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The project INSECT4CITY: assessment of benefits and risks of insect-based bioconversion for recycling bio-waste from urban and peri-urban areas

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Background/Objectives: In urban and peri-urban areas, where waste management is more than ever a major issue, insect farming may be an ecological way to recycle bio-waste in a circular bioeconomy approach. Indeed, some insect species such as *Hermetia illucens* can grow on many types of organic substrates and can convert them into valuable byproducts⁽¹⁾. There may be a wide variety of insect bioconversion products since larvae are a natural source of micronutrients, amino acids and antimicrobial compounds. They are also rich in proteins which can be used for animal feed, in fats used for the production of biodiesel, in chitin used in various industries, and they produce a type of manure called frass that can be used as biofertilizer⁽²⁾. However, besides its ecological and nutritional benefits, risks of insect-based bioconversion should be identified and monitored. Indeed, some chemical contaminants may be found in insect farming environment, in their feeding substrates or can be produced during processing methods⁽³⁾. Moreover, microbiological contaminants may be found in the farming insect chain⁽⁴⁾. Therefore, it is necessary to assess the impact of these contaminants on insect survival and to determine their fate in the insect. It is also important to assess the environmental, social and economic impact of insect-based bioconversion and to determine the consumer acceptability of these new processes and products.

Methods: It is around this overall benefit-risk assessment that the project INSECT4CITY initiated in 2019 is focused, bringing together 8 research divisions of INRAE, the French National Research Institute for Agriculture, Food and the Environment. It addresses, upstream of the development of this sector with very high potential, all the questions that the general public, the legislator as well as the producers of insects can ask themselves about this means of recovering biowaste.

Results: N/A

Discussion / Conclusion: N/A

References

1. Singh A & Kumari K (2019) *J Environ Manage* **251**, 109569.
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.
4. Vandeweyer D, De Smet J, Van Looveren N *et al.* (2021) *J Insects Food Feed* **7**, 807–822.

Disclosure of Interest

None Declared