Lifesuperbiodiesel.eu

Industrial symbiosis to valorise fleshing produced in tannery industry for different industrial applications

H. Pérez-Aguilar, M. Lacruz-Asaro, F. Arán-Ais
INESCOP, Footwear Innovation and Technology Institute. 03600 Elda (Alicante) - Spain
mlacruz@inescop.es
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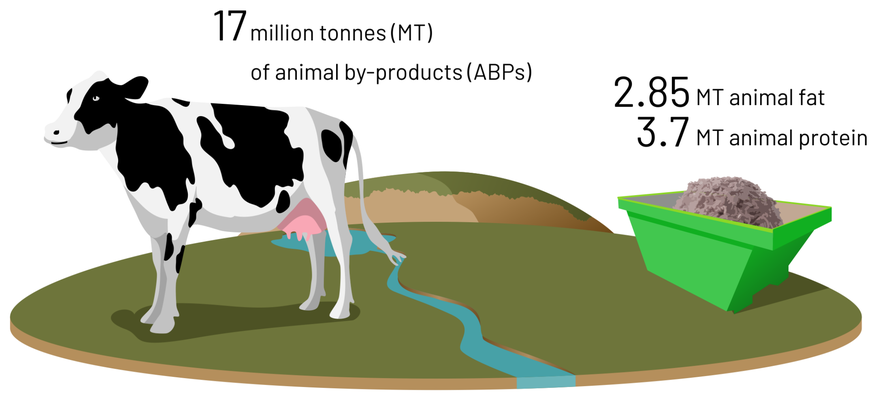
PROBLEM AND IMPACT OF THE RENDERING INDUSTRY

According to the European Fat Processors and Renderers Association (EFPRA), 17 million tonnes of animal by-products (ABPs) are managed annually in Europe, from which 2.85 million tonnes of animal fats and 3.65 million tonnes of processed animal proteins are produced, the rest is destined for landfill disposal or incineration[1]. This poses a problem for both the climate and the environment since they can contain harmful substances.

Therefore, ABPs (EC Regulation N° 1069/2009) plants require tuning up alternatives to minimise, recover and/or reduce the impact of their elimination.

A promising viable alternative is transforming animal fat into biodiesel, as well as discarding protein fraction into protein-based products such as biostimulants, which would contribute both to mitigate the effects of climate change and achieve the 2030 European targets.



AIM OF LIFE SUPERBIODIESEL PROJECT

Recovery of valuable fat and proteins from ABP category 3 (fleshing) to produce advanced biodiesel and biostimulants with the aim of contributing to the circular bioeconomy and reducing the management of solid by-products in tannery facilities.

METHODOLOGY

Two different bioprocesses have been developed to enable the integrated management of both lime and fresh fleshings, which are classified as CAT 3 ABPs.

PREPARATION

Fleshings have an average content of 15% fat, 20% protein and 65% water.

FRACTION SEPARATION

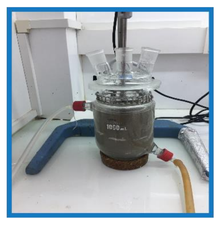
The fat fraction is separated from the protein and liquid protein fraction in order to process them independently.[2]

Separating process of the fleshing into protein fractions.

ENZYMATIC HYDROLYSIS

An enzymatic process is recommended for the extraction of the meat protein because it is a more environmentally friendly and less aggressive process.

CONCENTRATION



BIOESTIMULANTS

The bioprocess developed consist into transform the protein and liquid fraction into a biostimulant based on free amino acids.

Separating process of the fleshing into fat.

SUPERCRITICAL TRANSESTERIFICATION

The bioprocess transform fat fraction into an advanced biofuel and consists in catalytic transesterification of fat with heterogeneous catalysts made with methanol under supercritical conditions.

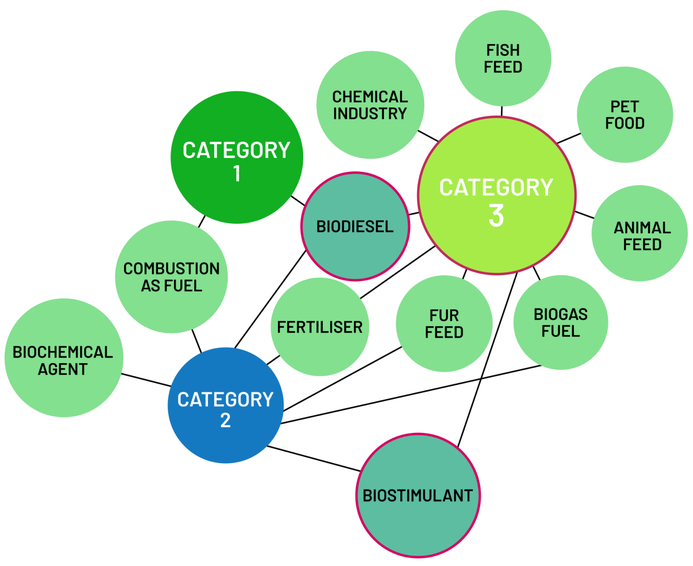
SUPERCRITICAL FLUID SYSTEM

SUPERBIODIESEL

This bioprocess allows transforming fats with high percentages of free fatty acids, without producing soaps, into an advanced biofuel that incorporates the modified glycerine, and reduce energy consumption of the process.

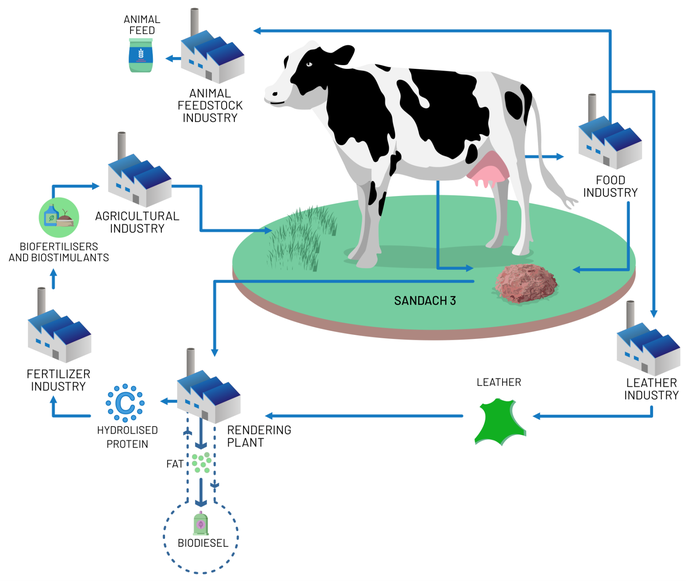
CONTRIBUTIONS

RENDERING PRODUCT APLICATIONS



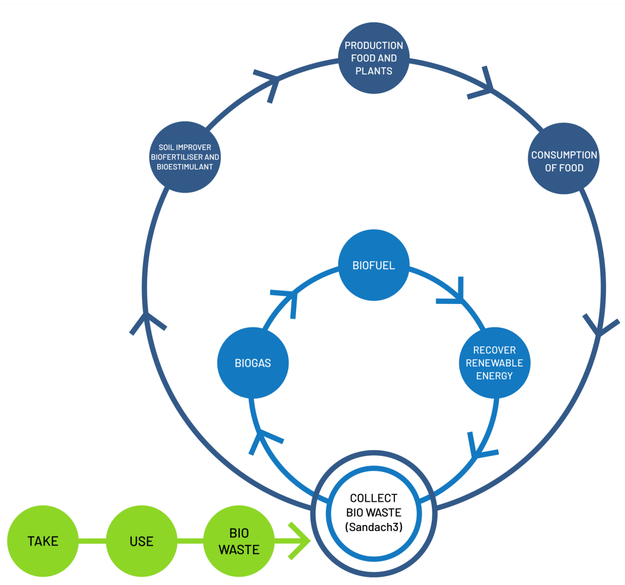
The rendering industry recovers nutrients, energy and functional molecules, mainly fats and proteins. According on their level of risk it is processed and use in different ways. There is a market for this type of animal by-products, mainly for category 3 animal by-products whose current use is extensive to biofuels, biogas or animal feed among others.

INDUSTRIAL SYMBIOSIS



Superbiodiesel processes and bioproducts promotes intersectoral collaboration. Benefits for the industry can be a resource-efficient bioprocess, contributing to a 35% reduction in CO2 emissions into the atmosphere by reducing the consumption of chemical substances, energy consumption, water consumption by 96%, and the production of wastewater.

FROM BIOWASTE TO BIOPRODUCTS



LIFE SUPERBIODIESEL contributes directly to the circular bioeconomy by recovering two bio-wastes (fat fraction and protein fraction) from the tanning industry[3] into two bio-products that can be used in two very different industries, such as biofuels and fertilisers, helping to close the loop and return them to nature at the end of their life cycle.

LIFE SUPERBIODIESEL RESULTS

The developed bioprocess has proved to allow the recovery up to 78% of mass yields as biostimulants and suitable properties for its implementation as a formulated product in the fertiliser market, so that the valorisation of these animal by-products to produce biostimulants could be replicated and implemented in other waste management plants.
In addition, it achieves a decarbonization of fuels, which is expected to reduce the consumption of fossil raw materials for the manufacture of conventional diesel by 40% and yield increases up to 10% with lower viscosity and improved cold-flow properties.

LIFE SUPERBIODIESEL IMPACT

Superbiodiesel Bioproduct's are developed by means of a resource-efficient bioprocess, biostimulant is produced with a carbon and water footprint much lower than biostimulants obtained by chemical processes. In addition, biodiesel reduces the generation of polluting effluents by 80% reduction of carbon footprint on conventional diesel.

Acknowledgements

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Project Partners

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Reference:

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