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ORIGINAL PAPER

Effect of dietary alternative lipid sources on haematological parameters and serum constituents of *Heterobranchus longifilis* fingerlings

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Abstract The worldwide increase in aquaculture production and the decrease of wild fish stocks has made the replacement of fish oil (FO) in aquafeed industry a priority. Therefore, the use of terrestrial animal fats and vegetable oils, which has lower cost and larger supplies, may be good as substitute for FO. This study investigate the effects of total replacement of FO by two terrestrial animal fats (pork lard and poultry fat) and three vegetable oils (palm kernel oil, sheabutter oil and sunflower oil) on haematological and serum biochemical profile of *Heterobranchus longifilis* over 70 days. FO-diet was used as the control. The haematological parameters were significantly affected by dietary lipid sources. Serum total protein was not influenced by the dietary lipids. However, serum cholesterol was significantly higher in fish fed diet containing sunflower oil. Glucose and activities of liver enzymes in blood serum were significantly reduced in fish fed alternative lipids when compared with the control. These results indicate that FO can be replaced completely with alternative lipids without any serious negative health impacts.

Keywords Fish oil · Alternative lipids · Haematology · *Heterobranchus longifilis* · Serum constituents

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Introduction

Marine fish oils have traditionally been used in diets for cultured fish to provide fish with energy and essential fatty acids. However, these oils are in great demand world-wide and as a result of their limited supply, they are becoming increasingly more costly. To maintain and enhance the economic viability of aquaculture, it has become necessary to find suitable, less expensive alternate plant and/or animal lipid sources that would satisfy the nutritional requirement of fish for growth and health.

Catfish can utilize saturated fats, and several studies have focused on catfish growth rates as a function of dietary lipid (Lim et al. 2001; Shirai et al. 2001; Ng et al. 2003). In these studies, no difference was observed between fish fed fish oil or vegetable oil or animal fats or their combinations. Differences in haematological parameters, immune response and disease resistance as a function of dietary lipid source have also been reported for catfish (Fracalossi and Lovell 1994; Klinger et al. 1996; Ochang et al. 2007),