Optimizing Fish Protein Hydrolysate Inclusion in Diets for Improved Growth, Digestibility, and Survival of Juvenile Seabass (*Lates calcarifer*) and Gold Spot Mullet (*Liza parsia*)

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Fish protein hydrolysates (FPHs), generated through enzymatic conversion of fish processing by-products into low-molecular-weight peptides, represent a promising nutritional strategy to enhance feed efficiency and resource utilization in aquaculture. In this study, FPHs were prepared using proteolytic enzymes at the optimal temperature and pH, digesting various fish waste components such as heads, trimmings, fins, frames, bones, scales, and viscera. A 6-week feeding trial was conducted to assess the impact of FPH on the growth performance, survival, digestive enzyme activity (amylase and protease), feed conversion ratio (FCR), and body composition in juvenile seabass (*Lates calcarifer*) and gold spot mullet (*Liza parsia*). For seabass, four isonitrogenous diets (50% protein) containing 0%, 10%, 20%, and 30% FPH were tested alongside a commercial control diet, while mullet juveniles were fed diets (35% protein) with 0%, 5%, 10%, 15%, and 20% FPH inclusion. Each treatment included three replicates, each containing 15 fish. All analyses were performed using R Studio version 4.4.2. In both species, dietary FPH levels significantly influenced growth, survival, digestive enzyme activity, and FCR. The 10% FPH inclusion consistently produced the highest total weight gain, specific growth rate, and survival, as well as improved feed utilization efficiency. Enhanced amylase activity was observed in both species at this inclusion level, while protease activity remained relatively stable in seabass but increased in mullet. Higher inclusion levels resulted in reduced growth performance and survival, indicating limited tolerance beyond optimal thresholds. Body composition showed minimal variation among treatments, although mullet exhibited an improved condition factor and favorable fatty acid profiles at moderate FPH inclusion. Additionally, feed cost analysis suggested that partial replacement of conventional protein sources with FPH can reduce overall feed expenses without compromising growth performance. These findings demonstrate that moderate incorporation of FPH enhances nutrient utilization and growth efficiency across species with differing feeding habits. The study highlights the potential of FPH as a functional and sustainable feed ingredient, contributing to waste valorization and cost-effective aquaculture practices.

Keywords: *Fish protein hydrolysate, Lates calcarifer, Liza parsia, Growth performance, Digestive enzymes*