

Abstract

Aquaculture is one of the rapidly growing sectors, still facing the challenges of sustainability and economic viability at the same time. Fish feed and its economy is one of the key factors in this context. Increasing demand for fish oil (FO) necessitates exploring suitable substitutes, for which sunflower oil may be tested. Here, we study to evaluate the replacement of fish oil with sunflower oil (SFO) and acetic acid (AA) supplementation using Nile Tilapia (*Oreochromis niloticus*). Four groups of *O. niloticus* fingerlings, each comprising 15 individuals with an average body weight of 1.95 ± 0.13 g, were designated as D1, D2, D3 & D4 for an eight-week trial. The trials were performed in triplicate. D1 (basal diet) was the control, whereas D2 (FO = 30 mL kg⁻¹, AA = 30 mL kg⁻¹), D3 (SFO = 30 mL kg⁻¹, completely replacing FO), and D4 (SFO = 30 mL kg⁻¹, AA = 30 mL kg⁻¹), were the treatment groups. We found that D4 showed better results in terms of growth performance (weight gain, weight gain%, specific growth rate, FCR, FER), and oxidative status (CAT, SOD, GST) with significant differences as compared to the other diet groups ($P < 0.05$). However, the D4 experimental group's proximate meat composition (crude protein%, crude fat%, Dry matter%, and ash%) showed elevated values but with no significant difference. Hence, we suggest that the total replacement of FO with SFO = 30 mL kg⁻¹, and AA = 30 mL kg⁻¹ can enhance the health status and fillet quality.