



SmartFood: Engaging citizens in food diversity in cities

D1.4. Co-design of edible insect production solutions

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Executive Summary

A significant part of the food consumed in cities today is:

- ⇒ produced outside cities (Leahy, 2020)
- ⇒ grown with the use of pesticides and fossil fuel energy (Carvalho, 2017)
- ⇒ processed and filled with ingredients, such as colorants, sweeteners, flavorings, preservatives, antioxidants, which negatively affect human health, e.g. through carcinogenic effects (Moldovan et al., 2021)
- ⇒ packed in plastic, which creates environmental problems in landfills and in the oceans (Kan & Miller, 2022)
- ⇒ transported over long distances, which emits large amounts of greenhouse gases (Pradhan, 2022)
- ⇒ wasted, which negatively affects the pockets of households (Philippidis et al., 2019).

The Polish-Norwegian research and innovation project SmartFood was created to explore several solutions that would help address these challenges. In particular, SmartFood consortium proposed the following vision: *Grow your own food in the corridor of your building, reduce greenhouse gas emissions, waste of food as well as energy and transportation costs! Improve your physical health by changing your eating habits and engage with your neighbours!*

The project in its entirety looks at several interventions by which the above vision can be fulfilled. In this report we present one of initiatives, the co-design of insect production solutions, which will complement the hydroponic SmartFood Cabins in the implementation of the SmartFood vision. The report introduces SmartFood Insectarium (in Polish: SmartFood Robaczkarium), i.e. novel small scale insect production systems allowing residents of urban apartment blocks to self-produce edible insects, e.g. within hydroponic SmartFood Cabins located in shared spaces (corridors). The report describes the following three stages of the co-design of SmartFood Insectarium that took place in SmartFood Work Package 1 (*Co-design of environmental innovation*).

First, the report provides the initial conceptual design of SmartFood Insectarium. Findings of the following activities are presented:

- ⇒ a literature review on the ecological aspects of edible insect farming, current legislation on consumer safety, insect farming conditions as well as the most popular edible insect species,
- ⇒ a specification of overall technical requirements for SmartFood Insectarium from the perspective of the safety of use, affordability, user-friendliness, and promoting Europe as a global leader in green technologies
- ⇒ a market research study to assess whether there are any commercially available existing solutions that meet the requirements set for SmartFood Insectarium in the SmartFood project.

Second, the report specifies the scope of initial co-design options that were proposed by the SmartFood research team as key features of this innovation that can and should be decided directly by residents of urban blocks of flats, to ensure that SmartFood Insectarium meets the needs of its end-users. Therefore, the SmartFood research team postponed design decisions until after gathering feedback from households on:

- ⇒ edible insect species to be farmed in SmartFood Insectarium,
- ⇒ forms of food products that could be self-produced by households from insects farmed in SmartFood Insectarium,
- ⇒ location of SmartFood Insectarium.

Third, the report summarises the results of an online interactive co-design workshop that was organised with eight Polish households living in urban blocks of flats. Following the integration of recommendations of end-users provided during the workshop, the report presents decisions concerning key features of SmartFood Insectarium that were taken directly by potential end-users of SmartFood Insectarium.

As a result, the report constitutes a knowledge base for prototyping and testing of novel urban agriculture solutions in SmartFood Work Package 4 (*Development and lab-scale tests of SmartFood solutions for environmental innovation*) and Work Package 6 (*Urban Living Labs implementation of Smart Food innovation*).