The Effect of Dietary Lipid Levels on Growth Performance, Lipid Deposition, and Antioxidant Status of Juvenile Turbot, Scophthalmus maximus, Fed Isonitrogenous and Isoenergetics Diets

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Abstract
The purpose of this study was to investigate the effects of different lipid (fish oil/soybean oil=1:1, w/w) levels in diets with 45% crude protein on growth performance, body composition, and antioxidant status of turbot (Scophthalmus maximus L.). 2040 turbot (39±0.2g) were randomly divided into 4 groups with 3 replicates and fed isonitrogenous and isoenergetic diets with lipid levels of 6.0%(L6.0), 8.5%(L8.5), 11.0%(L11.0), and 13.5%(L13.5) for 56 days. Hepatic lipase (HL) and superoxide dismutase (SOD) activity were evaluated, as well as lipid peroxidation measured as malondialdehyde (MDA). Results showed that no significant difference was observed in feeding rate (FR), protein efficiency ratio (PER) and protein retention, while dietary lipid levels caused a significant increase (P<0.05) in specific growth rate (SGR) The L13.5 group showed the highest lipid and energy retention and this was significantly higher than in other groups; lipid content in whole body and liver increased significantly with increased dietary lipid (P<0.05); the HL and SOD activity, and MDA in the liver all increased significantly (P<0.05)with dietary lipid supplementation in L13.5. In general, high dietary lipid levels enhanced growth rate of turbot, but the increment of growth was due mainly to excessive lipid deposition. Oxidation stress was observed in fish fed the diet containing 13.5% lipid. The optimal level of dietary lipid for good growth and antioxidant status in turbot was found to be 11%.

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