

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfilment of the requirements for the degree of Master of Science

USE OF BLACK SOLDIER FLY LARVAE MEAL AS PROTEIN SOURCE IN HYBRID GROUPER (*Epinephelus fuscoguttatus* ♀ × *Epinephelus lanceolatus* ♂) CULTURE

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The market demand for hybrid grouper is rising, hence sustainable alternative protein is necessary, as using fish meal (FM) as the principal protein source in aquafeed is very expensive and no longer feasible. This study was conducted to study the effects of Black soldier fly larvae meal (BSFLM) on feeding, growth performances, nutritional composition, and physiological indices of hybrid grouper (*Epinephelus fuscoguttatus* ♀ × *Epinephelus lanceolatus* ♂). A total of 240 fish were fed with 4 isonitrogenous formulated diets with BSFLM inclusion at 0, 15, 30, and 50% for 90 days. Fish fed with 30% BSFLM had the highest weight gain and specific growth rate. Muscle proximate composition revealed better performance in BSFLM fed groups compared to the BSFLM 0%. Tissue energy content was not affected in any adverse way. The highest muscle essential and non-essential amino acids were recorded in the BSFLM 30%. Muscle fatty acids were mostly similar across all groups. There was no significant difference in the hematological indices, although the highest hematocrit value was recorded in BSFLM 30%. This study concludes that hybrid grouper can utilize BSFLM up to 30% in their diet without adverse effects on growth performance.

Abstrak tesis yang dibentangkan kepada Senat Universiti Malaysia Terengganu bagi memenuhi keperluan ijazah Sarjana Sains

**PENGGUNAAN TEPUNG LARVA LALAT ASKAR HITAM SEBAGAI
SUMBER PROTEIN DALAM TERNAKAN IKAN KERAPU HIBRID
(*Epinephelus fuscoguttatus* ♀ × *Epinephelus lanceolatus* ♂)**

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Permintaan pasaran untuk kerapu hibrid semakin meningkat, justeru protein alternatif yang mampan adalah perlu, kerana penggunaan tepung ikan (FM) sebagai sumber protein utama dalam makanan akuatik sangat mahal dan tidak lagi mampan. Kajian ini dijalankan untuk menentukan kesan tepung larva lalat askar hitam (BSFLM) terhadap prestasi pertumbuhan, komposisi nutrisi dan index fisiologi kerapu hibrid (*Epinephelus fuscoguttatus* ♀ × *Epinephelus lanceolatus* ♂). Sejumlah 240 ekor ikan diberi makan dengan 4 jenis isonitrogen berformulasi diet dengan kadar campuran BSFLM pada 0, 15, 30 dan 50% selama 90 hari. Ikan yang diberi makan dengan 30% BSFLM mempunyai pertambahan berat badan dan kadar pertumbuhan spesifik yang tertinggi. Komposisi proksimat tisu menunjukkan prestasi yang lebih baik dalam kumpulan BSFLM berbanding BSFLM 0%. Kandungan tenaga tisu tidak terjejas. Jumlah asid amino perlu dan tidak perlu dalam tisu adalah lebih tinggi dalam kumpulan BSFLM 30%. Asid lemak dalam tisu tidak mempunyai perbezaan yang ketara. Tiada perbezaan ketara dalam indeks hematologi, walaupun nilai hematokrit tertinggi dicatatkan dalam kumpulan BSFLM 30%. Kajian ini menyimpulkan bahawa kerapu hibrid boleh menggunakan BSFLM sehingga 30% dalam diet tanpa kesan buruk terhadap prestasi pertumbuhan.

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