Integrated model of insect, fish and vegetable production

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Introduction

Global demand for food grow while resources including feed, water and spaces are limited. To supply this demand in a context of sustainable development, new production models must be developed. Integrated productions of insects, fishes and vegetables maximize the use of resources and limit waste production. The developed model allows local production of fishes and vegetables by insect bioconversion of many organic vegetable materials with small or no value.

Valorization of insect

1. Insect production

- **Mass rearing development**
- **Local plant co-product valorization**
- **Insect value improvement**

2. Insect-based feed production

- **Fish feed formulation**
- **75% of fish meal substitution**
- **Pellet extrusion**

Valorization of feed

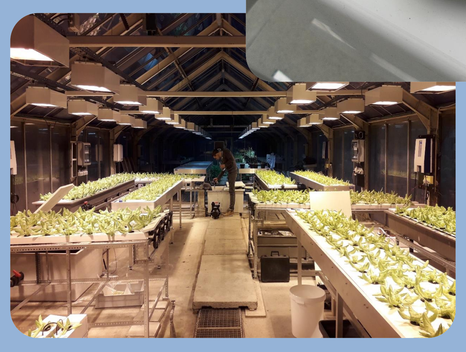
3. Fish production

- **Recirculating system design**
- **Fish feed experiment**

Valorization of aquaculture effluents

4. Vegetable production

- **Aquaponic system development**
- **Aquaculture wastewater valorization**



Valorization of vegetable waste

Conclusions

1. **Methods of mass insect production from plant co-products are developed.**
2. **The insect meal is produced and its nutritional value is characterized.**
3. **The extrusion parameters according to the raw material are determined.**
4. **Fish feed meeting the nutritional needs are formulated.**
5. **Insect-based pellets are tested on trout growth in recirculating system.**
6. **Aquaponics systems are developed to valorize wastewater from trout rearing.**