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Development of insect farming as an option for urban circular bioeconomy: the chemical safety issue

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Background/Objectives: With the growing world population and the rapid urbanization, there is a need to find alternatives to conventional protein sources for food and feed but it is also necessary to find new ways to manage organic waste. To respond to these challenges, farming insects may offer new options with two main scenarios in a circular bioeconomy approach. Firstly, insects like yellow mealworm (*Tenebrio molitor*) are already exploited for food and feed as sources of high-quality proteins, PUFAs and micronutrients(1). Secondly, some insect species, which can grow on many types of substrates like black soldier fly (*Hermetia illucens*), could be used in urban areas for biowaste recycling with the production of varied valuable by-products derived from insects like biomaterials (chitin), biofertilizers (frass), biofuels (produced from larvae fat)(2). Learning from the BSE crisis, it is essential to ensure the safety of these insect products for the development of these new practices.

Methods: N/A

Results: Some studies are already available about the microbiological hazards but there is a lack of knowledge concerning the chemical safety. Some chemical contaminants may be found in insect farming environment (persistent organic pollutants, heavy metals...), in their feeding substrates (pesticides, mycotoxins, antimicrobials...), can be produced during processing methods (process-induced toxicants) or can migrate from packaging material to insect products(3).

Discussion / Conclusion: In order to ensure the chemical safety of insect products, studies need to be conducted with a focus on 1/the transfer of chemical contaminants from the feeding substrate or the environment into the insect organism and their impact on insect survival 2/the bioaccumulation of these contaminants (persistent organic pollutants, heavy metals) or even their biodegradation (mycotoxins, antimicrobials) by insects(3) 3/the generation of process-induced toxicants or the migration of substances from packaging material 4/the potential biomagnification in consuming species or over the successive reuse cycles of insect products.

References

1. Hawkey KJ, Lopez-Viso C, Brameld JM, *et al.* (2021) *Annu Rev Anim Biosci* **9**, 333–354.
2. Surendra KC, Tomberlin JK, van Huis A, *et al.* (2020) *Waste Manag* **117**, 58–80.
3. Meyer AM, Meijer N, Hoek-van den Hil EF, *et al.* (2021) *J Insects Food Feed* **7**, 823–831.

Disclosure of Interest

None Declared