

Oxidized Palm Oil Diet Affects Fatty Acid Profiles, Apparent Digestibility Coefficients and Liver of Hybrid Grouper Juvenile (*Epinephelus fuscoguttatus* × *Epinephelus lanceolatus*)

ABSTRACT

Vegetable oil is progressively replacing fish oil (FO) in aquafeed production. However, the effect of oxidized vegetable oil is less reported. This study was done to investigate the effects of oxidized refined palm oil (RPO) on the growth performance, feed utilization, proximate and fatty acid profiles, apparent digestibility coefficients and oxidative stress of hybrid grouper juvenile (*Epinephelus fuscoguttatus* × *E. lanceolatus*). RPO was force-oxidized and introduced into diets at three oxidative levels to replace 50% of FO. Diets with FO and fresh RPO were served as controls. The peroxide value of the oxidized diets was measured as 14.73, 24.50, and 36.10 meq/kg for diets OxL, OxM, and OxH, respectively. These diets were fed to triplicate groups of hybrid grouper (initial body weight 9.91 ± 0.01 g) for 8 weeks. There was no significant difference in terms of growth performance, survival, feed utilization, and whole-body protein proximate composition in all treatments ($p > 0.05$). However, different dietary treatments affected the body fatty acids profile and fish-fed OxM diet achieved the highest body weight gain without significant difference ($p > 0.05$). In terms of hepatic somatic index (HSI), fish-fed OxH showed a significantly lower value compared to other treatments. Similarly, the lowest apparent digestibility coefficients (ADC) of nutrients were observed in fish fed OxH diet. The oxidized diets caused significant lower blood cholesterol and high-density lipoprotein cholesterol (HDL) ($p < 0.05$). The oxidative stress in the liver as indicated by the significantly higher thiobarbituric acid-reactive substance (TBARS) value in fish fed all the oxidized diets while no significant changes on the muscle TBARS values. In conclusion, the oxidized RPO diets significantly affected the liver, the nutrient digestibility, and the blood total cholesterol and HDL. Furthermore, hybrid grouper can tolerate up to 20 meq/kg of oxidized RPO in the diet without compromising the growth.