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# Insects as future food ingredients: Impact of rearing substrates on insect health and nutritional composition, and sensory characteristics of derived products

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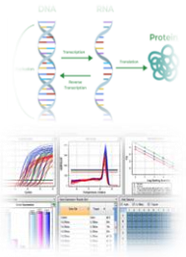
## State-of-the-Art

- Alternative food resources and sustainable resource management is a must to ensure the food security
- Insects are highly nutritious (high in protein, lipids, essential amino acids, minerals, vitamins, etc…) and consist of valuable AMPs and antioxidants for humans
- Insects can convert low- and high-quality organic materials (food industry side streams and agricultural by products), into high-quality insect biomass.
- The nutritional value of insects can be improved by enhancing the composition of their substrate
- Insects with added nutritional value along with rich active substances, they can be used for human consumption.
- *Tenebrio molitor* (TM) is selected for this study, as it is an EU authorized insect which is easy to raise, breed and has good measurable performance indicators.



## Objectives

**Produce a palatable, attractive new food product for human consumption using insect-derived product**

**1. To produce an insect product rich in protein and bioactive compounds through**:

a. the formulation and optimization of a low-cost diet using by-products which will be able to improve the insect nutritional value

b. the increase of bioactive compounds through the diet.

**2. To produce a new food (containing insect-derived product) able to fit the consumer requirements.**

## Milestones

| Activity/ Month | First year | | Second year | | Third year | |
|---|---|---|---|---|---|---|
| | 1-6 | 7-12 | 13-18 | 19-24 | 25-30 | 31-36 |
| Literature survey | ■ | | | | | |
| Compulsory and optional courses for credit acquisition | ■ | | | | | |
| Hands on experience with the routine reproduction and production of TM larvae | ■ | | | | | |
| Preparation of experimental protocol | | ■ | | | | |
| Formulation and analysis of diets | | ■ | | | | |
| Experimental trials | | ■ | | | | |
| AMP analysis (RNA extraction, cDNA synthesis, qPCR) | | ■ | ■ | | | |
| Request for ethical clearance committee authorization | | | ■ | | | |
| Data collection | | | ■ | | | |
| Statistical analysis | | | ■ | | | |
| Writing articles for scientific publications (abstracts) | | | | ■ | | |
| Foreign training (industrial) | | | | ■ | | |
| Thesis writing | ■ | ■ | ■ | ■ | ■ | |
| Full paper publications in peer reviewed journals | | | | | | ■ |