

CichOpt

OPTIMAL USE AND VALORIZATION OF BIOMASS
STREAMS FROM CICHORIUM.

Cichorium crops included in the CichOpt project: Belgian
Endive, Industrial chicory, Endive and Radicchio



1° Call:	2017
Project period:	03/2018 - 02/2021
Topic:	Small scale biorefinery of Cichorium feedstocks
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FACCE SURPLUS
SUSTAINABLE AND RESILIENT AGRICULTURE
FOR FOOD AND NON-FOOD SYSTEMS

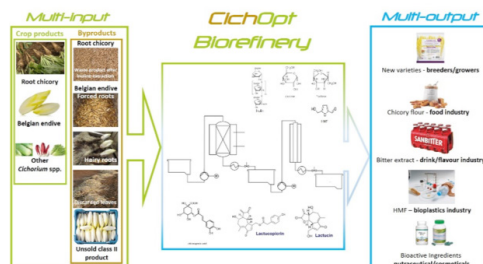


BACKGROUND

The project focuses on four different crops in the Cichorium genus which are of major economic importance in Europe: industrial chicory grown for inulin extraction, and Belgian endive, Radicchio Rosso and Endive, all three grown as leaf vegetables. The biomass from these crops is especially interesting as a feedstock for the bio-economy because they are rich in the following valuable target compounds: dietary fibers (DF) and free sugars (both relevant for food applications, materials), and the bioactive sesquiterpene lactones (SL) and polyphenols (PP) (relevant for food, beverages, cosmetic applications). In addition significant volumes of by-products and waste fractions are available which remain currently underutilized.

OBJECTIVE

The overall aim of the CichOpt project is to develop innovative biorefinery processing schemes to turn different underutilized Cichorium biomass streams (multi-input) into fractions with high added value which can be used in a wide range of applications, ranging from food & drink applications over cosmetics to biomaterials (multi-output).



METHODOLOGY

- Systematic and detailed molecular analysis of these target compounds in different varieties and tissues of these 4 crops (bioprospecting);
- Monitoring of the presence of these interesting compounds in the existing by-products and waste fractions which are generated throughout the current value chain of these crops (on the field, at the farm, during industrial processing, during storage, at the vegetable auctions);
- Developing a long term strategy for high value Cichorium materials with the same data from the molecular analysis;
- Identification of plant breeding targets for robust Cichorium germplasm, with the aim to develop Cichorium varieties with tailored content of high value compounds and/or which are diversified in taste characteristics;
- Selection of the most promising starting materials for biorefinery process development;
- Developing of a cascade biorefinery scheme with four selected bio-based applications in mind;
- Biobased product development.

RESULTS AND KEY FINDINGS

- Novel integrated biorefinery schemes for processing Cichorium biomass, by-products and waste streams into well-characterized, valuable fractions, striving for a zero-waste approach;
- Functional food and drink ingredients enriched in DF, SLs and/or PP that will benefit industry and bring these ingredients to a pre-competitive stage;
- A Cichorium derived fraction enriched in SLs and/or PP as bio-active ingredient for cosmetics;
- The production of hydroxymethylfurfural starting from underutilized Cichorium biomass is demonstrated in a small demo plant, on a farm;
- A Techno-economic analysis (TEA) and Life Cycle Assessment (LCA) for two of the most advanced products in the project;
- Drivers to realize an increase in the global production area of Cichorium crops.