



LIFE for Acid Whey - Reuse of waste acid whey for extraction of high added value bioactive proteins

LIFE16 ENV/SI/000335



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Project description:

Background

The dairy industry is one of the primary sources of industrial effluent. Global production of whey, the liquid remaining after milk has been curdled and strained, is estimated at 180-190 million tonnes annually, of which only 40% is further processed in the EU. The remainder is waste with a high level of chemical oxygen demand (COD). While sweet whey has several commercial uses, the acid (sour) whey is often discharged into the sewage system (approximately 150 000 tonnes/year in Slovenia alone). This represents an enormous environmental burden as this by-product has the potential to deplete oxygen levels in water, with repercussions for human health. It is also a non-rational use of valuable natural whey components, including the protein lactoferrin, market demand for which is very high. Extraction of proteins from acid whey using existing approaches is not technologically feasible and new solutions are needed.

Objectives

The main objective of the LIFE for Acid Whey project is to demonstrate a new technology for the extraction of high added-value proteins (including lactoferrin, lactoperoxidase and immunoglobulins) from waste whey streams. The Fast-flow Monolith Based Whey Protein Fractionation process will extract lactoferrin, lactoperoxidase and immunoglobulins in an economically-viable way.

Further specific project objectives are to:

- Reduce the environmental burden of waste acid whey;
- Provide income to small and medium-sized dairies from the whey by-product instead of incurring costs for its treatment or disposal; and
- Help meet the growing market demand for specific proteins, providing high-quality products at competitive prices compared to alternative production options.

The project's objectives are strongly linked to various resource efficiency-related policies and legislation, as outlined in the Roadmap to a Resource Efficient Europe and in the EU Action Plan for the Circular Economy. LIFE for Acid Whey will help the dairy industry comply with the Industrial Emissions Directive by introducing a high-tech solution for the extraction of important milk proteins from milk-processing waste streams.

Expected results:

- Establishment of the conditions to process 24 m³ of whey and produce 1.8 kg of lactoferrin per day;
- Construction of a demonstration plant with Fast-flow Monolith Based Whey Protein Fractionation technology for processing 100 m³/day acid whey;
- Optimisation of the production process to fractionate lactoperoxidase and immunoglobulins from acid whey;
- Reduction of the acid whey's COD by 95% during further anaerobic digestion in a biogas plant, with an associated production of at least 200 000 m³ of methane by the end of the project;
- Anaerobic digestion of the whey in a biogas co-digestion plant for methane production; and
- Demonstration of other whey processing options at pilot scale for production of dairy starter cultures, dry whey proteins and B vitamins.

Results

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Environmental issues addressed:

Natura 2000 sites

Not applicable

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Beneficiaries:

Coordinator

Arhel projektiranje in inženiring d.o.o.

Type of organisation

Large enterprise

Description	Founded in 2002, Arhel is a privately-owned business with extensive experience in mechatronics and development of measurement instruments and sensors for physical quantities. Industrial electronics and automation of working processes represent an important part of the company's products and services.
Partners	University of Ljubljana (Biotechnical Faculty), Slovenia

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Administrative data:

Project reference	LIFE16 ENV/SI/000335
Duration	03-JUL-2017 to 30-JUN -2021
Total budget	4,439,001.00 €
EU contribution	2,622,435.00 €
Project location	Osrednjeslovenska(Slovenia Slovenija)

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