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Partial and Total Substitution of Dietary Fishmeal by Conventional Soybean or Genetically Modified (GM) Soybean Meal Supplemented with Formic Acid for Nile Tilapia, *Oreochromis niloticus* Fingerlings

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Abstract

A feeding trial was conducted to reduce the cost of diet by using two sources of soybean meal (conventional or genetically modified) instead of the expensive commercial fishmeal (FM). In the present study, commercial FM was substituted by partial (50%) or total (100%) soybean. Diets were supplemented with formic acid (FA) at level of 0 or 10 ml kg⁻¹ to investigate the growth performance and feed utilisation of *Oreochromis niloticus*. The experiment was conducted with 360 Nile tilapia fingerlings (with initial weight of 22.15 ± 2.70 g). Nine isonitrogenous 25% crude protein and isocaloric 19.28 MJ kg⁻¹ gross energy experimental diets were formulated. Over the 10-weeks feeding period, formic acid supplementation elevated the growth performance and feed utilisation for fish fed either 50% conventional (C-SBM50) or 50% genetically modified soybean meal (GM-SBM50). Serum ALT, AST, glucose and triglyceride values were lower in fish fed the control diet and conventional soybean in comparison with those fed genetically modified soybean meal. No obvious changes were found in micronucleus or in nuclear abnormalities for all diets compared with the control diet. FA supplementation improves the growth performance, feed utilisation and biological abdominal parameters in fish fed either C-SBM50 or GM-SBM50. In spite of that, genetically modified soybean elevated the levels of ALT, AST, glucose and triglyceride. These results draw our attention to the important use of organic acids in fish diets to improve the growth performance and feed utilisation. As regarding the genetically modified soybean, it needs more investigation to evaluate their effect in feeding trials on fish.

Keywords: Conventional soybean meal, fishmeal, formic acid, genetically modified soybean meal, *Oreochromis niloticus*