The effect of using insects in the diet and its effect on the growth and performance of aquatic animals

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Abstract

Statement of the Problem: According to the Food and Agriculture Organization (FAO) of the United Nations, insects can be a sustainable source of proteins. Insect meal provides a good source of amino acids, lipids, minerals, vitamins, and energy. Currently, the aquaculture industry is looking for alternative protein sources for aquaculture - proteins that are good candidates for maintaining performance and growth as well as improving resistance to aquatic diseases. Therefore, the use of insects in the aquatic meal can play an important role in the economy and sustainability of breeding compared to plant-based fish food.

Methodology and Theoretical Orientation: After preparing meal worm larvae and keeping them for 24 hours to empty their intestines and then drying and powdering meal worm, they were added to the diet of rainbow trout with different percentages of 0% (control), 15 %, 30 % and 45% and after a full period Various analyzes were carried out on them. Of course, during the growth phase, biometrics was performed 3 times and was analyzed.

Findings: The larval stage of the yellow meal worm, *Tenebrio molitor*, and larvae powder is a good candidate to be used as a high protein feed ingredient that could replace FM for carnivorous aquaculture species. In this research, the best rate of consumption of mealworm larvae powder was 30%, which showed the best rate of growth and performance.

Conclusion & Significance: *Tenebrio molitor* is one of seven farmed insect species approved by the European Commission for use in fish feeding. Experiments have shown that TM larvae are rich in protein and lipid, ranging from 47 to 60% and from 31 to 43% (on a dry weight basis), respectively. Also, the analysis of amino acids in this larva shows that its amino acids are balanced. Our recent research has shown that the consumption of TM larvae powder used in the diet of rainbow trout has resulted in optimal fish performance. It has also increased the beneficial bacteria and probiotics in the gastrointestinal tract of fish fed with larvae powder of TM, which has resulted in better fish health and increased survival.

Biography: I entered the university in 1991 as a bachelor and graduated in 1995. In 1997, I was employed as a researcher in the research center. In 2000, I entered the university as a master's degree and after graduation; I became a member of the faculty. In 2014, I entered the university

for a PhD in microbiology and graduated from the university after 4 years. Now, I am Assistant Professor with 27 years of research experience, I am the executive of 22 research projects, the author of 2 books, 14 ISI articles, 16 scientific research and promotion articles, and 115 conference articles.