

PROValue



Provalue project

AZTI-Tecnalia technological centre leads this initiative, which is funded by the Interreg IV B SUDOE, which works together with institutions from Spain (CTIC-CITA, CENER, FIAB, CITOLIVA, UDL-DBA), France (CRT CATAR CRITT, CRT-AGIR) and Portugal (CVR).

PROVALUE: "Promotion and capitalisation of waste recovery solutions in the agri-food industry for the SUDOE region", funded by the Interreg IV B SUDOE, to meet the needs of energy and food waste recovery in SUDOE territory, which contributes to enhancing the competitiveness of the food industry and promoting the development of this European bioeconomy.

This project extends the technical scope of the VALUE project, approved in the previous SUDOE call and framed in the vegetable processing industry as highly representative of the European space, generating a significant volume of products: processed vegetables (including wine and oil), processed meat and processed fish. The aim is to provide practical solutions applicable to waste recovery and all the agri-food SUDOE tissue, and to create a critical mass of European innovation in this technical field that allows further development of more effective solutions.

As a result, companies can identify the most appropriate recovery solution for each type of waste under study and evaluate the cost of implementing this solution, thereby enhancing competitiveness and innovation capacity and reducing environmental impact.



Objectives

The PROVALUE project aims to extend the knowledge generated in VALUE, the previous project, through the SUDOE agri-food business sector by disseminating and communication studies carried out in the VALUE project, providing more appropriate and *ad hoc* solutions for companies and setting a transnational 'Excellence & Innovation Pole'. This will ultimately contribute to improving the competitiveness and sustainable growth of the agri-food sector and boosting SUDOE bioeconomy.

Secondary objectives:

1. Increase the use of results from previous models of co-operation projects on agri-food waste recovery and the technical and economic feasibility studies done in the previous VALUE project;
2. Identify recovery solutions for major agri-food subsectors in the SUDOE area: vegetable processing (canning, wine, oil, etc), processed meat and processed fish;
3. Develop *ad hoc* implementation solutions of waste recovery technologies for a representative sample of food companies;
4. Develop an Excellence & Innovation Pole on agri-food waste recovery in the SUDOE area by integrating major business centres and specialised knowledge which is connected with other international poles; and
5. Disseminate the best available waste recovery solutions to SUDOE agri-food selected companies.

PROVALUE is co-financed with FEDER funds in the frame of the European South West Space SUDOE Territorial Cooperation Programme. The opinions expressed only represent the PROVALUE project beneficiaries and in no case represent the official opinion of the management bodies of the co-operation programme.



www.provalueproject.eu

Food waste valorisation

AZTI-Tecnalia co-ordinates the PROVALUE project aiming to capitalise different food waste valorisation options in the SUDOE region

AZTI-Tecnalia is the co-ordinator of the PROVALUE project which aims to promote and capitalise the different valorisation solutions for the food wastes generated in the southwest of Europe, also known as the SUDOE area. Azti-Tecnalia technological centre leads this initiative, which is funded by the Interreg IV B SUDOE within the European Regional Development Funds (FEDER), in which institutions from Spain, France and Portugal work together: from Spain, the Spanish Food and Drink Industry Federation (FIAB), the National Renewable Energy Centre (CENER), the Innovation and Technologic Centre for Food and Meat in La Rioja (CTIC-CITA), the Universitat de Lleida (DBA) and the Technological Centre for Olive Farming and Olive Oil (CITOLIVA); from France, the Centre for Application and Transformation of Agro Resources (CATAR) and the Agro-food Innovation Research Centre (AGIR); and from Portugal, the Centre for Waste Valorisation (CVR).

The official title of the PROVALUE project is: "Promotion and capitalisation of waste recovery solutions in the agri-food industry for the SUDOE region", funded by the Interreg IV B SUDOE, to meet the needs of energy and food waste recovery in SUDOE territory, which contributes to enhancing the competitiveness of the food industry and promoting the development of this European bioeconomy.

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As a result, companies can identify the most appropriate recovery solution for each type of waste under study and evaluate the cost of implementing this solution, thereby enhancing competitiveness and innovation capacity and reducing environmental impact.

The aim of the project is to boost the use of the valorisation technological solutions to obtain high value compounds and also to obtain the energetic valorisation of the wastes generated by the food industries within the SUDOE territory.

The identified technologies are available in the database linked to the project's web page (<http://www.provalueproject.eu>). The tool allows the choosing of a specific waste from a list of typical food industry wastes. It is possible to define what the final product or

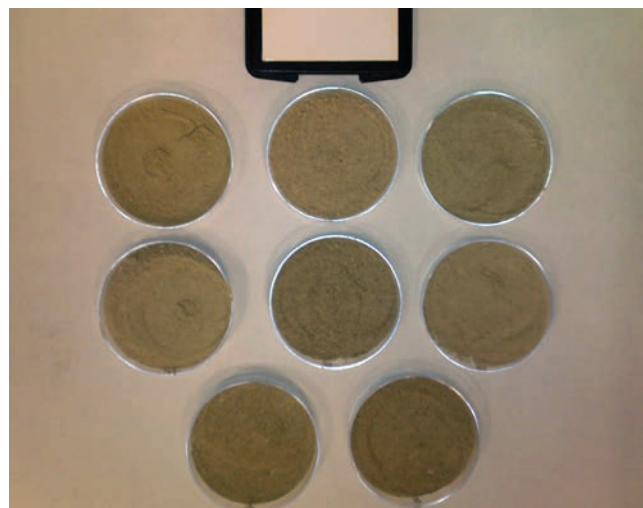


Fig. 1 Colour comparison in cardoon and artichoke fibres extracted and dried by different methods. From left to right and top to bottom: artichoke extracted with ultrasounds (UAE) and dried at 65°C with forced air (FA); cardoon UAE and FA 65°C; cardoon after classical extraction with solvent (SE) and FA 65°C; cardoon SE and AF 80°C; cardoon UAE and FA 65°C; cardoon UAE and FA 80°C; cardoon SE and microwave drying (MW); cardoon UAE and MW

ingredient to be obtained will be, the potential market for that given product and the current viability for the proposed technologies (high, medium or low) depending on their availability in the markets. Therefore, a food industry with a certain waste can see what product can be obtained with what kind of technologies and what the potential market for the obtained product is.

During the PROVALUE project, another improvement will be added to the database, and the possibility to identify businesses with valorisation capacities will be added. With the help of the Geographical Identification System (GIS), food industries will be able to find the valorisation company closest to their location. This option is expected to be available by the end of the current year.

In the first phase of the project, the results obtained in different valorisation pilot experiences were disseminated in various workshops with the objective to increase the generated knowledge and the valorisation options among the industrial sector. Experiences on extraction, valorisation and recovery of by-products as high value compounds, as well as experiences on energetic valorisation (generation of biogas and bioethanol) were presented.

The pilot experiences were done with by-products provided by interested companies who also facilitated production numbers in order to perform an *ad hoc* study on the technical and economic feasibility of the proposed valorisation options in



Fig. 2 Pilot plant fermenter to obtain bioethanol

each case. From the interested companies, nine have been selected in order to do the pilot studies with the most appropriated valorisation technologies.

With the experience and lessons learned on valorisation technologies for food waste, a transnational 'Excellence Pole' is expected to be created. The presentation of this pole is expected by the end of 2014.

As examples the following valorisation options have been proposed and tested at pilot level, focusing on recovery of food ingredients, energy from organic compounds and production of agro-materials:

Food valorisation

Food valorisation is focused on the obtaining of dietary fibres and the extraction of natural antioxidants. Several combinations of different extraction technologies were tried, as well as different drying and stabilisation technologies for the resulting ingredients. The best technologies were selected considering the quality of the final products, the efficiency and the cost (Fig. 1).

The wastes with higher concentration of the aimed compounds were selected (fibres and polyphenols). The obtained ingredients in the extraction trials were used successfully in different food applications.

These applications were fibre in tomato sauces and breads as thickening agent and fibre source respectively while some antioxidants were also used to produce cosmetics.

Energy valorisation

In order to obtain biogas, multiple co-digestion trials were done in continuous reactors (Fig. 3) with two types for waste mixes: waste from olive oil mills with pig manures, and vegetable mixes (broccoli, carrots, cauliflower and cardoon) with wastewater treatment plant sludge.

In the case of olive oil wastes, the feasibility study was done for the industrial-scale of an olive oil mill in Extremadura (Spain). The study defined that if the government's financial premiums for electric

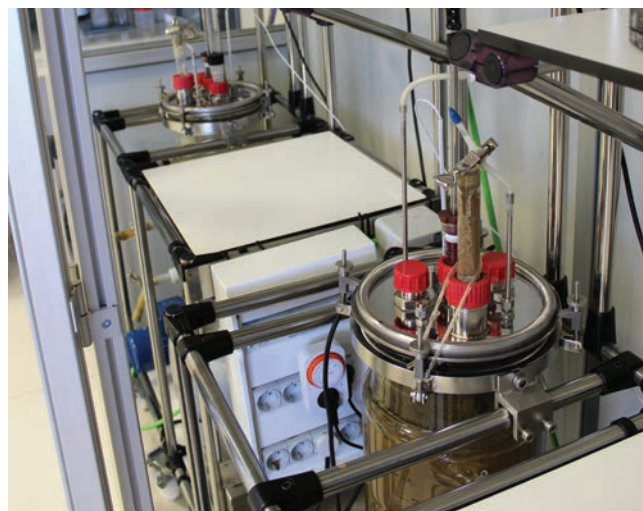


Fig. 3 Equipment for biogas generation

energy generated with renewable sources should stay stable, the time needed to return the inversion was around six years.

The bioethanol production trials at pilot-scale (Fig. 2) with wastes from the jam industry and the potato omelette producing industry gave very positive results. The economic feasibility study showed that the key factors to achieve the positive economic feasibility depend on the stable volume of wastes to be treated, the minimum being 4,000 tonnes per year, and the second key aspect was the cost of the waste from the generating plant to the bioethanol producing plant.

Agro-materials

Another alternative for valorisation studied was the production of agro-materials from agro-food wastes. Pits from prunes were studied in different forms: full pit, semi-grinded pit and grinded pit. With the three options, 20x20cm planks were produced. The one that presented better properties was the one done with grinded pits. This was a material with high interest in construction due to the isolation properties.

Further information can be found on the project's web page: www.provalueproject.eu

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