

Study on the Inclusion of Black Soldier Fly Larvae (BSFL) in Feeding Regimen of Catfish (*Pangasius* sp.) Fingerlings

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Structured Abstract

Background: The aquaculture industry is expanding rapidly due to increasing global demand for fish protein. However, the industry faces sustainability and cost challenges, with feed accounting for over 60% of production costs. Conventional ingredients like fishmeal and fish oil are unsustainable due to overfishing and rising costs. This study explores the use of Black Soldier Fly Larvae (BSFL) as an alternative, sustainable, and economical feed ingredient to enhance the growth and health of *Pangasius* sp. fingerlings.

Methods: BSFL was incorporated into aquafeeds at 20% levels. Two different pellets of fermentation were done; inclusion of BSFL before fermentation and inclusion of BSFL after fermentation of substrate. Commercial pellet was used as the negative control. Proximate analysis of feed pellets was conducted to know the nutrients content. A total period of two weeks was spent to feed the fishes with the pellets. Growth performance and feed conversion ratio (FCR) were monitored over the study period. Polyunsaturated fatty acid (PUFA) content in catfish flesh was analysed using Gas Chromatography-Mass Spectrometry (GC-MS).

Results: Diets incorporating BSFL enhanced growth performance, improved FCR, and increased PUFA levels in fish flesh. The total weight gained by the BSFL pellet fed fishes were higher than weight gained by the fish that ate the commercial pellet. Although the differences between them were not significant, the FCR proved a better result when fed with BSFL incorporated pellets. Oleic acids, Arachidonic acids and some useful fatty acids were recorded to increase after the two weeks of feeding regimen. When compared to the commercial pellet, fishes that ate the fermented pellets also showed better PUFA content in their flesh. Higher BSFL inclusion levels correlated with better health and nutritional profiles, suggesting the potential of BSFL as a superior alternative to conventional fishmeal and fish oil.

Conclusion: Incorporating BSFL into aquafeeds demonstrates significant promise in addressing sustainability challenges, offering a cost-effective solution that supports the growth and health of cultured fish. This study contributes to advancing aquaculture practices and reducing dependency on traditional feed ingredients.

Keywords: Aquaculture, Black Soldier Fly Larvae, *Pangasius* sp., Feed Conversion Ratio, Sustainable Feed

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