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LACQUA

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DIETARY HOUSEFLY LARVAE MEAL INDUCES TRANSCRIPTOMIC CHANGES IN TAMBAQUI *Colossoma macropomum*

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The larvae of the common housefly (*Musca domestica*) provide a nutrient-rich protein source that can partially replace fishmeal in aquaculture feeds. Tambaqui (*Colossoma macropomum*), the most widely farmed native fish species in South America, is highly adaptable to alternative diets. This study evaluated the white muscle gene expression profiles of tambaqui individuals (~5 g) fed diets in which 50% of fishmeal protein (32% crude protein) was replaced with 32% *M. domestica* larva meal (FLMD). Differentially expressed genes (DEGs with FDR < 0.05 and $|\log_2$ fold change$| \geq 1$) were identified between three fish fed the 50% FLMD diet and three fish fed the control diet (0% FLMD). The insect protein-enriched diet led to increased expression of genes involved in muscle protein degradation (e.g., atrogin-1/FBXO32), cellular stress response (HSP70), and immune signaling (IL-8), while simultaneously downregulating key structural muscle genes, such as troponins, myosin, and actin. These shifts suggest a potential muscle remodeling or mild catabolic state. Optimizing insect meal inclusion levels and balancing essential nutrients (e.g., amino acids) may be crucial to support healthy muscle development. Overall, our initial findings highlight the importance of considering muscle-specific molecular responses when evaluating sustainable aquafeed ingredients, to ensure both fish health and production performance.

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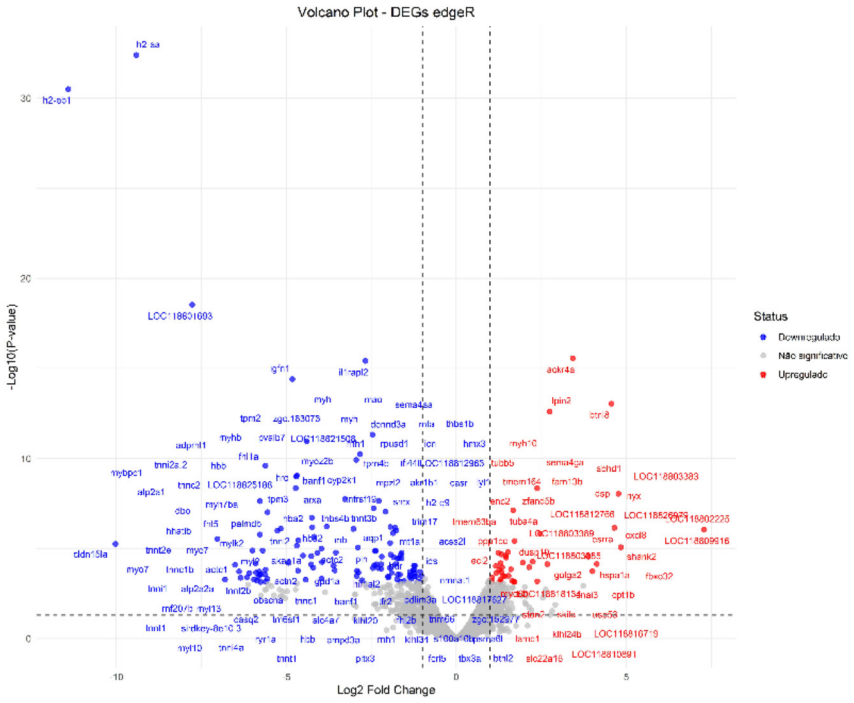

DEGs	*FDR < 0.05*	*Log₂FC > 1*	*Log₂FC < -1*
10,539	160	43	117