



## ProEnergy - New food products and bio-energy from fruits of low commercial value and agro-industrial wastes

### COUNTRY

Portugal

### PROJECT PROMOTER

Instituto Superior de Agronomia

### FUNDING

RDP funds, EUR 371 394

### RDP MEASURE

M16 – Cooperation (EIP AGRI)

### DURATION

2018 – 2019

### CONTRIBUTION TO

- generating environmental benefits
- mitigating climate change
- increasing efficiency of biomass resource use
- creating value through improved production methods or processing technology
- scaling up a pilot project to commercial scale

### KEYWORDS

Agriculture, cooperation, bio-waste, residues, pilot project

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### WEBSITE

n/a

### The initiative

The project aims to add value to fruit that has little or no commercial value, as well as to the by-products and residues of the fruit and vegetable industry. The project will develop new technologies to obtain new products (e.g. fruit pulps) and additives (microencapsulated stabilized bioactive extracts) for the fortification of processed foods, or for cosmetics, pharmaceutical and other industries. In this way it will add value to non-commercial by-products.

It will also establish criteria for optimizing the co-digestion process with a view to maximizing the decentralized production of biogas. Biogas will be the primary energy source used in the implementation of the new technological processes explored by this project.

### RESULTS

- ✓ Implementation of the circular economy concept, including (i) quantification and classification of fruit and vegetable bio-waste, (ii) production of functional food and bio-ingredients, (iii) production of bio-energy and the use of it for thermal processing.
- ✓ Increase the economic input of the industry, positive environmental impact, social outcomes (employment increase, healthy food products).
- ✓ 2 individuals directly employed in/by the initiative



### Context

The Fruit and Vegetable (F&V) sectors - including post-harvest handling, juice production and minimally processed F&V industries - generate large amounts of by-products and biowaste, which lead to environmental and economic problems. Removing by-products and biowaste quickly from processing plants is an integral aspect of food quality management systems. However, these materials still have high value due to their functional compound content.

### Objective

Bio-waste from fruit and vegetables is a valuable resource within the circular economy and the biorefinery sector. This will contribute to building a sustainable, low-carbon economy. The project's specific goals involve:

- implementing new technologies in order to obtain innovative healthy products (F&V pulps and dehydrated pulps) and functional bio-ingredients (antioxidants, antimicrobials, dietary fibres, food colourings, structure agents and unconventional oils).
- establishing optimization criteria for the anaerobic co-digestion process in order to support the decentralization of biogas production.

### Activities

The following tasks are being implemented :

- Task 1. Measurement and classification of fruit and vegetable bio-waste flows and outputs.
- Task 2. Develop innovative food products and processes.
- Task 3. Functional bio-ingredients production
  - Task 3.1. Pre-treatments and extraction process design
  - Task 3.2. Bio-ingredient encapsulation, stabilisation and formulation

- Task 4. Anaerobic digestion.
- Task 5. Dissemination of results.
- Task 6. Economic analysis.

### Environmental sustainability

The traditional means of reusing fruit and vegetable bio-waste (as animal feed, incineration and composting, etc.) are not resource efficient. The ProEnergy project will address environmental needs and also help to ensure economic returns for the companies.

The initiative will measure its environmental impact by mapping all fruit and vegetable outputs and potential strategies.

This initiative was inspired in EU bio-economy strategy and follows on from previous projects.

### Lessons learnt

There is a lack of studies and data concerning trends in fruit and vegetable bio-waste use.

The bureaucracy involved in public funding can sometimes make the implementation of a project difficult. When dealing with fresh produce with a high degree of variability, decisions often need to be taken at the last minute, but this is not compatible with the rules of public funding. Potential partners and stakeholders can easily be put off due to a fear of the bureaucracy involved and the uncertainty of an economic return.

It is difficult to achieve economic viability unless the products obtained from bio-waste are of high added value.