

Innovations in postharvest treatments against weevils in rice (ELMIRA)

Summary

The project represents an important step towards reducing the risk of insects developing in postharvest rice, using a physical technology that leaves no residue. The technology to be prepared is based on the industrial application of dielectric heating to eliminate insect infestations in cereals and/or other grains. Dielectric heating raises the temperature in insect larvae that develop within the grains more easily than in the grain itself. This enables the elimination of infestations without changing the properties of the cereals, with moderate energy consumption and possibly preventing the prevalence of pesticides in the end product.

Objectives

- a) Validate the breeding systems of the insects of interest (*Sitophilus oryzae*, *Oryzaephilus surinamensis* and *Tribolium confusum*) in order to obtain sufficient eggs, larvae and adults to allow the effectiveness of the treatments to be assessed.
- b) Assessment of the degree of infestation in the products in order to define the treatment intensities required to guarantee product stability.
- c) Carry out preliminary tests in which the insects are killed using microwaves and construct mathematical models to predict the effect of the microwaves on the survival of the three species of interest.
- d) Carry out tests to eliminate insects in the pilot radio frequency prototype to determine effectiveness, including treatment penetration tests.
- e) Physical, chemical and sensory assessment of the changes that radio frequency treatments may produce in rice.
- f) Define the technical specifications and requirements to be met by the radio frequency equipment.
- g) Disseminate the results and prepare proposals for the use of the developed technology and products.

Description of initiatives outlined in the project

1. Adapt the breeding systems of *Sitophilus oryzae* to the other insect species of interest (*Oryzaephilus surinamensis* and *Tribolium confusum*) in order to obtain a sufficient number of eggs, larvae and adults to be able to assess the effectiveness of the treatments.
2. Assess the degree of infestation of polished rice produced in normal industrial conditions.
3. Carry out preliminary tests in which the insects are killed using microwaves and construct mathematical models to predict the effect of the microwaves on the survival of the two species of interest.
4. Carry out tests to eliminate insects in the pilot radio frequency prototype to validate effectiveness, including treatment penetration tests.

5. Complete the definition and/or readjustment of the technical specifications and requirements to be met by the industrial radio frequency equipment.
6. Assess the degree of infestation in the products of the company in question in order to define the treatment intensities required to guarantee product stability.

Expected results and practical recommendations

The technological application would have the following advantages over existing solutions:

- No use of chemical disinsectisation products and, consequently, reduction of the possible risks associated with the consumption of such products.
- No limitations (due to cost increases and/or formats related to the type of packaging) on the exportation and/or marketing of these products.
 - Improvement of the guarantee of quality in exportations of large quantities of cereals, also improving competitiveness.
- Reduction or elimination of product returns made by the customer and/or the end consumer.
- Energy efficient solutions with a smaller environmental impact.

Task force leader

Entity: **ARROSSAIRES DEL DELTA DE L'EBRE I SECCIÓ DE CRÈDIT, SCCL**

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Typology of entity:

Agrifood co./ind. assoc. or group

Task force coordinator

Other task force members (grant beneficiaries)

Other task force members

Entity: **Federació de Cooperatives Agràries de Catalunya (FCAC)**

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Typology of entity:

Cooperative federation or association

Entity: **Universitat Autònoma de Barcelona**

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Typology of entity:

University

Entity: **Universitat Autònoma de Barcelona. Departament de Ciència Animal i dels Aliments**

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Subject area(s) of application

Geographical area(s) of application

Farming/forestry competitiveness and diversification
Food quality / processing and nutrition
Supply chain, marketing and consumption

Province(s)

Tarragona

Region(s)

Baix Ebre

Dissemination of the project *(publications, conferences, multimedia...)*

Dissemination via the websites of the cooperative and of the Catalan Federation of Agricultural Cooperatives (FCAC). The project will be included in the projects presented at the dissemination and transfer seminars that the FCAC organises on a regular basis, which will be aimed at other cooperatives and the agricultural sector in general.

Project website

<https://www.arrossaires.com>

More information on the project

Project dates

Starting date (month-year): June 2018

Completion date (month-year):

Current status: *Underway*

Budget approved

Total budget: €65,000.00

DARP funding: €25,935.00

EU funding: €19,565.00

Own funding: €19,500.00

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Generalitat de Catalunya
**Departament d'Agricultura,
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**Fons Europeu Agrícola
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Order ARP/133/2017, of 21 June, approving the regulatory bases of grants for cooperation for innovation through the promotion of the creation of European Association for Innovation task forces in terms of agricultural productivity and sustainability and the execution of innovative pilot projects by these groups.

Resolution ARP/1868/2017, of 20 July, calling for applications for grants for the year 2017.

Project ID: 009_2017