Effects of Dietary Emodin Supplementation on Growth Performance, Non-Specific Immune Responses, and Disease Resistance to Aeromonas hydrophila in Juvenile Wuchang Bream (Megalobrama amblycephala)

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Abstract

An 8-week feeding trial was conducted to investigate the effects of dietary emodin supplementation on growth, non-specific immunity, and protection against Aeromonas hydrophila infection in juvenile Megalobrama amblycephala. A basal diet was supplemented with 0 (control), 15, 30, 60 and 120 mg emodin/kg to formulate five experimental diets. Each diet was randomly allocated to triplicate tanks of fish in a circulating water system (initial average weight 3.49±0.045g, 25 fish per tank). At the end of the feeding trial, fish fed the diet supplemented with 0 and 120 mg emodin/kg had lower weight gain (WG) and specific growth rate (SGR) than those in the other treatment groups, but no significant differences were observed among diets supplemented with emodin from 15 to 60 mg/kg. A significant increase on feed conversion ratio (FCR) of fish fed diet supplemented with 120 mg emodin/kg was observed. The white blood cell count (WBC), respiratory burst activity, superoxide dismutase (SOD) activity, myeloperoxidase (MPO) activity, malondialdehyde (MDA) content, and tumor necrosis factor-α (TNF-α) activity first increased and then decreased with increase of the dietary emodin levels. Fish fed the 30 mg emodin/kg supplemented diet had higher WBC, respiratory burst activity, SOD and TNF-α activity, and lower MDA content, than fish fed diets supplemented with 0 and 120 mg emodin/kg. In the bacteria challenge experiment with A. hydrophila, fish fed a diet supplemented with 30 and 60 mg/kg had a lower cumulative mortality rate than the control group. These results indicated that appropriate dietary emodin supplementation (especially 30 mg emodin/kg diet) could enhance the growth and immune responses of fish and improve resistance to infection by A. hydrophila.

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