

## ABSTRACT

The aim for this research was to develop a cost-effective diet for red tilapia (*Oreochromis spp.*) using an insect protein-based source, the super worm meal (SWM), *Zophobas morio* according to various levels of fish meal replacement. This research would be focused on alternative protein source to fish meal with some assessment needed for a complete diet. This experiment consists of 4 experiments. Firstly, the nutritional evaluation and proximate analysis of *Z. morio* meal in *Oreochromis spp.* diet were studied. Then, the SWM was partially replaced by appropriate substitution level before being enriched by methionine and then supplemented by mushroom stalk meal as prebiotic compound. All diets of each experiment was formulated to be isonitrogenous (32 - 34%) and isoenergetic (436 – 478 kcal/g) fed to red tilapia juvenile at 10% of their body weight for a period of eight weeks.

Proximate analysis showed that SWM had 42.83% crude protein, 40.01% crude lipid, 7.51% moisture and 3.54% ash content. Generally, SWM has all essential amino acid and fatty acid profiles although not as good as fish meal (FM). This alternative protein source showed an increase in growth performance at 50% substitution level although with a slightly depressed growth due to high lipid content within the diets. Supplementing with methionine probably led to improvement of feed utilization but no significant difference ( $P>0.05$ ) was noted as 1.0% (w/vv) supplementation level revealed the best growth response with final weight of 6.5 g. Lastly, usage of mushroom stalk meal (MSM) stimulates the immune system against infections as shown when 10% MSM inclusion level gave 6.72 g of final weight with FCR value, 1.78. All fish fillet from each experiment were subjected to analysis to investigate the chemical analysis and clearly no significantly different ( $P>0.05$ ) was shown among them. It can be concluded that the experimental diets did not show any altered body composition and

the same final product quality could be obtained when offering the new diets based on SWM inclusion.

Overall, from a nutritional aspect, SWM could potentially replace FM but some other considerations should be taken into account in order to minimize production cost. The 50% replacement portion seemed the best substitution of SWM into diet with 1.0% DL-Methionine added and supplemented with 10% MSM which could be the best formulation for a complete package in a well balanced diet.