

SUPRABIO, an innovative, sustainable biorefinery research project, has received major funding to the tune of 19 million Euros from the EU and the corporate sector.

“The crux of this project is to address the problems of declining fossil fuels and global warming. To resolve these we need to bring in renewable materials to produce fuels and chemicals. This project will use biomass to achieve this goal. However, in order to ensure the competitiveness and sustainability of the processes to produce fuel and chemical from biomass, we will need to develop some critical technologies such as efficient fractionation of lignocellulose, enhanced and selective microbial and fungal conversions, and economic distributed chemical processing using integrated highly intensified modular reactors.”

The project will use bio-resources such as straw, seed oil, algae and wastewater. The bio-resources will be improved and converted (through microbial, fungal, enzymatic and chemical processes) to make products for consumers and industry e.g. healthcare products, cosmetics, pharmaceutical intermediates, biofuels, and materials such as polymers.

This biorefinery project will investigate and identify:

- availability and cost effectiveness of renewable raw materials
- developing technologies
- appropriate geographical locations where products can be manufactured
- size of the bio-refinery plant
- size of the market place to make each product competitive and sustainable

The project will also take into account environmental sensitivities and will not compete with agricultural land best used for food crops or compete with food products.

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SUPRABIO is supported as part of a joint call of various EC Directorates on the development of biorefineries within the Work Programme 2009. Within this call, the Commission supports three four-year collaborating research projects (SUPRABIO, BIOCORE and EUROBIRO-REF) and a two-year coordination action project (STAR-COLIBRI).



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**Sustainable products
from economic processing of biomass
in highly integrated biorefineries**

The project is financially supported by the 7th Framework Programme of the European Commission (grant agreement 241640).



The SUPRABIO Project

A biorefinery is a multi-disciplinary and complex concept addressing at the same time the production of value-added bio-products (chemical building blocks, materials), and bioenergy (biofuels, power and heat) from biomass, within a sustainability assessment carried out along the entire value chain and life cycle.

From February 2010 to January 2014, the SUPRABIO project will research, develop and demonstrate a toolkit of

- novel generic processes together with
- advanced process intensification
- heat management
- utilities management and
- integration methodologies

that can be applied to a range of biorefinery scenarios based on sustainable biomass feedstocks.

This is supported by

- an economic and lifecycle assessment of the resulting gains in energy efficiency and conversion of renewable carbon, together with
- an implementation strategy based on a product mix with optimal value.

The project will contribute to the European Lead Market initiative on Bio-Based products and to the implementation of the European Energy & Climate Package. The biorefinery concept is also an important feature of the European Industrial Bioenergy Initiative (EIBI), one of the six industrial initiatives of the European Strategic Energy Technology (SET) Plan, which aims to speed up the development of clean, efficient and low-carbon technologies.

suprabio
innovative bio solutions

The SUPRABIO Team

The SUPRABIO consortium includes seventeen research partners from nine European countries: three industrial companies, eight small and medium enterprises (SMEs), three research institutes and three universities.



The University of Oxford is coordinating the project.



Main drivers of the biorefinery approach

Declining petroleum resources, increased demand for petroleum by emerging economies, and political and environmental concerns about fossil fuels are driving our society to search for new sources of liquid fuels and commodity chemicals. The only current sustainable source of organic carbon is biomass. Large amounts of biomass are present throughout the world and the European Biomass Industry Association (EUBIA) has estimated that Europe could produce 8,900 PJoule of biomass per year. Biofuels, produced in biorefineries, give out significantly less greenhouse gas (GHG) emissions than fossil fuels and can even be greenhouse gas neutral if efficient methods for production are developed.

The biorefinery itself must address two strategic goals. A well-recognised driver is **the substitution of imported petroleum with domestic raw materials**, but realization of the energy goal requires a financial incentive to build or retrofit facilities capable of utilising renewable biomass as feedstocks, to justify industrial use of new raw materials and to incorporate technology for their conversion. Since fuel is a high volume, low value product, new, standalone fuel facilities are often burdened by a low return on investment, making their construction less desirable. A biorefinery based on chemical products alone can realize a much higher return on investment, but lacks the potential for a large energy displacement impact as chemical production accounts for only about 7 to 8% of our oil imports. Analysis reveals that **producing both chemicals and fuels in an integrated biorefinery meets the energy and economic goals simultaneously**. In integrated operations, such as those developed in SUPRABIO, high value products become an economic driver. This provides higher margins to support lower value fuels, leading to a profitable biorefinery operation that also exhibits an energy impact.