

Characterization of Farmed Edible Insect Species

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The world's population is expected to increase from the current 8 billion to 9.7 billion in 2050. To ensure food and feed security, environmentally sustainable food sources need to be found. Insects can serve as an excellent novel food source due to their high protein and nutritional content, rapid growth rates, high fertility and reproduction rate, efficient feed conversion, low ecological footprint, and ability to be farmed in a relatively small area with minimal water requirements (1). Additionally, insect farming can help reduce waste by valorizing agricultural by-products. The European Commission has so far approved four insects, namely yellow mealworm, migratory locust, house cricket and lesser mealworm, as novel foods. However, as with any food product, insect products need to be examined and monitored not only for their safety but also for quality and authenticity.

In our work, we investigated three different farmed species: yellow mealworm (*Tenebrio molitor*), migratory locust (*Locusta migratoria*) and house cricket (*Acheta domestica*). The quality of the lyophilized insects was assessed regarding the amino acids, fatty acids, polyphenols and elemental composition using GC-MS, LC-MS/MS and ICP-MS. Safety has been assessed by calculating the risk to human health resulting from consuming potentially toxic elements. Also, antioxidant activity and anti-inflammatory effects have been measured. In addition, analysis of the stable isotopic composition of light elements ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{34}\text{S}$) has been performed using IRMS since isotopic ratios can discriminate among species and across diets and are important for establishing the authenticity of insect-based products. Within this presentation, the preliminary results of our study will be shown.

Keywords: edible insects, quality characteristics, traceability

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