

Correlations and Impacts Of Optimal Rearing Parameters on Nutritional Value Of Mealworm (*Tenebrio Molitor*)

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Abstract : Insects are displaying high nutritional value, low greenhouse gas emissions, low land use requirements and high food conversion efficiency. They can contribute to the food chain and be one of many solutions to protein shortages. Currently, in North America, nutritional entomology is under-developed and the needs to better understand its benefits remain to convince large-scale producers and consumers (both for human and agricultural needs). As such, large-scale production of mealworms offers a promising alternative to replacing traditional sources of protein and fatty acids. To proceed orderly, it is required to collect more data on the nutritional values of insects such as, a) Evaluate the diets of insects to improve their dietary value; b) Test the breeding conditions to optimize yields; c) Evaluate the use of by-products and organic residues as sources of food. Among the featured technical parameters, relative humidity (RH) percentage and temperature, optimal substrates and hydration sources are critical elements, thus establishing potential benchmarks for to optimize conversion rates of protein and fatty acids. This research is to establish the combination of the most influential rearing parameters with local food residues, to correlate the findings with the nutritional value of the larvae harvested. 125 same-monthly old adults/replica are randomly selected in the mealworm breeding pool then placed to oviposit in growth chambers preset at 26°C and 65% RH. Adults are removed after 7 days. Larvae are harvested upon the apparition of the first nymphosis signs and batches, are analyzed for their nutritional values using wet chemistry analysis. The first samples analyses include total weight of both fresh and dried larvae, residual humidity, crude proteins (CP%), and crude fats (CF%). Further analyses are scheduled to include soluble proteins and fatty acids. Although they are consistent with previous published data, the preliminary results show no significant differences between treatments for any type of analysis. Nutritional properties of each substrate combination have yet allowed to discriminate the most effective residue recipe. Technical issues such as the particles' size of the various substrate combinations and larvae screen compatibility are to be investigated since it induced a variable percentage of lost larvae upon harvesting. To address those methodological issues are key to develop a standardized efficient procedure. The aim is to provide producers with easily reproducible conditions, without incurring additional excessive expenditure on their part in terms of equipment and workforce.

Keywords : entomophagy, nutritional value, rearing parameters optimization, *Tenebrio molitor*

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