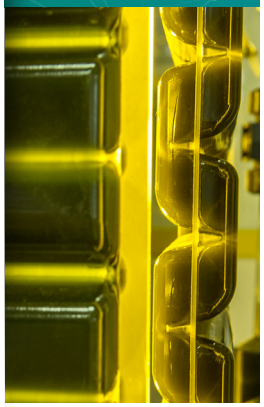


Bringing **INNOVATIVE MICROALGAE-BASED** compounds to the **MARKET**

UPSTREAM

TERPENOID PRODUCTIVE ALGAE

- Strain selection
- Adaptation of algae (mutants development)

BIOREACTION

OPTIMISED ALGAE BIOMASS CULTURE

- Optimise parameters of biosynthesis
- Develop control parameters of terpenoid production
- Manage terpenoid production

DOWNSTREAM

TERPENOID BIO-BASED PRODUCT

- Reduce process steps by integration
- Develop low cost & environmentally friendly extraction processes

MARKET PRODUCT

- Investigate Life cycle
- Implement eco-design ot terpenoids production
- Demonstrate technological sustainability of bio-based algae value chain

BIO-BASED VALUE CHAIN

THE MAIN ACHIEVEMENT FROM ABACUS WILL BE TO TACKLE THE BIOLOGICAL AND BIOPROCESS CHALLENGES of oriented algal production for different terpenoids encompassing both well-established and more innovative market sectors.

Road**MAP**

Algae selection
Selection of about 10 strains including natural, mutant and GMO for an improved production of terpenes and terpenoids for applicaton in fragrances, and cosmetic actives, nutraceuticals and agrochemicals.

Up-scaling
Upscaling of the production systems for algae culture and terpene production. After setting the process books for implementing the optimised process design, experimental large scale manufacturing of innovative algal products will be carried out.

WP1 WP2 WP3 WP4 WP5 WP6 WP7 WP 8-9-10

Market and Roadmap
Solidify market opportunities for terpenoids and carotenioids and identify relevant product specifications. Indeed the the Roadmap of the Project will be drawn.

Process design
Process design for an optimized biomass production using the strains selected in WP2 on a pre-pilot, indoor basis. Development of innovative sensors for precise in situ process monitoring and control, aiming at operating expenses reduction.

Fractionation
Environmental friendly extraction steps will be proposed for the downstream process, where green fractionation steps will be developed also on representative technological platform.

Applicability
Applicability of extracted target compounds and other side products will be assessed. Processes issued from previous WPs will be up scaled on biotechnological platforms provided by RTOs and SMEs partners. Regulation aspects related to target products (terpenes and terpenoids) and by-products (lipids, hydrocarbons, …) will be also considered in this WP.

Management
WP8 and WP9 deal respectively with the exploitation/ dissemination/communication activities and with management/coordination tasks of the Project. WP10 addresses the Project's ethical requirements, particularly given its work with GMOs.

Product and market acceptance
The whole value chain of production will be evaluated through life cycle, technical-economic and environmental analyses which are required for market acceptance of algae biomass production. The acceptability of algal products will be assessed.

ALGAE ARE A FERTILE SOURCE OF POTENTIAL NEW NATURAL MATERIALS. ABACUS will make a major step in mastering the value chain for competitive, algae based-products.

About the PROJECT

ABACUS is a 3-year project aiming at a business-oriented and technology-driven development of a new algal biorefinery, thereby bringing to the market innovative algae-based ingredients for high value applications, with focus on algal terpenes for fragrances to long-chain terpenoids (carotenoids) for nutraceuticals and cosmetic actives.

The concept of ABACUS will associate several interdisciplinary approaches in order to support a high-value products oriented market development:

- Selection and Biological engineering of microalgal strains and oriented photosynthesis of terpenoids
- Technological development of algae biomass production system to optimize cultivation and photosynthesis of terpenoids
- Technological development of the dowstream processing step to reduce harvesting time and costs (both investment and operational costs), and to be environmentally acceptable
- Market development oriented to new added value algae bio-based materials and new bio based value chain production

Terpenoids are molecules that can be found in photosynthetic microorganisms like plants or algae. They represent a renewable alternative to petroleum-derived fuel and building blocks of synthetic biopolymers as well as high value compounds for cosmetic and nutraceutical uses

WE ARE abacus

This project has received funding from the Bio-Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation program (grant agreement N° 745668)

BIO-BASED INDUSTRIES Public-Private Partnership

Biobased Industries Consortium

Horizon 2020
European Union Funding
for Research & Innovation

CONTACT us

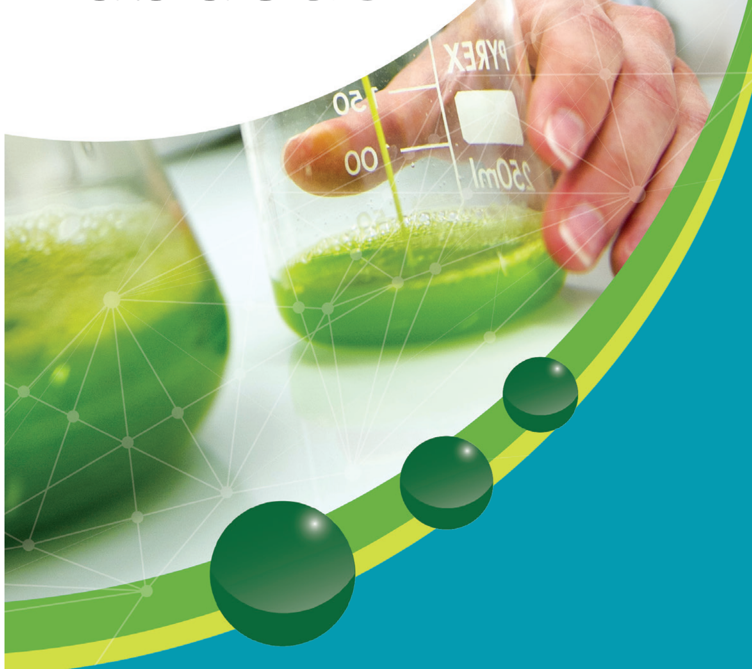
Project Coordinator
Jean François Sassi
Jean-Francois.SASSI@cea.fr

BBI JU Project Officer
Dieter Brigitta
dieter.brigitta@BBI.europa.eu

www.abacus-bbi.eu

Création graphique florence pillet

abacus



ALGAE for a BIOMASS Applied to the PRODUCTION of added value COMPOUNDS