Mangrove yeasts as protein additive to Nile tilapia (*Oreochromis niloticus*) feed meal

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ABSTRACT:
Yeasts are unicellular eukaryotic microorganisms that have been widely used in a variety of applications. In the Philippines, little attention has been given to marine or mangrove yeast species utilized in aquaculture industry. Microbial proteins have been explored as an alternative source of protein in feeds due to their nutritional benefits. In this study, mangrove yeasts as potential source of proteins and as feed additive to Nile Tilapia (Oreochromis niloticus) meal diets were investigated. Yeasts were isolated from mangrove leaf litters, barks, and soil collected at Barangay Silonay, Oriental Mindoro. Small strips of leaves were placed in full strength Glucose-Yeast Extract-Peptone (GYP) Agar, whereas barks and soil were enriched in full strength Glucose-Yeast Extract-Peptone (GYP) broth in 50% seawater. Of the nine (9) yeast isolates, results of protein assay using the Bradford method showed that A2B R1 ISO 1 (Candida tropicalis) and A2B R1 ISO 3 (Pichia kudriavzevii) isolated from bark samples have higher protein content with 579 µg/mL and 571.22 µg/mL, respectively. Generally recognized as safe (GRAS), P. kudriavzevii was selected, characterized, and used for biomass production in fish feed formulation. The amino acid profile of P. kudriavzevii revealed the essential amino acids are present which are required for the growth of Nile tilapia. The addition of glycine (1.0 g/L) to GYP liquid medium resulted to higher protein content (974.56 µg/mL) and cell density (OD600 = 11.68). After 40 days of feeding experiments, groups which received YB2 (2 g/kg) resulted to higher final body weight (g), weight gain (%), and specific growth rate. However, there was no significant difference based on one-way ANOVA due to higher p values obtained. Similarly, no significant difference ($p > 0.05$) was observed in feed utilization and body composition of Nile tilapia. The ascomycetous P. kudriavzevii isolated from a mangrove can be tapped as a potential source of protein in fish feed diet. However, it is recommended to extend the feeding period (>40 days) to examine the long-term effects of yeast-supplemented diets on Nile tilapia.

KEYWORDS:
Yeast; mangroves; proteins; Bradford assay; feed additive.