

**REPLACEMENT OF FISH MEAL WITH POULTRY BY-  
PRODUCT MEAL IN ARTIFICIAL FEEDS OF  
JUVENILE TIGER GROUPER, *Epinephelus  
fuscoguttatus***



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## ABSTRACT

### REPLACEMENT OF FISH MEAL WITH POULTRY BY-PRODUCT MEAL IN ARTIFICIAL FEEDS OF JUVENILE TIGER GROUPER, *Epinephelus fuscoguttatus*

A 16-week feeding trial was done to evaluate the possibility of replacing fish meal (FM) with poultry by-product meal (PBM) at high inclusion levels in the feeds of juvenile tiger grouper, *Epinephelus fuscoguttatus*. Four isoproteic (50 %) and isolipidic (13 %) test feeds were formulated and fed to triplicate groups of experimental fish. The control feed was formulated with 100 % local FM (PBM 0) and three other feeds with inclusion levels of PBM 50, 75, and 100 %. Fish with mean body weight of  $26.4 \pm 0.2$  g were randomly put into groups of 30 fish in cylindrical mesh cages placed in a 150-ton high density polyethylene (HDPE) tank. Feeding was done close to apparent satiation level, twice daily at 08:00 and 16:00 hours. Growth of fish fed PBM 0 and TF were significantly lower ( $P < 0.05$ ) to those fed with PBM 50, 75 and 100. Weight gain of juveniles ranged from 233 to 338 % at the end of feeding trial. The best feed conversion ratio (FCR) was achieved in PBM 50 (1.1), followed by PBM 100 (1.2), PBM 75 (1.3), and PBM 0 (2.0). Feeding with trash fish had resulted in significantly poorer FCR of 6.6. Survival were not significantly different ( $P > 0.05$ ) among all treatments. Apparent digestibility coefficients (ADCs) for dry matter were not significantly different among dietary treatments, ranging from  $58.7 \pm 2.03$  % to  $62.42 \pm 0.81$  %. ADCs for crude protein were significantly different ( $P < 0.05$ ) among the dietary treatments except for PBM 50 and 75 ( $87.06 \pm 0.94$  % and  $85.85 \pm 0.12$  %, respectively) and the values were decreasing for PBM 100 ( $74.47 \pm 3.13$  %) followed by PBM 0 ( $73.37 \pm 3.42$  %). ADCs for crude lipid in PBM 100 shows a significantly lower ( $P < 0.05$ ) value compared with PBM 0, 50 and 75 ( $84.32 \pm 0.39$  %,  $87.00 \pm 0.32$  %,  $87.05 \pm 0.52$  % and  $84.32 \pm 0.65$  %, respectively). Whole body proximate compositions, body indices and haematological parameters were not affected by dietary composition. The basic cost analysis revealed that a combination of 50 % PBM and FM gives the more cost effective result. The present study shows that PBM is an excellent alternative protein source for the tiger grouper juveniles.

## ABSTRAK

Satu percubaan pemakanan selama 16 minggu telah dijalankan untuk mengetahui samada tepung hasil sampingan ternakan ayam (PBM) berkemungkinan untuk menggantikan tepung ikan (FM) pada kadar yang tinggi dalam makanan kerapu harimau juvenil, *Epinephelus fuscoguttatus*. Empat makanan isoproteic (50 %) dan isolipidic (13 %) telah dirumuskan dan diberikan kepada tiga replikat kumpulan ikan. Makanan kawalan dirumuskan menggunakan 100 % tepung ikan tempatan dan tiga lagi makanan lain mengandungi kadar kenaikan PBM (50, 75 dan 100 %). Ikan dengan berat purata  $26.4 \pm 0.2$  g diagihkan secara rawak ke dalam sangkar silinder yang diletakkan di dalam tangki polyethylene berketumpatan tinggi (HDPE). Pemberian makanan dilakukan menghampiri tahap kepuasan nyata sebanyak dua kali sehari pada jam 08:00 dan 16:00. Kadar tumbesaran bagi ikan yang di beri makan PBM 0 dan TF adalah lebih rendah ( $P < 0.05$ ) daripada PBM 50, 75 dan 100. Perolehan berat juvenil adalah dari 233 hingga 338 % pada hari terakhir percubaan tumbesaran. Kadar penukaran makanan (FCR) terbaik di capai oleh PBM 50 (1.1), diikuti oleh PBM 100 (1.2), PBM 75 (1.3), dan PBM 0 (2.0). Pemberian ikan baja mencatatkan peningkatan bererti pada FCR iaitu 6.6. Kadar kemandirian tidak menunjukkan perbezaan bererti ( $P > 0.05$ ) di antara semua rawatan. Koefisien pencernaan nyata (ADCs) untuk bahan kering tidak mempunyai perbezaan bererti dengan nilai dari  $58.7 \pm 2.03$  % hingga  $62.42 \pm 0.81$  %. ADCs untuk protein mempunyai perbezaan bererti ( $P < 0.05$ ) dalam semua rawatan kecuali bagi PBM 50 dan PBM 75 ( $87.06 \pm 0.94$  % dan  $85.85 \pm 0.12$  %, masing-masing) dan nilainya berkurangan bagi PBM 100 ( $74.47 \pm 3.13$  %) dan diikuti oleh PBM 0 ( $73.37 \pm 3.42$  %). ADCs untuk lipid dalam PBM 100 menunjukkan perbezaan bererti yang terendah ( $P < 0.05$ ) dibandingkan dengan PBM 0, 50 dan 75 ( $84.32 \pm 0.39$  %,  $87.00 \pm 0.32$  %,  $87.05 \pm 0.52$  % dan  $84.32 \pm 0.65$  %, masing-masing). Komposisi proksimat badan ikan, indeks badan dan parameter darah tidak dipengaruhi oleh komposisi bahan makanan. Analisa kos asas menunjukkan gabungan 50 % FM dan PBM memberikan kos terendah dan berpatutan. Kajian terkini menunjukkan PBM mampu menjadi sumber protein alternatif yang berpotensi untuk kerapu harimau juvenil.