

# BioSUNmutant

INNOVATIVE APPLICATIONS FROM SUNFLOWER  
BY-PRODUCTS



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| <b>3° Call:</b>          | 2019  |
| <b>Project period:</b>   | 1/04/2020 – 31/03/2023  |
| <b>Topic:</b>            | Innovative applications from sunflower by-products  |
| <b>Keywords:</b>         | Sunflower biomass, bio-based materials, circular economy  |
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**FACCE SURPLUS**  
SUSTAINABLE AND RESILIENT AGRICULTURE  
FOR FOOD AND NON-FOOD SYSTEMS



## BACKGROUND

Sunflower is grown for its seed, from which high-quality oil and protein are extracted. The seed only accounts for a small part of the plant, leaving a substantial amount of sunflower biomass unexploited. Indeed, the current harvesting practice cuts the sunflower heads from which seeds are isolated, and the remaining material is dumped via the back of the combine harvester.

As a result, sunflower growers would greatly benefit from new applications that create value from the unused sunflower biomass. So far, most studies have focused on the possibility to use sunflower biomass for the production of fibre. The pith of sunflower stems contains good quality fibres that can be used in various new bio-based materials, for instance as insulation or as construction material.

Previous studies have shown that the bark of sunflower stem also contains fibres that may lead to new bio-based products. In addition to fibre, we found that a side stream that is generated during bark fibre extraction is highly bioactive when applied to plants. This intriguing property prompted further investigation and preliminary analysis showed that the bioactivity can potentially be developed into new agricultural products. These findings entail new opportunities for transforming sunflower biomass into renewable products that match with the forecasted sustainable bio-economy.

## OBJECTIVE

The project aims to create an integrated value chain of sunflower biomass by considering the entire process from plant selection and cultivation, biomass collection and transformation, up to the formulation of bioactive extracts and testing these in the field.

## METHODOLOGY

To progress our knowledge of the bioactivity, which will help to improve product development and application, the project aims to chemically purify the bioactive ingredient(s) and analyse the physicochemical properties. The bioactive extracts are expected to be valorised as innovative and ecologically friendly agricultural products. Besides, we also aim to validate fibres extracted from sunflower biomass as a natural material source, generating economical values with a lower environmental footprint.

## FUTURE

The outcome of the project is an integrated value chain for sunflower biomass by-product, taking into account economic, environmental and societal impact, contributing to the sustainable development goals set by the UN. The project will disseminate results among academia, industries, and policymakers, through communication tools such as conferences, workshops, manuals and university classes. We aspire to promote novel biomass (by-products) utilisation strategies in the EU, creating new directions for the bio-economy (Figure 1).

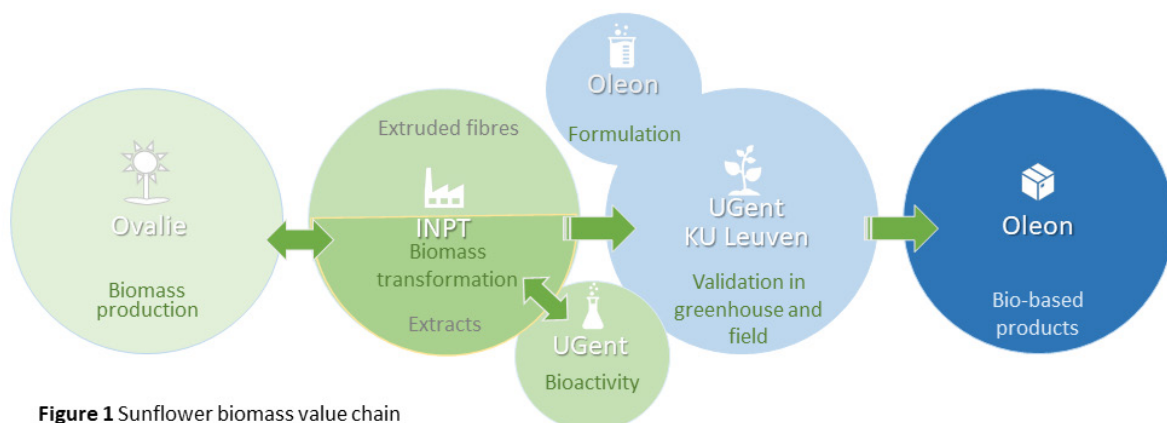


Figure 1 Sunflower biomass value chain