



BLACK SOLDIER FLY (*Hermetia illucens*) LARVAE MEAL AS A PARTIAL FISHMEAL SUBSTITUTE IN DIETS FOR PACO (*Piaractus brachypomus*) FINGERLINGS: EFFECTS ON DIGESTIBILITY, GROWTH AND BLOOD BIOCHEMISTRY

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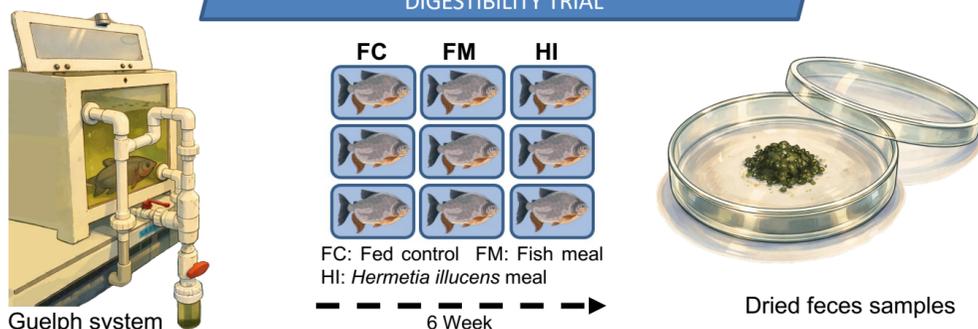
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INTRODUCTION & AIM

The increasing global demand for animal protein requires sustainable ingredients that reduce dependence on fishmeal. Black soldier fly (*Hermetia illucens*) larvae meal is a promising alternative, but information on its use for pacu (*Piaractus brachypomus*) juveniles is limited. This study evaluated the apparent digestibility, growth performance and blood biochemical profile of pacu fed diets in which fishmeal was partially or totally replaced by *H. illucens* larvae meal.

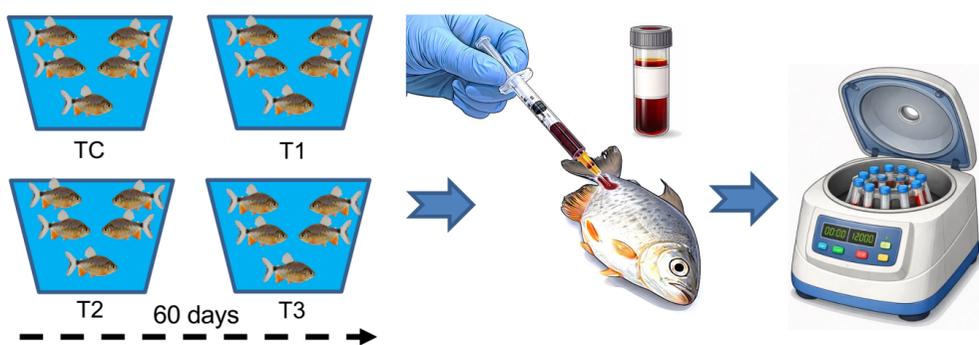
METHOD

DIGESTIBILITY TRIAL



An apparent digestibility trial was conducted using Guelph-type fecal collectors with nine fish fed control, fishmeal, and *H. illucens* meal diets. Feces were collected daily, dried (65 °C, 6 h), ground, and a total of 9 g per treatment were analyzed for moisture, crude protein, ether extract, gross energy, and chromium oxide.

GROWTH TRIAL AND BLOOD BIOCHEMISTRY



A growth trial was conducted with four replicate tanks per treatment and 20 fingerlings per tank. Fishmeal was replaced with insect meal at 0% (TC), 30% (T1), 60% (T2), and 100% (T3). At the end of the trial, blood was collected from the caudal vein, centrifuged (<30 min post-collection), and analyzed for triglycerides, cholesterol, liver enzymes, glucose, and total protein.

RESULTS & DISCUSSION

Table 1. Composition, digestibility (ADC), digestible nutrients, and energy of black soldier fly larvae meal.

Nutrient/Energy	Crude composition of BSFL Meal	ADC (%)	Digestible Nutrients and Energy
Dry matter (%)	96.12	81.38 ± 3.58	78.22 ± 3.44
Crude protein (%)	43.25	88.76 ± 2.14	38.39 ± 0.92
Corrected protein (%) ^a	38.75	88.76 ± 2.11	34.40 ± 0.09
Crude lipids (%)	29.15	97.09 ± 1.13	28.30 ± 0.83
Gross energy (Mcal/Kg)	5.603	85.96 ± 2.94	4.82 ± 0.16

^a Corrected crude protein was calculated by applying a nitrogen-to-protein conversion factor of kp = 5.6.

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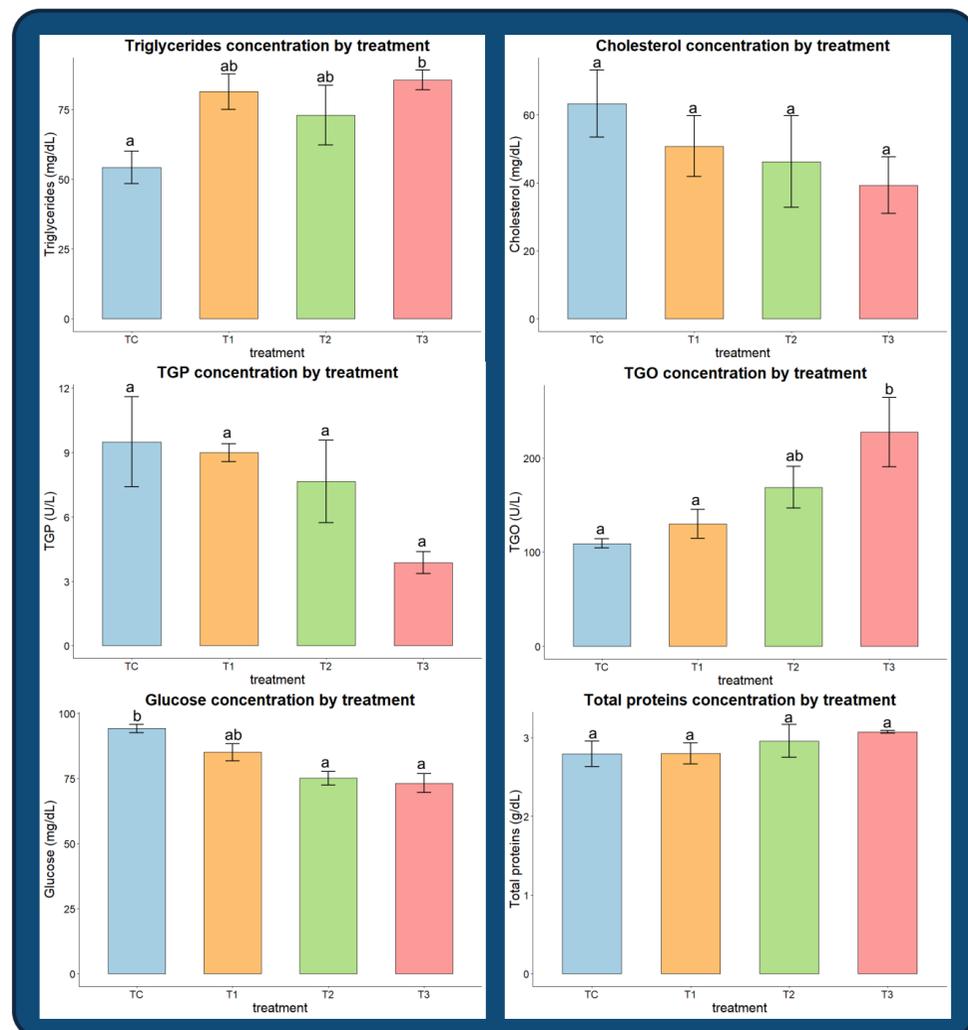


Fig 1. Comparison of serum metabolite levels in pacu fed graded levels of black soldier fly larvae meal for 60 days. Values are mean ± SD. Different letters indicate significant differences among treatments ($p < 0.05$). Data were analyzed by one-way ANOVA followed by Tukey's HSD test.

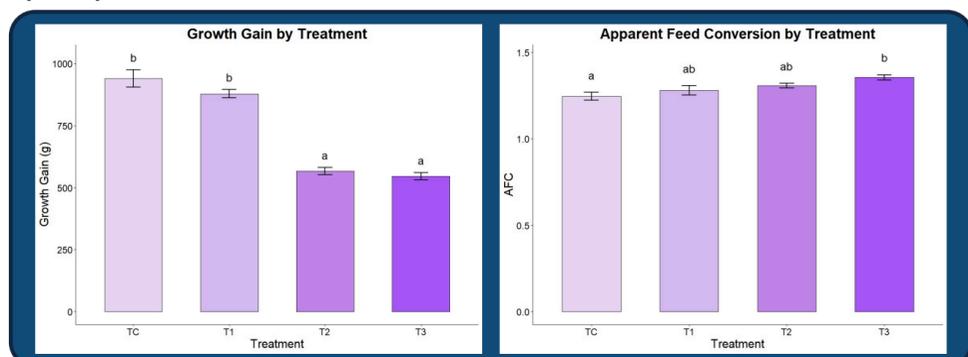


Fig 2. Growth performance of pacu fed diets containing graded levels of black soldier fly larvae meal for 60 days. Values are mean ± SD. Different letters indicate significant differences among treatments ($p < 0.05$). Data were analyzed by one-way ANOVA followed by Tukey's HSD test.

DISCUSSION & CONCLUSION

Several studies report successful partial replacement of fishmeal with full-fat black soldier fly larval meal in tilapia (Munguti et al., 2024), tambaqui (Matos Dantas et al., 2024), carp (Lu et al., 2020), and even improved immunity or total replacement in trout and salmon (Cho et al., 2022; Belghit et al., 2018). Although nutritionally comparable to fishmeal, its fatty acid profile and chitin may limit full substitution (Calinski et al., 2024). In this study, blood parameters remained within normal ranges (Minaya, 2018). *H. illucens* induced metabolic shifts without compromising fish health, and inclusion up to 30% did not impair pacu fingerling growth.

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