

## **Nutritional properties of two formulated diets using fisheries by-products: an alternative for fish meal in fish diets**

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Aqua feed industry focuses on using less expensive ingredients with comparable nutritional value to replace fish meal due to its high cost as well as restricted supply of fish meal. Fisheries discards, namely, fish offal and by-catch may contain considerable amounts of proteins and other nutritive compounds, thus may qualify as cheap protein sources in fish feed formulation. Present study aimed to determine nutritional properties of diets prepared by using dried, ground fish offal (Diet A) and by catch (*Hilsa kelee*; Diet B) fully replacing the fish meal (40% by weight), and to compare those with the nutritional properties of a formulated diet (Diet C) containing similar proportion of an imported commercial fish meal (named 999). Other ingredients were common and similar in all the diet formulations, and included red rice bran, maize, soya bean, coconut poonac, maize, wheat flour, vitamin and mineral mixture. Protein content of diet C was significantly higher ( $46.74 \pm 2.339\%$ ) than diet A ( $39.47 \pm 0.455\%$ ), and B ( $42.00 \pm 0.579\%$ ). Total essential amino acids (TEAA) were not significantly different among formulated diets (Diet A: 1.18%; Diet B: 1.19%; Diet C 1.46%). Diet A had significantly higher crude fat content (11.4%) followed by the Diet B and C. Diet C had the higher Omega-3 fatty acids (1.72%) than Diet A (1.06%) and Diet B (1.26%) ( $p < 0.05$ , ANOVA), while n3: n6 ratios were 0.61%, 0.65% and 0.89% in Diets A, B and C, respectively. Material costs (LKR) per one kilogram of diet were 143.3, 155.3 and 291.3 respectively for Diet A, B and C. According to the comparable levels of nutrient content and the lower unit cost, unprocessed fisheries by-products can be used as protein source replacing high-cost fish meal in aqua feed formulation. Feeding trials are needed to evaluate the suitability of diets with alternative ingredients for growth enhancement in cultured fish.

**Keywords:** *Aqua feed, essential amino acids, fish meal replacement, omega-3 fatty acids*

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