

Physiological changes of giant grouper (*Epinephelus lanceolatus*) fed with high plant protein with and without supplementation of organic acid

ABSTRACT

This study was conducted to identify the effects of organic acid supplementation on 50 % replacement of fish-meal by soybean meal on the growth performance, hepatic condition and intestinal histology of giant grouper *Epinephelus lanceolatus*. Giant grouper juveniles were fed three different diets, 50 % fishmeal protein replacement with soybean meal (SBM50), 50 % fishmeal protein replacement with soybean meal added 1% butyric acid supplementation (SBM50 +1%) and fishmeal diet (FM) as the control. All diets were formulated isoproteic (48 %) and isolipidic (12 %). Experimental fishes were cultured in a recirculating system and fed twice daily until apparent satiation level. Growth performance, hepatic condition and histological changes were observed in the feeding trial. Highest growth was seen in fish fed FM ($p < 0.05$), followed by SBM50 and SBM50 +1% showed the lowest growth. Better feed conversion ratio (FCR) and protein efficiency ratio (PER) was also observed in fish fed FM ($p < 0.05$) followed by fish fed SBM50 and SBM50 +1%. Meanwhile, hepatic superoxide dismutase activity of fish fed FM was higher, followed by SBM50 +1% and SBM50 not significant and the thiobarbituric acid reactive substances (TBARS) of fish fed FM was significantly lower ($p < 0.05$) followed by SBM50 +1% and SBM50. Fish fed FM also showed significantly bigger hepatocytes ($p < 0.05$) and significantly higher glycogen content ($p < 0.05$) compared to SBM50 and SBM50 +1%. On the other hand, inclusion of 1% butyric acid helped in mitigating intestinal inflammation caused by soybean meal although not significant. Findings from this study showed that 1% butyric acid did not help in optimizing high levels of plant based protein for giant grouper juveniles.