

Thesis

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Evaluation of the advantages and risks of entomoconversion of urban and peri-urban biowaste by the insect *Hermetia illucens* – focus on the bioaccumulation of micronutrients and micropollutants



Given that total production of waste worldwide is predicted to reach 3.4 billion tons by 2050, entomoconversion offers an attractive supplementary solution to overcome this major challenge, particularly in urban and peri-urban contexts.

Context and challenges

Raising insects is an ecological way to recycle and value biowaste by transforming it into, for example, protein for animal feed, fertilizer, and biofuel. In urban and peri-urban zones where waste management is an ever-growing challenge, entomoconversion is an attractive solution but also raises specific questions particularly concerning the different types of waste and management of potential health risks. Faced with this situation, the main objective of this thesis will be to conduct a preliminary evaluation of the advantages and risks involved in using entomoconversion to recycle biowaste in urban and peri-urban zones. As both the advantages and risks are potentially highly contrasted, this thesis will focus on bioaccumulation of nutrients (an advantage) and of micropollutants (a risk) by insect larvae.

The thesis will be supported by a collaborative project named FLY4WASTE, (Evaluation of the advantages and risks of using entomoconversion to recycle biowaste in urban and peri-urban zones by the insect *Hermetia illucens* - Funding BETTER - 2022-2024).

Objectives

While focusing on the bio-waste streams that are the most representative of those usually produced in urban and peri-urban zones, the specific objectives of the thesis will be the following:

- To perform separate analyses of the different flows of biowaste and of the products of entomoconversion to screen for micropollutants and micronutrients;
- For each stream of biowaste, to assess the bioaccumulation of micropollutants and micronutrients in insect larvae during entomoconversion;
- To integrate these data into an initial benefit-risk analysis of entomoconversion.

