ABACUS-BBI
Algae for a Biomass Applied to the production of added value CompoUndS

Jean-François Sassi, CEA

5ème Forum de l'Industrie: Atelier *"S'appuyer sur les partenariats Public-Privé pour innover"*

19 novembre 2020

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 745668)

ABACUS at a glance

abacus = Research & Innovation Action funded by BBI JU

KICK-OFF MAY 17
3-YEAR PROJECT

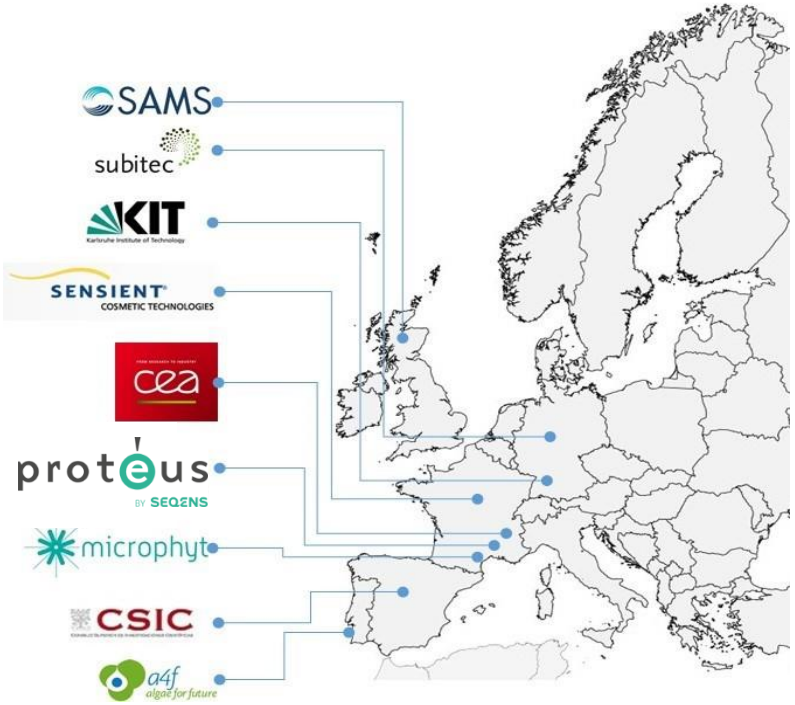
4,65 M€
GRANT FROM H2020 BBI JU

600 MAN MONTHS

2 LARGE INDUSTRIES

3 ALGAE BIOTECH SMES

4 RTOs

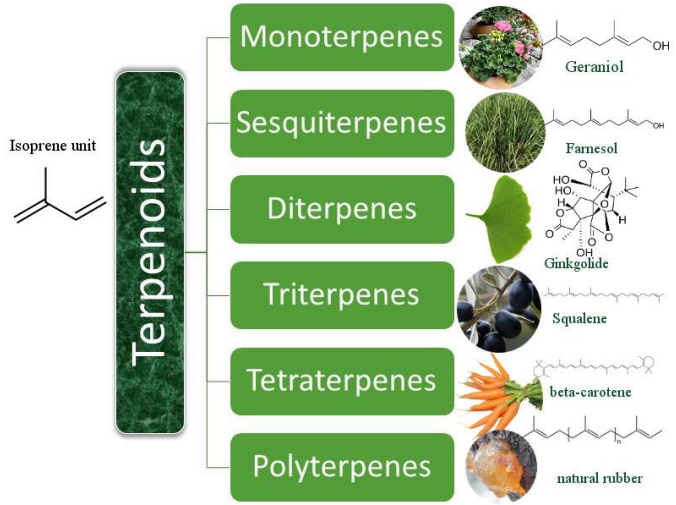


BBI JU
Bio-based Industries Consortium
Horizon 2020 European Union Funding for Research & Innovation

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 745668)

ABACUS concept

abacus aims at a business-oriented and technology-driven development of a **new algal biorefinery**, thereby bringing to the **market competitive and innovative algae-based ingredients** for high-end applications, spanning from **algal terpenes** for **fragrances** to **long-chain terpenoids** (**carotenoids**) for **nutraceuticals** and **cosmetic actives**.

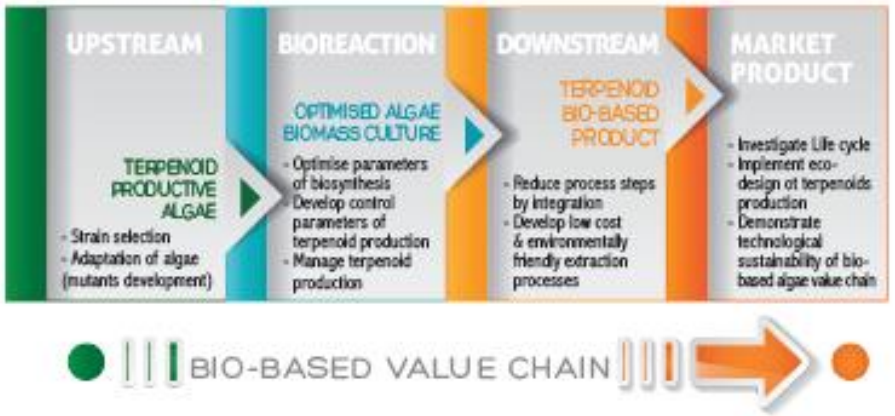


Terpenoids can be found in photosynthetic microorganisms like plants or algae. They represent a renewable alternative to petroleum-derived fuel and building blocks of synthetic biopolymers as well as high value compounds for fragrances, cosmetics and nutraceuticals

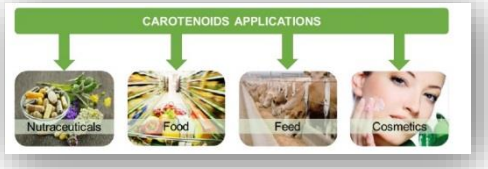
This project has received funding from the Bio-Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation program (grant agreement 745668)

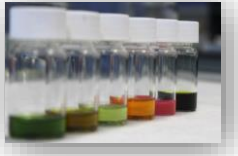
Specific objectives

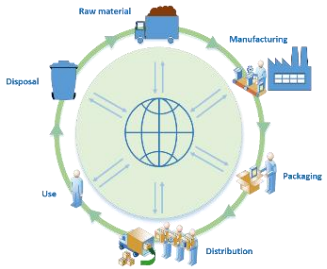
- Select and/or engineer best microalgae and cyanobacteria strains for photosynthesis of terpenes and carotenoids
- Improve and automate cultivation systems to enhance biomass & products yields and to reduce operating costs
- Optimize DSP to reduce OPEX and to secure societal and environmental acceptability
- Assess applicability of targeted ingredients in cosmetic and nutraceutical applications
- Scout market potential of new algae-based ingredients



WP overview







WP1 Market & roadmap

WP2 Algae selection

WP3 Process design

WP4 Up-scaling

WP5 Fractionation

WP6 Applicability

WP7 Product & market acceptance

WP 8-9-10 Communication Management Ethics requirements

Result Highlights

- Market surveys => selection of relevant molecular targets for light terpenes and carotenoids
- **Selected improved strains through direct screening** (carotenoids) & synthetic biology (light terpenes)
- Developed new devices for online monitoring of algae growth and content in target molecules, with some integrated in a commercial demonstrator
- **Upscaled** 5 product/strain scenarios **to several-kgs and multiple-week runs**
- Improved fractionation-purification steps for carotenoids and side-products (EPS, phycoerythrin)
- Performed LCA and LCCA for new value chains, including biomass growth and DSP into active extracts
- **27 original publications** and a **2-day international workshop with >100 attendees** from France, Germany, Spain, UK, Portugal, Chile, Morocco

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 745668)

More info?
Check www.abacus-bbi.eu

Thanks to

All members of the abacus consortium

subitec · SAMS · KIT Karlsruhe Institute of Technology · CSIC Consejo Superior de Investigaciones Científicas · cea · proteus by SEQENS · microphyt · SENSIENT COSMETIC TECHNOLOGIES · a4f algae for future

BBI JU · Bio-based Industries Consortium · Horizon 2020 European Union Funding for Research & Innovation

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