

## ABSTRACT

This study was conducted in a semi-static culture system with the aim to determine the effects of dietary inclusion of propolis (pp) on growth, feed utilization, body composition, hematological and biochemical health indices in *Labeo rohita*. A sample population of 275 fish ( $4.9 \pm 0.1$ g) were randomly assigned to five treatment groups that consisted of three replicates. A basal diet (as control with 0% pp) was formulated and by adding graded concentrations of propolis (05, 10, 15, and 20 g pp/kg feed) four test diets were prepared. During the 60-day feeding trial, fish were hand-fed to apparent satiation three times a day. The water quality parameters (temperature, pH, dissolved oxygen, and total ammonia) were regularly monitored and kept within the recommended ranges for rohu culture. Analytical results obtained were statistically analyzed using the Statistix 9.0 software. According to the simple one-way analysis of variance (ANOVA), followed by the Tukey's HSD (Honestly Significant Difference) post-hoc test, the diet with 10 g pp/kg feed was found more effective ( $p < 0.05$ ) as it led to enhanced feed consumption, and hence growth performance (weight gain, specific growth rate%, feed conversion ratio, and feed efficiency) compared to control and all other treatment groups. Weight gain data were also fitted to a quadratic regression model, and it was found that 6.2 g pp/kg feed is optimum to obtain maximum biological performance. With the optimum dietary supplementation of

pp, nutrient intake, and hence nutrient assimilation enhanced resulting in improved body nutritional composition in terms of body crude protein and mineral deposition along with improvement in body moisture content while decreased body fat. Compared to control, in the pp supplemented groups the improved ( $p < 0.05$ ) hematological indices were an indication of better physiological status. White blood cells and differential leukocytes were found statistically similar ( $p > 0.05$ ) between control and treatment groups. Biochemical analysis showed lowered ( $p < 0.05$ ) plasma glucose and triglycerides while improved ( $p < 0.05$ ) plasma protein in propolis-fed groups compared to control indicating better metabolic performance and enhanced natural immune responses. The activity of liver function enzymes including ALT and AST remained same ( $p > 0.05$ ) across all groups, indicating that no oxidative stress was induced by pp, whereas the supplementation of pp beyond 10

g/kg feed (15 and 20 g pp/kg feed) significantly reduced ( $p < 0.05$ ) the palatability and feed consumption, and eventually adversely affected ( $p < 0.05$ ) growth performance and body nutritional profile. In conclusion, based on the simple ANOVA 10 g pp/kg feed was found optimum but the quadratic regression analysis revealed that 6.2 g pp/kg feed is optimum for attaining better growth performance, body consumption and health conditions in *Labeo rohita*. This study provides aquaculturists with important information on the promising growth and health promoting effects of dietary supplementation of propolis ensuring economic and environmental sustainability.

### **Keywords**

Feed utilization, Metabolic regulation, Intensive aquaculture, Natural immunostimulants, Sustainability, Rohu