

Use of fermented fisheries by-products and soybean
curd residues mixture as a fish meal replacer
in diets of juvenile olive flounder
(*Paralichthys olivaceus*)

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An 8-week feeding experiment was conducted to evaluate the potential use of fish silage in combinations with defatted soybean meal (FSBM) as a partial replacement of fish meal (FM) in juvenile olive flounder (*Paralichthys olivaceus*). Five isonitrogenous and isoenergetic diets were formulated to contain fish silage and defatted soybean meal mixture to replace the fish meal at 0%, 15%, 30%, 45% and 60% of fish meal protein (FSBM₀, FSBM₁₅, FSBM₃₀, FSBM₄₅ and FSBM₆₀), respectively. White fishmeal, squid liver powder, wheat gluten meal and corn gluten meal were used as the dietary protein sources in this study.

Prior to the start of the feeding trial, fish were fed the commercial diet for 2 weeks to adjust to the experimental conditions. Fish averaging 5.99±0.08 g (mean ±SD) were randomly distributed to fifteen aquaria as groups of 15 fish and fed the experimental diets in triplicate at a rate of 4 to 5% of wet body weight twice daily to satiation per day. The feeding trial was conducted by using a recirculating system with fifteen 60-L aquaria receiving filtered seawater at a rate of 0.8L/min. All the experimental aquaria were under the natural light conditions and the seawater temperature was maintained at 20±1°C by heaters during the whole experimental period. Supplemental aerations were provided to

keep dissolved oxygen near saturation in each aquarium.

Survival rates were almost the same among all treatment groups. However, weight gain(WG) and specific growth rate (SGR) of olive flounder fed the diet FSBM₁₅ were significantly higher compared to fish fed diet FSBM₄₅ and FSBM₆₀($P < 0.05$), but not different from fish fed diet FSBM₀ and FSBM₃₀. Feed efficiency ratio (FER) and protein efficiency ratio (PER) of fish fed diet FSBM₀ were significantly higher compared to the fish fed diet FSBM₆₀ but not different compared to the fish fed all other diets. There were no significant differences in hematological characteristics together with condition factor among all treatments. These results indicated that fish silage and defatted soybean mixture could replace 30% fish meal protein with good growth and feed utilization in feeds for juvenile olive flounder.