iCulture: A digital bio-platform and co-culture bioprocess to prospect and utilize macroalgae responsibly and sustainably.

Fact Sheet

Project Information

**iCULTURE**
Grant agreement ID: 101082010

**Funded under**
Food, Bioeconomy Natural Resources, Agriculture and Environment

**DOI**
10.3030/101082010

**Total cost**
€ 5 999 686.25

**EU contribution**
€ 5 999 686.25

**Start date** 1 September 2023  
**End date** 31 August 2027

**Coordinated by**
NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU  
Norway

Objective

Over 100 Megatons of seaweed constitute Europe’s largest biomass, but less than 0.25% is utilized. Marine industry stakeholders are currently left with 50-70% of residual side-streams sold as low-cost fertilizers. Existing data on more than 10000 macroalgae species could help this industry to improve their processes but the data is too large and manual curation is not feasible. Despite the progression of artificial intelligence (A.I.) and digital instruments, these techniques have barely entered the biobased sector.
iCulture is a cross-disciplinary consortium where European expertise on ICT, bioinformatic, biodiversity, biotechnology, synthetic biology and bioprocessing is combined to develop a set of digital toolboxes that can prospect for new species of seaweed, utilize these in microbial fermentation, and understand how to use it responsibly and sustainably.

Over 80 TB of existing seaweed data and 700,000 genes will be mined by machine learning algorithms in an A.I. toolbox to identify macroalgae characteristics: growth, response to environmental conditions, chemical composition and more. These will be used by a predictive Model toolbox, with models for compositional changes, recovery, resilience and Dispersion, to deliver key features that are important for responsible resource management. A Bioprocess technology toolbox will use this information for a machine learning controlled microbial co-culture, that will convert complex sugar mixtures to catalysts producing high-value antimicrobials.

The multiple benefits of this digital platform are 1) boost the prospecting efficiency of new species by using powerful A.I. algorithms 2) help to understand the potential and vulnerability of resources, so that a responsible management strategy can guide the operations of stakeholders, and 3) create a novel value-chain, valorizing European seaweed side-streams into valuable antimicrobials (>$150/kg) for feed, food and pharma, while reducing CO2 footprint more than 20%.

**Fields of science**

- natural sciences > biological sciences > synthetic biology
- natural sciences > biological sciences > ecology > ecosystems
- natural sciences > chemical sciences > catalysis
- natural sciences > computer and information sciences > artificial intelligence > machine learning
- engineering and technology > industrial biotechnology > bioprocessing technologies > fermentation

**Keywords**

- Artificial Intelligence
- microbial Co-Culture
- biotechnology
- Macroalgae
- seaweed
- sustainable resource management
- Digital Twins
- Technology Stack

**Programme(s)**
**Topic(s)**

HORIZON-CL6-2022-CIRCBIO-02-05-two-stage - Life sciences and their convergence with digital technologies for prospecting, understanding and sustainably using biological resources

**Call for proposal**

HORIZON-CL6-2022-CIRCBIO-02-two-stage

See other projects for this call

**Funding Scheme**

HORIZON-RIA - HORIZON Research and Innovation Actions

**Coordinator**

NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU

Net EU contribution

€ 1 303 403,75

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Hogskoleringen 1
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Norge > Trøndelag > Trøndelag

Links

Contact the organisation Website Participation in EU R&I programmes HORIZON collaboration network

Other funding

€ 0,00
Participants (15)

UNIVERSITEIT GENT
Belgium
Net EU contribution
€ 601 123,75
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Sint pietersnieuwstraat 25
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Vlaams Gewest > Prov. Oost-Vlaanderen > Arr. Gent
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Other funding
€ 0,00

CENTRO DE CIENCIAS DO MAR DO ALGARVE
Portugal
Net EU contribution
€ 371 482,50
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Continente > Algarve > Algarve
Links
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Other funding
€ 0,00
UNIVERSITAET ULM
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€ 645 275,00
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Helmholtzstrasse 16
89081 Ulm
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Baden-Württemberg > Tübingen > Ulm, Stadtkreis

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Other funding
€ 0,00

CENTRO INTERDISCIPLINAR DE INVESTIGACAO MARINHA E AMBIENTAL
Portugal
Net EU contribution
€ 267 375,00
Address
Av general norton de matos s/n
4450 208 Matosinhos
Region
Continente > Norte > Área Metropolitana do Porto
Activity type
Research Organisations

Links
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Other funding
€ 0,00
UNIVERSITAET BIELEFELD

Germany
Net EU contribution
€ 668 126,25

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33615 Bielefeld

Region
Nordrhein-Westfalen > Detmold > Bielefeld, Kreisfreie Stadt

Activity type
Higher or Secondary Education Establishments

Links
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Other funding
€ 0,00

ALGINOR ASA

Norway
Net EU contribution
€ 229 551,25

Address
Haraldsgata 162
5525 Haugesund

SME Yes

Region
Norge > Vestlandet > Rogaland

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links
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ALGINOR BIOREFINERY AS

Norway

Net EU contribution

€ 55,937.50

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SME

Yes

Region

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Links

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Other funding

€ 0,00

POLAR ALGAE AS

Norway

Net EU contribution

€ 235,000.00

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SME

Yes

Region

Norge > Nord-Norge > Troms og Finnmark
INTELLOMICS DRUSTVO S OGRANICENOM ODGOVORNOSCU ZA USLUGE

Croatia

Net EU contribution

€ 230 625,00

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Vukovarska 41
21000 Split

SME

Yes

Region

Hrvatska > Jadranska Hrvatska > Splitsko-dalmatinska županija

FONDAZIONE BRUNO KESSLER

Italy

Net EU contribution

€ 454 062,50

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Via santa croce 77
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Region

Nord-Est > Provincia Autonoma di Trento > Trento
**POLYTECHNEIO KRITIS**

**Greece**

Net EU contribution

€ 240,346.25

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Building e4, technical university campus counoupidiana
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Νησιά Αιγαίου > Κρήτη > Χανιά

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Other funding

€ 0,00

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**ALGAIA**

**France**

Net EU contribution

€ 262,666.25

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Region

Bretagne > Bretagne > Finistère

Links

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APPLIKON BIOTECHNOLOGY BV
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Net EU contribution
€ 128,581.25
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Heertjeslaan 2
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Yes
Region
West-Nederland > Zuid-Holland > Delft en Westland
Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)
Links
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Participation in EU R&I programmes
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Other funding
€ 0,00

IBERAGAR SOCIEDADE LUSO ESPANHOLA DE COLOIDES MARINHOS SA
Portugal
Net EU contribution
€ 104,692.50
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FVA SAS DI LOUIS FERRINI & C

Italy

Net EU contribution
€ 201,437.50

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SME
Yes

Region
Centro (IT) > Lazio > Roma

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Other funding
€ 0.00

BASF SE

Germany
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*Switzerland*  
Net EU contribution  
€ 0,00  

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**SME**  
Yes  

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*Schweiz/Suisse/Svizzera > Zürich > Zürich*  

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**Other funding**  
€ 0,00
Net EU contribution
€ 0,00

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Other funding
€ 0,00

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