : Asst. PROF. CHATSIRIN NAKHARUTHAI, Ph. D., 76 PP.

Keyword: Duck blood/Protein hydrolysate/Microbiome/Immune response/Antioxidant

Food-derived bioactive peptides could serve as feed ingredients and/or feed additives. We investigated the health-promoting properties of low molecular weight duck blood protein hydrolysate (DBPH), fractionated by ultrafiltration with a 10 kDa molecular weight cut-off membrane in flowerhorn fish. The analysis of molecular weight distribution revealed that the most common sizes of DBPH fell within the range of 3-7 kDa (39.68%), followed by >7-10 kDa (20.69%), 1-3 kDa (23.03%), and <1 kDa (9.00%). After one month of the feeding trial, fish fed with diets supplemented with 2% DBPH exhibited the highest growth, antioxidant activity, and humoral immune response enhancement under normal conditions. In addition, microbiome analysis confirmed that 2% DBPH possesses antimicrobial activity, as evidenced by the significant decrease in operational taxonomic units (OTUs) and alpha diversity indexes, including Chao1 and Shannon. Compared to the control group, fishes that were fed with diets supplemented with 2% DBPH exhibited a significantly higher abundance of the genera *Cetobacterium* and *Romboutsia*, which could serve as indicators of the overall health and well-being of the fish. After a *Streptococcus agalactiae* challenge, fish fed with diets supplemented with 2% DBPH exhibited an enhanced ability to modulate inflammatory genes, including IL-1β, IL-6, CC, and CXC chemokine as well as antioxidant gene expression (SOD and CAT). Overall, dietary supplementation with 2% DBPH could improve the overall health of the flowerhorn fish by ameliorating humoral immune response, alleviating oxidative stress and strengthening resistance against *S. agalactiae*.

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