



**HAL**  
open science

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

Erwan Engel, Christelle Planche, Rallou Thomopoulos, Catherine Macombe, Christina Nielsen-Leroux, Pascale Bazoche, Christophe Bressac, Armel Donkpegan, Bertrand Meda, Samir Mezdour, et al.

### ► To cite this version:

Erwan Engel, Christelle Planche, Rallou Thomopoulos, Catherine Macombe, Christina Nielsen-Leroux, et al.. The project INSECT4CITY: assessment of benefits and risks of insect-based bioconversion for recycling bio-waste from urban and peri-urban areas. Proceedings of the Nutrition Society, 81 (SI), pp.E73, 2022, Proceedings of the Nutrition Society : Urban food policies for sustainable nutrition and health, 10.1017/s0029665122000969 . hal-03685819

**HAL Id: hal-03685819**

**<https://hal.inrae.fr/hal-03685819v1>**

Submitted on 2 Jun 2022

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

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

Erwan Engel<sup>1</sup>, Christelle Planche<sup>1</sup>, Rallou Thomopoulos<sup>2</sup>, Catherine Macombe<sup>2</sup>, Christina Nielsen-Leroux<sup>3</sup>, Pascale Bazoche<sup>4</sup>, Christophe Bressac<sup>5</sup>, Armel Donkpegan<sup>6</sup>, Bertrand Meda<sup>7</sup>, Samir Mezdour<sup>8</sup>, Souhil Harchaoui<sup>4</sup>, Géraldine Boué<sup>9</sup>, Mustapha Berri<sup>7</sup>, Pascal Schlich<sup>10</sup>, Sandrine Skiba<sup>11</sup>, Isabelle Virlogeux-Payant<sup>7</sup>, Jean-Philippe Steyer<sup>12</sup> and Patrick Borel<sup>13</sup>

<sup>1</sup>INRAE, Saint-Genès-Champanelle,

<sup>2</sup>INRAE, Montpellier,

<sup>3</sup>INRAE, Jouy-en-Josas,

<sup>4</sup>INRAE, Rennes,

<sup>5</sup>CNRS, Tours,

<sup>6</sup>INRAE, Villenave d'Ornon,

<sup>7</sup>INRAE, Nouzilly,

<sup>8</sup>INRAE, Massy,

<sup>9</sup>INRAE, Nantes,

<sup>10</sup>INRAE, Dijon,

<sup>11</sup>INRAE, Saint-Pée-sur-Nivelle,

<sup>12</sup>INRAE, Narbonne, and

<sup>13</sup>INRAE, Marseille, France

**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<sup>(1)</sup>. 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<sup>(2)</sup>. 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<sup>(3)</sup>. Moreover, microbiological contaminants may be found in the farming insect chain<sup>(4)</sup>. 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