

## TOPIC INPUT

### BOARD CONSULTAZIONE SC2 FOOD SECURITY, SUSTAINABLE AGRICULTURE AND FORESTRY, MARINE AND MARITIME AND INLAND WATER RESEARCH AND THE BIOECONOMY

#### 1. Specific activity of interest (select one of the following)

##### 1. Sustainable Food Security

- Sustainable food production systems
- Safe food and healthy diets and sustainable consumption
- Global drivers of food security

##### 2. Blue Growth: Unlocking the potential of Seas and Oceans

- Sustainably exploiting the diversity of marine life
- New offshore challenges
- Ocean observation technologies/systems
- Horizontal aspects, socio-economic sciences, innovation, engagement with society and ocean governance across the blue growth focus area

##### 3. Innovative, Sustainable and Inclusive Bioeconomy

- Sustainable Agriculture and Forestry
- Sustainable and competitive bio-based industries
- X Cross-cutting actions covering all activities

#### 2. Title of proposed TOPIC (max. 20 words)

**Optimising cultivation and processing methods of micro- algae aimed at the production of innovative bio-based materials**

#### 3. Challenge, Objective and Impact of proposed TOPIC including innovative solution approaches (short and concise, max. 300 words)

**Specific Challenge:** sets the context, the problem to be addressed, why intervention is necessary

Micro-algae have several major advantages as a “renewable raw material” for the production of bio-based materials: they have high growth rates; have low or no requirements of agricultural land; need little or no freshwater; can use power-plant gases as carbon source (carbon sequestration); use nutrients (N, P) with > 99% efficiency; are easy to harvest and process; are biochemically flexible; have good protein & vitamin content; are bioactive and control associated organisms; do not need herbicides/pesticides.

However, the massive production and use of micro-algae presently involves difficulties: The identification of the most suitable micro-algae species for specific applications needs coordinated research work by several multidisciplinary groups. The production cost is very high despite the higher growth rate of algae in comparison to

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Emilia Romagna  
Friuli Venezia Giulia  
Lombardia

Marche  
Molise  
Piemonte  
Puglia  
Sardegna  
Sicilia  
Toscana  
Umbria  
Veneto

land crops, while identification, extraction and processing of useful ingredients from algae are poorly investigated so far.

**Scope:** *delineates the problem, specifies the focus and the boundaries of the potential action BUT without overly describing specific approaches*

**Micro-algae selection, methods of targeted composition & quality enhancement, optimized intensive algae production systems, extraction from selected algae of targeted high value substances currently under-utilized.**

- Introduction of zero waste concept into the production of high-value products from microalgae, re-using the biomass for repeated extractions of high value product and eventually for energy purposes.
- Synthesis of polymers from extracted components, applications & evaluation of algae-based polymers. This work is expected to lead into significant innovation in the field of biobased polymers.
- Socio-economical assessments evaluating the economics and feasibility behind production systems while providing scientists with an optimum set of data to develop a model for alternative use of algae products and economic potentials of the newly developed techniques.

**Expected Impact:** *describe the key elements of what is expected to be achieved in relation to the specific challenge*

The project intends to carry out complimentary research activities and initiatives on key aspects concerning the “Selection, optimised cultivation and use potential of micro-algae”. It addresses key scientific questions of interest both for academics and private companies. The possible development of high value commercial algae-based products is expected to promote growth with more and better jobs, helping to develop a strong, competitive and sustainable maritime economy in harmony with the environment, which is one of the goals set by EU. European industry and in particular its materials sector will benefit from its gradual independence from imported fossil oil and its transition to the bio-based economy era.

#### 4. Type of funding scheme (i.e., Research & Innovation action; Innovation action; CSA; SME instrument)

R&I Action; Innovation Action; SME Instrument

#### 5. Possible budget request

5,000,000 €

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