

Effects of Dietary Polyunsaturated Fatty Acids and Beta Glucan on Maturity, Immunity, and Fry Quality of Pabdah Catfish, *Ompok pabda*

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Abstract : A nutritionally balanced diet and selection of appropriate species are important criteria in aquaculture. The present study was conducted to evaluate the effects of polyunsaturated fatty acids (PUFAs) and beta glucan-containing diets on growth performance, feed utilization, maturation, immunity, early embryonic and larval development of endangered Pabdah catfish, *Ompok pabda*. In this study, squid extracted lipids and mushroom powder were used as the source of PUFAs and beta-glucan, respectively, and formulated two isonitrogenous diets such as a basal or control (CON) diet and a treated (PBG) diet with maintaining 30% protein levels. During the study period, similar physicochemical conditions of water such as temperature, pH, and dissolved oxygen (DO) were 26.5 ± 2 °C, 7.4 ± 0.2 , and 6.7 ± 0.5 ppm, respectively, in each cistern. The results showed that final mean body weight, final mean length gain, food conversion ratio (FCR), specific growth rate (SGR), food conversion efficiency (%), hepato somatic index (HSI), kidney index (KI), and viscerosomatic index (VSI) were significantly ($P < 0.01$ and $P < 0.05$) higher in fish fed the PBG diet than that of fish fed the CON diet. The length-weight relationship and relative condition factor (K) of *O. pabda* were significantly ($P < 0.05$) affected by the PBG diet. The gonadosomatic index (GSI), sperm viability, blood serum calcium ion concentrations (Ca^{2+}), and vitellogenin level were significantly ($P < 0.05$) higher in fish fed the PBG diet than that of fish fed the CON diet; which was used to the indication of fish maturation. During the spawning season, lipid granules and normal morphological structure were observed in the treated fish liver, whereas fewer lipid granules of liver were observed in the control group. Based on the immunity and stress resistance-related parameters such as hematological indices, antioxidant activity, lysozyme level, respiratory burst activity, blood reactive oxygen species (ROS), complement activity (ACH50 assay), specific IgM, brain AChE, plasma PGOT, and PGPT enzyme activity were significantly ($P < 0.01$ and $P < 0.05$) higher in fish fed the PBG diet than that of fish fed the CON diet. The fecundity, fertilization rate ($92.23 \pm 2.69\%$), hatching rate ($87.43 \pm 2.17\%$), and survival ($76.62 \pm 0.82\%$) of offspring were significantly higher ($P < 0.05$) in the PBG diet than in control. Consequently, early embryonic and larval development was better in PBG treated group than in control. Therefore, the present study showed that the polyunsaturated fatty acids (PUFAs) and beta-glucan enriched experimental diet were more effective and achieved better growth, feed utilization, maturation, immunity, and spawning performances of *O. pabda*.

Keywords : lipids, beta-glucan, fish maturity, fish immunity

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