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Effect of fishmeal replacement with poultry by-product meal on serum parameters and histomorphology of liver and kidney in Nile tilapia ((*Oreochromis niloticus*), Linnaeus, 1758)

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Abstract

Today, *Oreochromis niloticus* has become one of the most popular fish in the world. Due to the increasing prices of fishmeal and its limited availability, various protein sources, including poultry by-product meals (PBM) can substitute fishmeal in the aquatic diet. This study was thus intended to investigate the effect of replacing fishmeal with different ratios of PBM on the liver, and kidney tissue structure changes, growth performance, and some serum parameters of *O. niloticus*. To that end, 120 *O. niloticus* were randomly distributed into four groups: the control, 25, 50, and 100% PBM meal instead of fishmeal which was fed for 44 days. At the end of the treatment period, growth parameters, blood serum, liver enzymes, and histomorphology of the liver and kidney of all fish were evaluated. The results showed that the liver enzymes increased significantly in the groups with higher replacement (100% PBM) compared to the control group; and in the histological examinations of the liver, the liver tissue lost its normal structure and function with the increase in the amount of replacement diets and there were fat vacuoles accumulated in the cytoplasm of hepatocytes. The level of urea plasma also showed a significant difference with the increase in the amount of substitute diets among the groups with upward substitution compared to the control group. These changes were evident in the structure of tubules and glomeruli. Data suggests that 100% PBM meal is not recommended for fishmeal substitution in *O. niloticus* but PBMs up to 50% can replace fishmeal for *O. niloticus* diet without adversely affecting the growth performance and biochemical parameters of the fish.

Keywords: Fishmeal, Growth performance, Histomorphometric changes, *Oreochromis niloticus*, Poultry by-product (PBM)

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