Evaluation of the effects of garlic powder and oil on growth performance and physiological parameters of common carp (*Cyprinus carpio* L.)

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Abstract

This study evaluated the effects of dietary garlic powder (1%), garlic oil (1%), and their combination (0.5%) each on the growth performance and some biochemical parameters of common carp (*Cyprinus carpio* L.) over a 75 day period. The results showed that the treatments with added garlic powder and garlic oil improved growth performance compared to the control group (C). Notably, the synergistic blend treatment removes (T3) demonstrated significant improvements in final weight (30.4 g), weight gain (18.3 g), relative growth rate (151.2%), specific growth rate (1.65%/day) and feed conversion ratio (1.81) with statistically significant differences ($P<0.05$) compared to other treatments. Digestibility was also significantly enhanced in all treatments containing garlic powder, garlic oil and their combination with the highest total digestibility recorded in treatment T3 (84.8%), which differed significantly ($P<0.05$) from the other treatments. Blood analyses indicated a gradual increase in values with the use of the garlic powder and oil mixture, with the highest levels observed in fish fed the T3 diet. The total blood protein concentration reached 2.08 mg/dl. An increase in albumin concentration was noted in all fish-fed diets supplemented with garlic powder and oil compared to the control, reaching the highest value in T3 (0.96 mg/dl). Regarding globulin concentration, a significant increase ($P<0.05$) was observed in treatment T3 compared to the other treatments, with a value of 1.12 mg/dl. Liver enzyme analysis (AST, ALT, and ALP) in serum showed reduced enzyme levels indicative of improved liver function in treatments T1, T2, and T3 compared to the control group, with the lowest values recorded in T3: 82.7 IU/l (AST), 7.79 IU/l (ALT), and 45.2 IU/l (ALP), The study concluded supplementing diets with garlic powder or oil, particularly their synergistic blend for *Cyprinus carpio* L. was effective in improving growth performance, enhancing general health status and increasing feed efficiency.

Keywords: Fish diet, Garlic Powder, Garlic Oil, Hematological parameters.

Introduction

The success of aquaculture largely depends on nutritionally balanced diets that contain all the essential components and additives necessary to support growth rates, improve digestibility, enhance immunity, increase disease resistance, provide energy, build tissues and reduce stress and mortality (Silva, 2022). The physiological status of fish is affected

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