



What is MIRACLES about? What are the main objectives?

- MIRACLES is a 4-year industry driven R&D and innovation project aimed at developing integrated, multiple-product biorefinery technologies for production of specialties from microalgae for application in food, aquaculture and non-food products.
- The focus is on development and integration of mild cell disruption and environmentally friendly extraction and fractionation processes including functionality testing and product formulation based on established industrial algal strains. The project will also develop new technologies for optimizing and monitoring of valuable products in the algal biomass during cultivation. An innovative photobioreactor and an improved harvesting technology combined with medium recycle technologies will enable substantial cost reduction of algal biomass production.

Activities

MIRACLES will undertake the following activities

To improve the production and harvesting of the algal biomass doing substantial cost reductions.

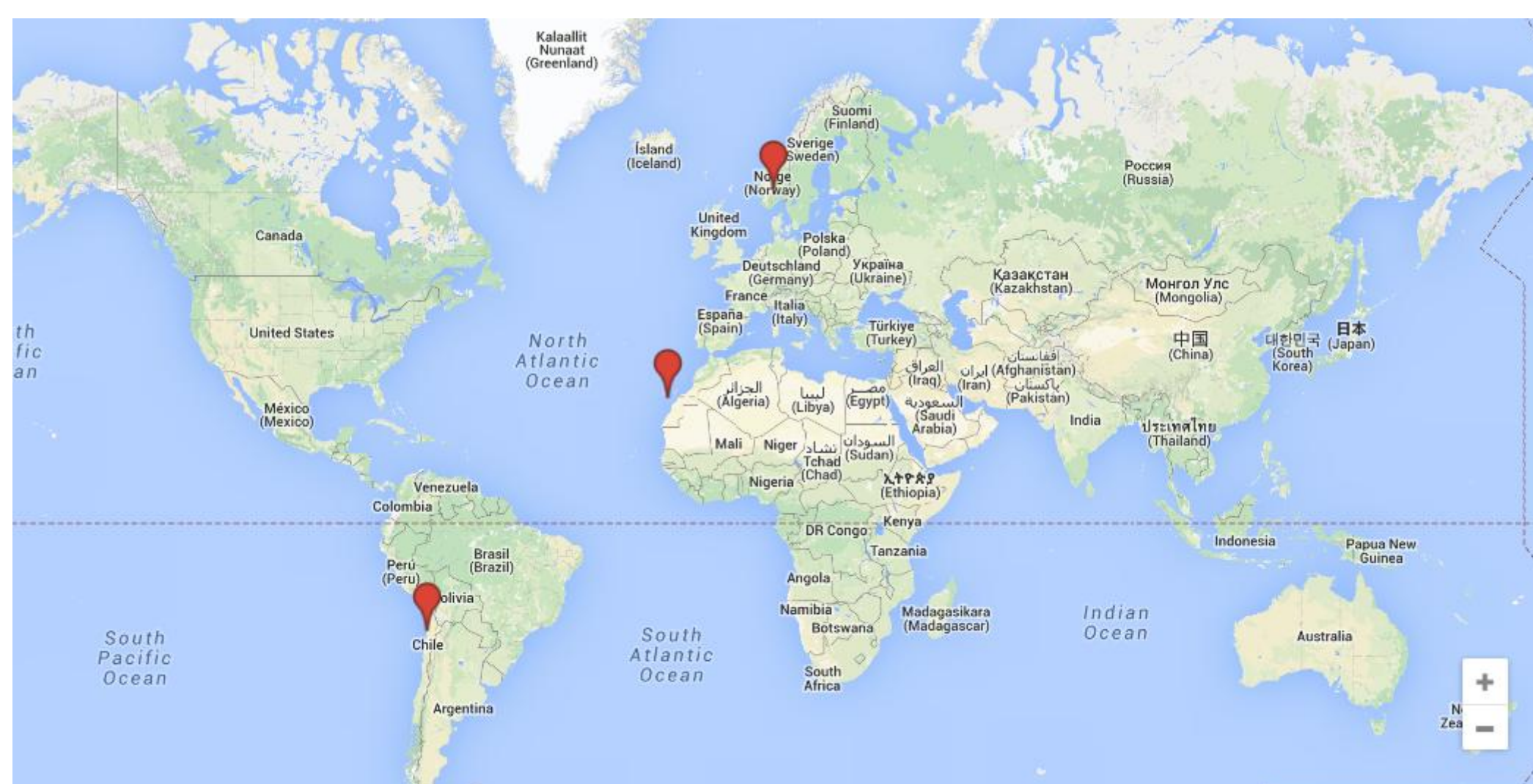
1. To perform bioprospecting, metabolic optimization and cultivation at extreme locations. The aim is to enable cultivation of microalgae in areas with limited potential for agriculture, in order to broaden the resource base of a growing microalgae industry.
2. To develop an integrated biorefinery / processing technologies employing mild disruption, green extraction and fractionation/purification technologies to produce multiple specialty products from microalgae biomass by valorising all biomass components.
3. To product development and market assessment of algae products produced in previous activities by means of chemical characterization and functionality testing, formulation and performance testing of products on lab and pilot scale.
4. To demonstrate integrated value chains with the aim of delivering a proof-of-concept and demonstrate techno-economic viability.
5. To assess the environmental, social and techno-economic sustainability as well as the development of business plans.
6. To engage the industry and stakeholders through the adequate dissemination and exploitation activities combined with the correct intellectual property management.

WP1: Production and harvesting of algal biomass

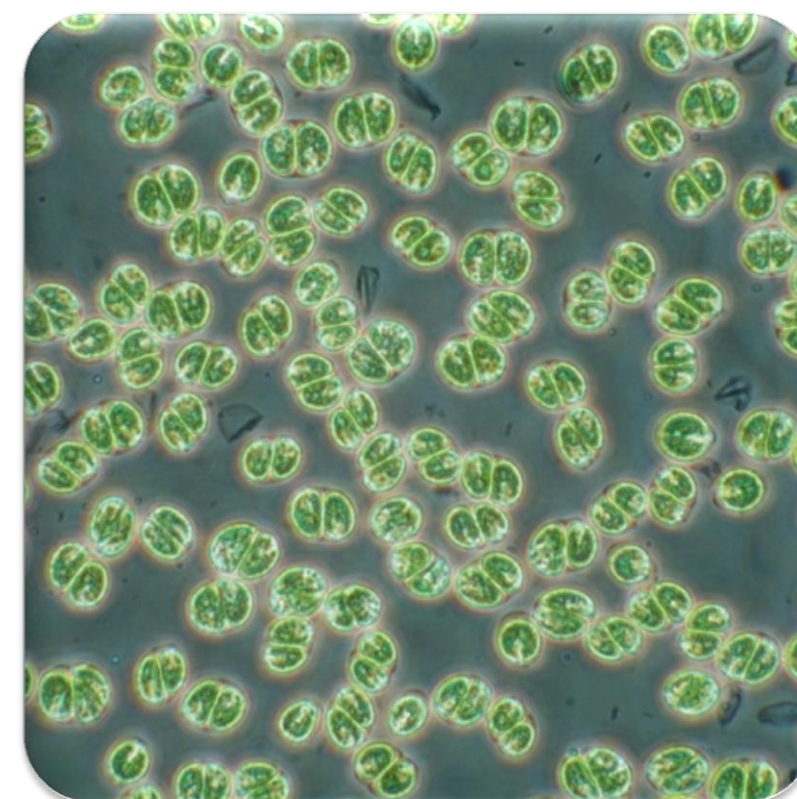
Main objective:

To produce algal biomass for the project and to realize improvements and substantial cost reductions in the cultivation phase.

WP2: Bioprospecting, metabolic optimization and cultivation at extreme location

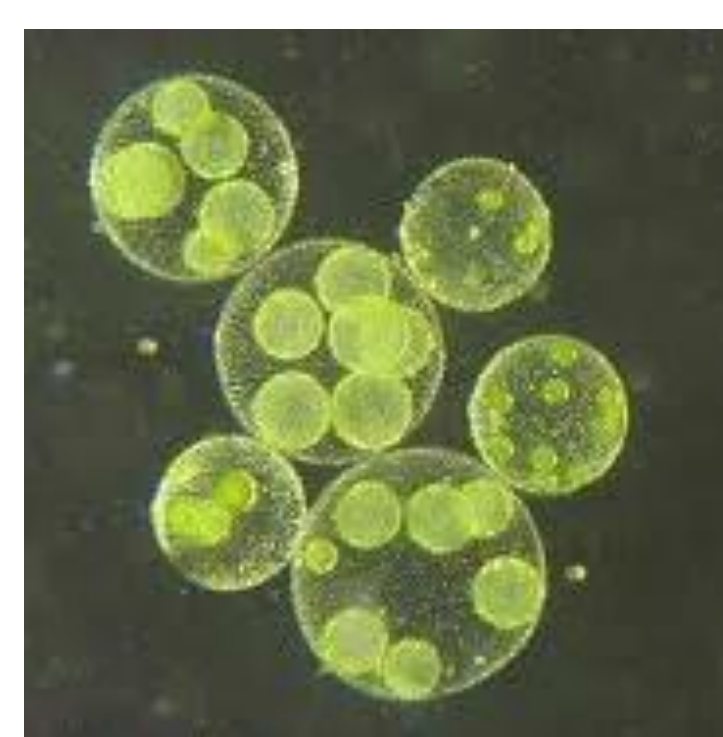


Main Objective of this WP is to perform bioprospecting and selection of robust, highly productive algal species for extreme climatological conditions with appropriate product profiles and biomass characteristics, and to optimize their productivity parameters. The aim is to enable cultivation of microalgae in areas with limited potential for agriculture, in order to broaden the resource base of a growing microalgae industry.



WP3: Development of integrated biorefinery technology

The main objective of WP3 is the development of integrated biorefinery / processing technologies employing mild disruption, green extraction and fractionation/purification technologies. We aim to produce multiple specialty products from microalgae biomass by valorising all biomass components.



WP4: Product development and market assessment

The overall objective of WP4 is to develop applications of algal products by means of chemical characterization and functionality testing, formulation and performance testing of products on lab and pilot scale and performance of market assessment to validate the proposed applications.

WP5: Demonstration of integrated value chains

The main objective of WP5 is the demonstration of selected integrated value chain(s) to deliver proof-of-concept and demonstrate techno-economic viability. The focus will be on selected biorefinery process chains starting from the algae biomass, followed by biorefinery and validation of product application.



MIRACLES Contact information:

Contact Information
MIRACLES website:

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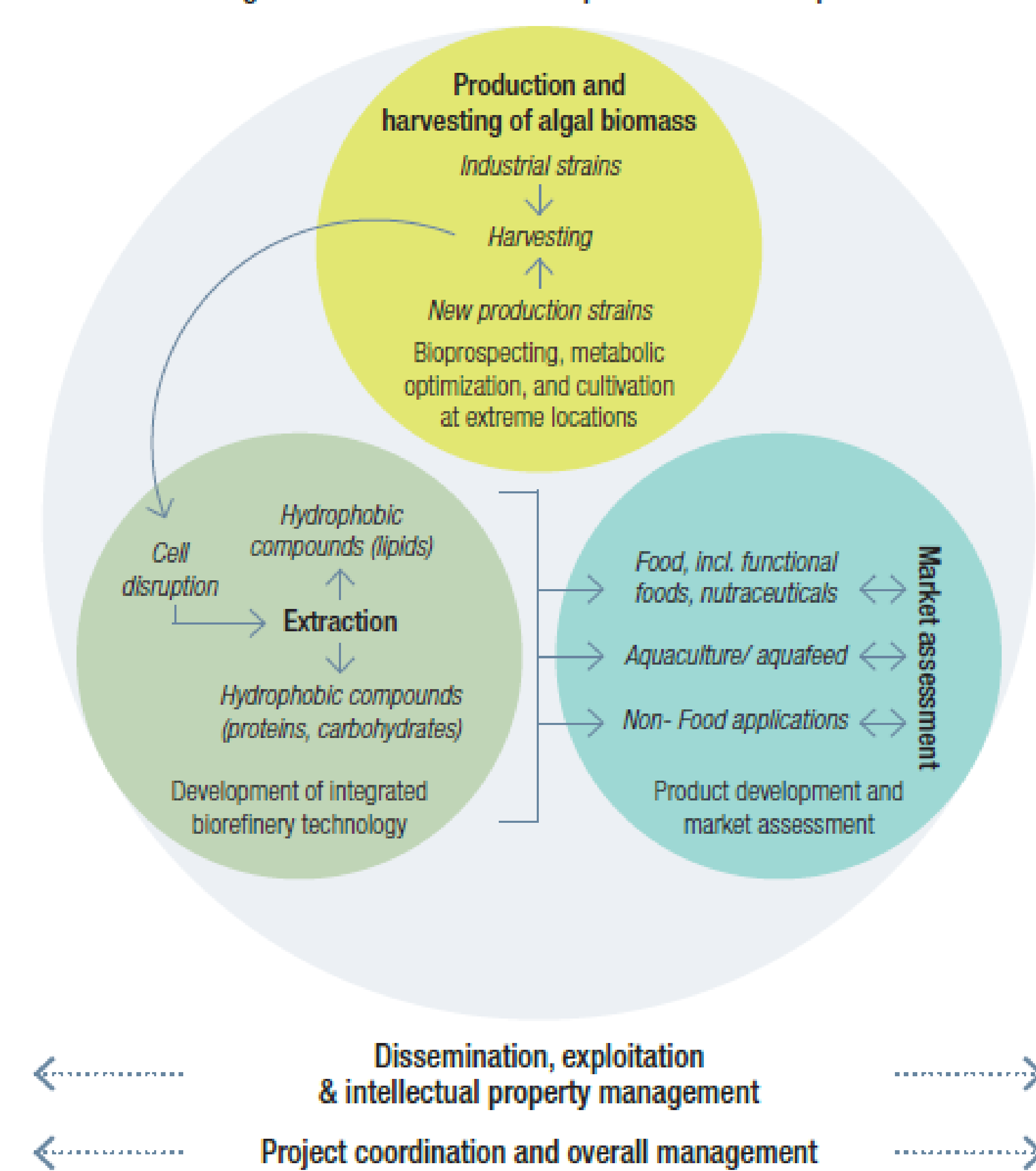
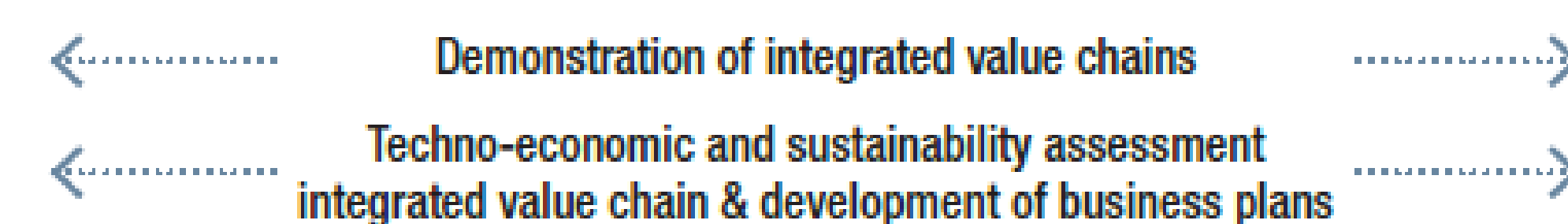
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MIRACLES AT CIAL:

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Samples will be taken from the , Altiplanic Lagoons and saltlakes (Chile), the Canary Islands (Spain) and the Nordic and Arctic region (Norway)



WP6: Techno-economic and sustainability assessment integrated value chain and development of business plans

Objectives of WP6 include

1. To generate conceptual biorefinery design models for techno-economic and sustainability assessment
2. To assess the economics and sustainability of the biorefinery concepts and value chain employing techno-economic evaluation, state-of-the-art Life Cycle assessment methodology, and socio-economic assessment
3. Economic evaluation incl. development of scenarios for multi-product biorefinery value chains for high-value specialties and scenarios for co-production of specialties and algal biofuels.
4. Generation of business cases and business plan(s)

