



Overview of the microalgae research in Europe

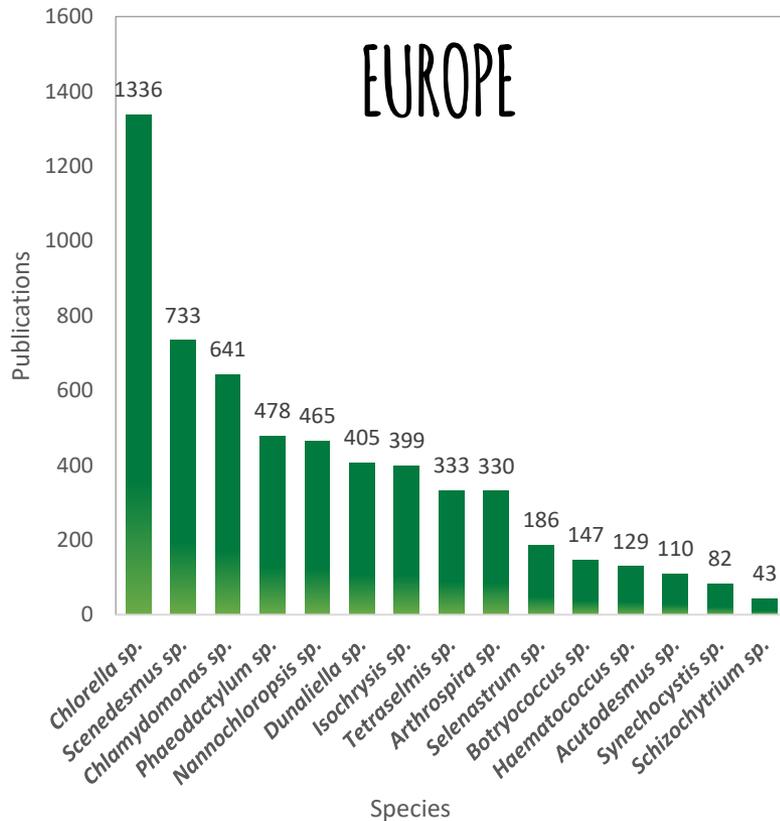
Top 5 of the most published species

PUBLICATIONS DATABASE OF THE MICROALGAE SECTOR

University of La Rochelle – WP4



SCIENTIFIC PUBLICATIONS BY SPECIES IN EUROPE



TOP 5

Chlorella sp.

Scenedesmus sp.

Chlamydomonas sp.

Phaeodactylum sp.

Nannochloropsis sp.



ENHANCE MICROALGAE

ANALYSIS OF “CONCEPTS” AND “DESCRIPTORS” IN THE SCIENTIFIC PUBLICATIONS:

Renewable and Sustainable Energy Reviews 35 (2014) 265–278



Contents lists available at ScienceDirect

Renewable and Sustainable Energy Reviews

journal homepage: www.elsevier.com/locate/rser



Morphology, composition, production, processing and applications of *Chlorella vulgaris*: A review



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ABSTRACT

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Chlorella vulgaris

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Growth conditions

Morphology

Primary composition

Production

Economic and technical problems related to the reduction of petroleum resources require the valorisation of renewable raw material. Recently, microalgae emerged as promising alternative feedstock that represents an enormous biodiversity with multiple benefits exceeding the potential of conventional agricultural feedstock. Thus, this comprehensive review article spots the light on one of the most interesting microalga *Chlorella vulgaris*. It assembles the history and a thorough description of its ultrastructure and composition according to growth conditions. The harvesting techniques are presented in relation to the novel algo-refinery concept, with their technological advancements and potential applications in the market.

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CONCEPTS

DESCRIPTORS

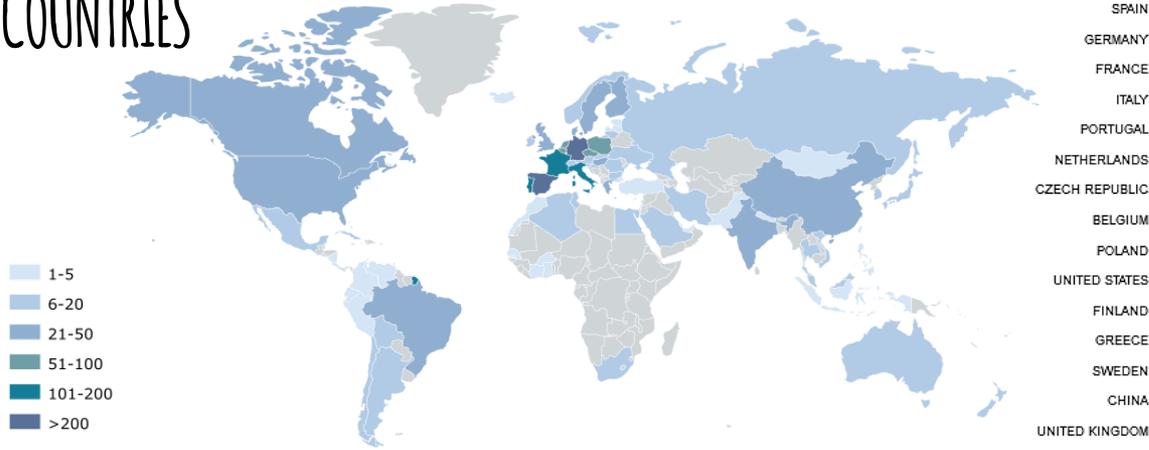


Bibliometric information from Scopus



ENHANCE MICROALGAE

COUNTRIES

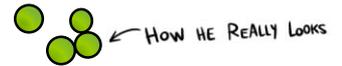
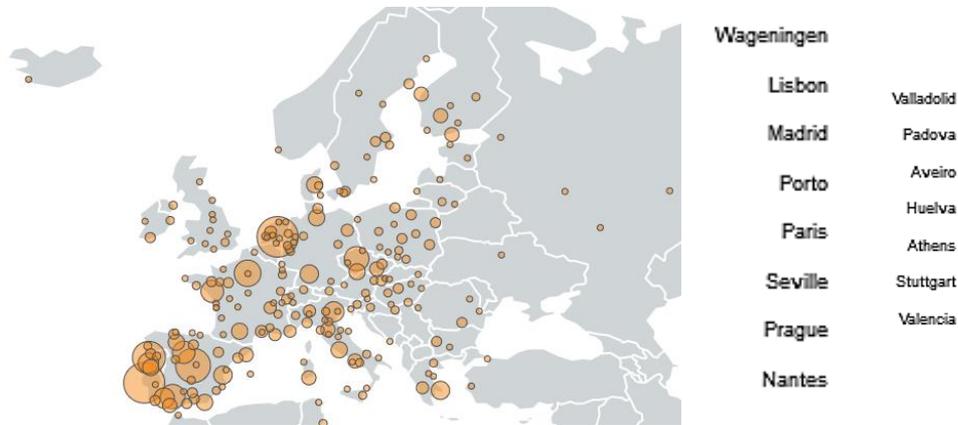


Chlorella sp.

1 336 publications



CITIES





ENHANCE MICROALGAE

CITATIONS

TITLE OF PUBLICATIONS

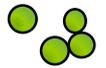
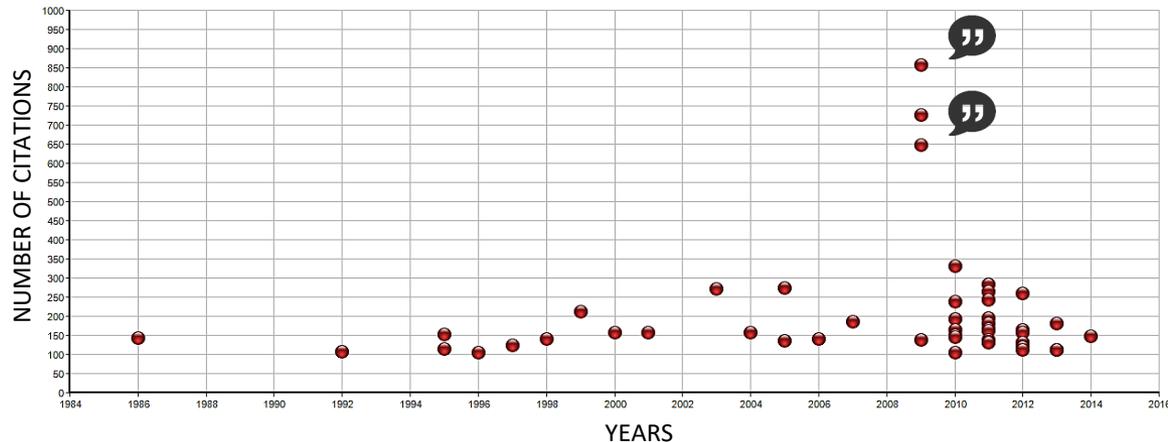
NUMBER OF CITATIONS

Life-cycle assessment of biodiesel production from microalgae	858
Microalgae as a raw material for biofuels production	727
Effect of temperature and nitrogen concentration on the growth and lipid content of <i>Nannochloropsis oculata</i> and <i>Chlorella vulgaris</i> for biodiesel production	647
Microalgae as substrates for fermentative biogas production in a combined biorefinery concept	332
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Utilization of flue gas for cultivation of microalgae (<i>Chlorella</i> sp.) in an outdoor open thin-layer photobioreactor	275
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Marine bioactives as functional food ingredients: Potential to reduce the incidence of chronic diseases	264
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Competition for light between phytoplankton species: Experimental tests of mechanistic theory	213
Microalgae-novel highly efficient starch producers	196
Flocculation of microalgae using cationic starch	193
Removal of nitrogen and phosphorus from wastewater using microalgae immobilized on twin layers: An experimental study	185



***Chlorella* sp.**

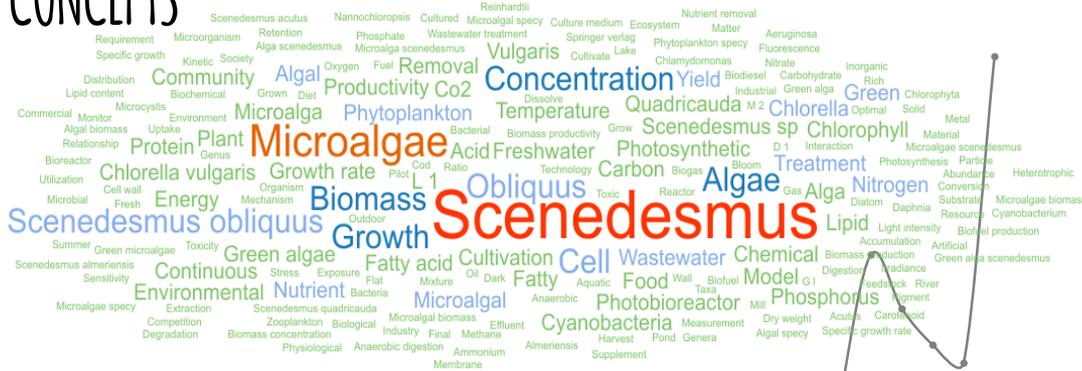
1 336 publications





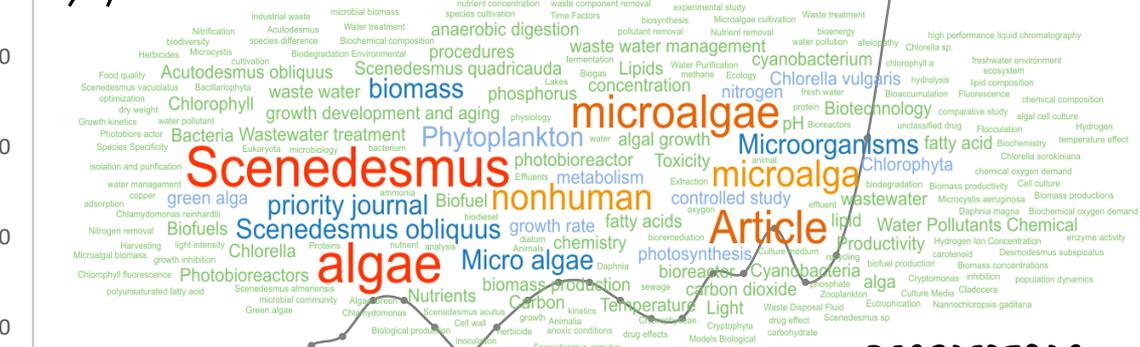
ENHANCE MICROALGAE

CONCEPTS



← HOW HE REALLY LOOKS

PUBLICATIONS



DESCRIPTORS

1985 1990 1995 2000 2005 2010 2015 2020
YEARS

EMERGING CONCEPTS

- verlag gmbh germany
- Tetradesmus **2017 - 2019**
- Tetradesmus obliquus
- BioStimulant
- Informa
- Informa uk
- Informa uk limit
- Livestock
- Phosphorus removal rate
- Root
- Tailor
- Trad
- UK
- Batch operation
- Biomass grown
- Centrate
- Corn
- Cylindrical

- FEED
- Centrate
- retention time
- biostimulants
- Firmicutes
- freeze drying
- Microbial ecology
- nitrifying bacterium
- nitrite
- sustainability
- Volatile suspended solids
- Activated carbon treatment
- adult
- Aquatic ecosystems

2017 - 2019 EMERGING DESCRIPTORS

TOP 5 IN EUROPE
Scenedesmus sp.

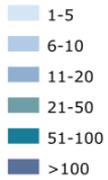
733 publications





ENHANCE MICROALGAE

COUNTRIES



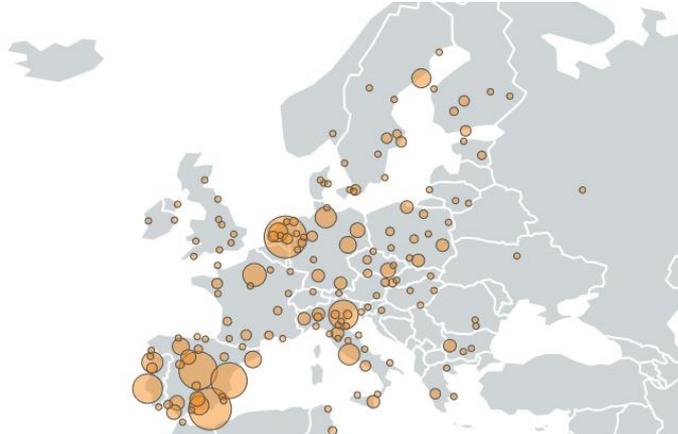
- SPAIN
- GERMANY
- ITALY
- NETHERLANDS
- FRANCE
- PORTUGAL
- SWEDEN
- POLAND
- BELGIUM
- CZECH REPUBLIC
- UNITED STATES
- FINLAND
- UNITED KINGDOM
- CANADA
- CHINA

Scenedesmus sp.

733 publications



CITIES



- Almeria
- Wageningen
- Madrid
- Valencia
- Lisbon
- Padova
- Paris
- Porto
- Rome
- Granada
- Umea
- Amsterdam
- Barcelona
- Leon
- Bmo



← HOW HE REALLY LOOKS



ENHANCE MICROALGAE

CITATIONS

TITLE OF PUBLICATIONS

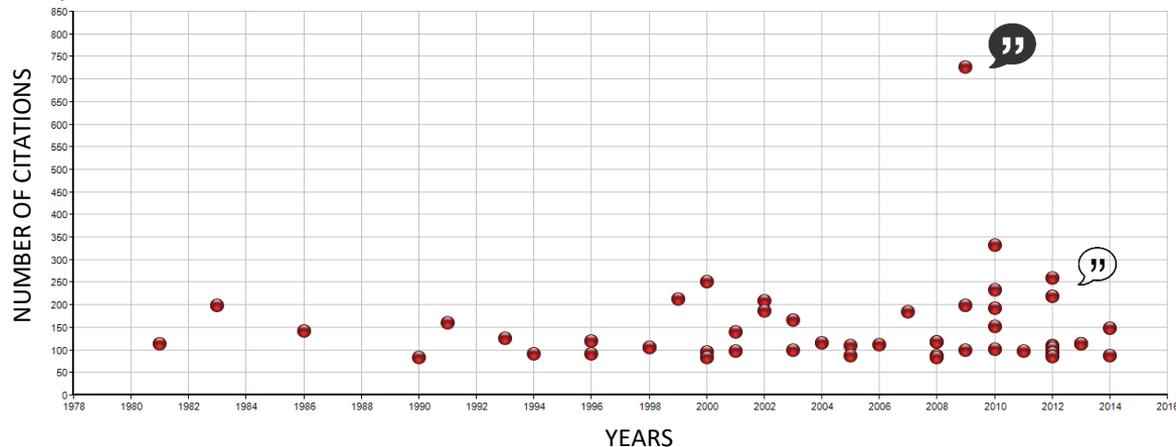
NUMBER OF CITATIONS

Microalgae as a raw material for biofuels production	727
Microalgae as substrates for fermentative biogas production in a combined biorefinery concept	332
The impact of nitrogen starvation on the dynamics of triacylglycerol accumulation in nine microalgae strains	259
Nitrogen and phosphorus removal from urban wastewater by the microalga <i>Scenedesmus obliquus</i>	250
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Flocculation of microalgae using cationic starch	193
Determination of limiting polyunsaturated fatty acids in <i>Daphnia galeata</i> using a new method to enrich food algae with single fatty acids	187
Removal of nitrogen and phosphorus from wastewater using microalgae immobilized on twin layers: An experimental study	185
Use of chlorophyll fluorescence in metal-stress research: A case study with the green microalga <i>Scenedesmus</i>	165
Chemical evidence of kerogen formation in source rocks and oil shales via selective preservation of thin resistant outer walls of microalgae: Origin of ultralaminae	160



Scenedesmus sp.

733 publications

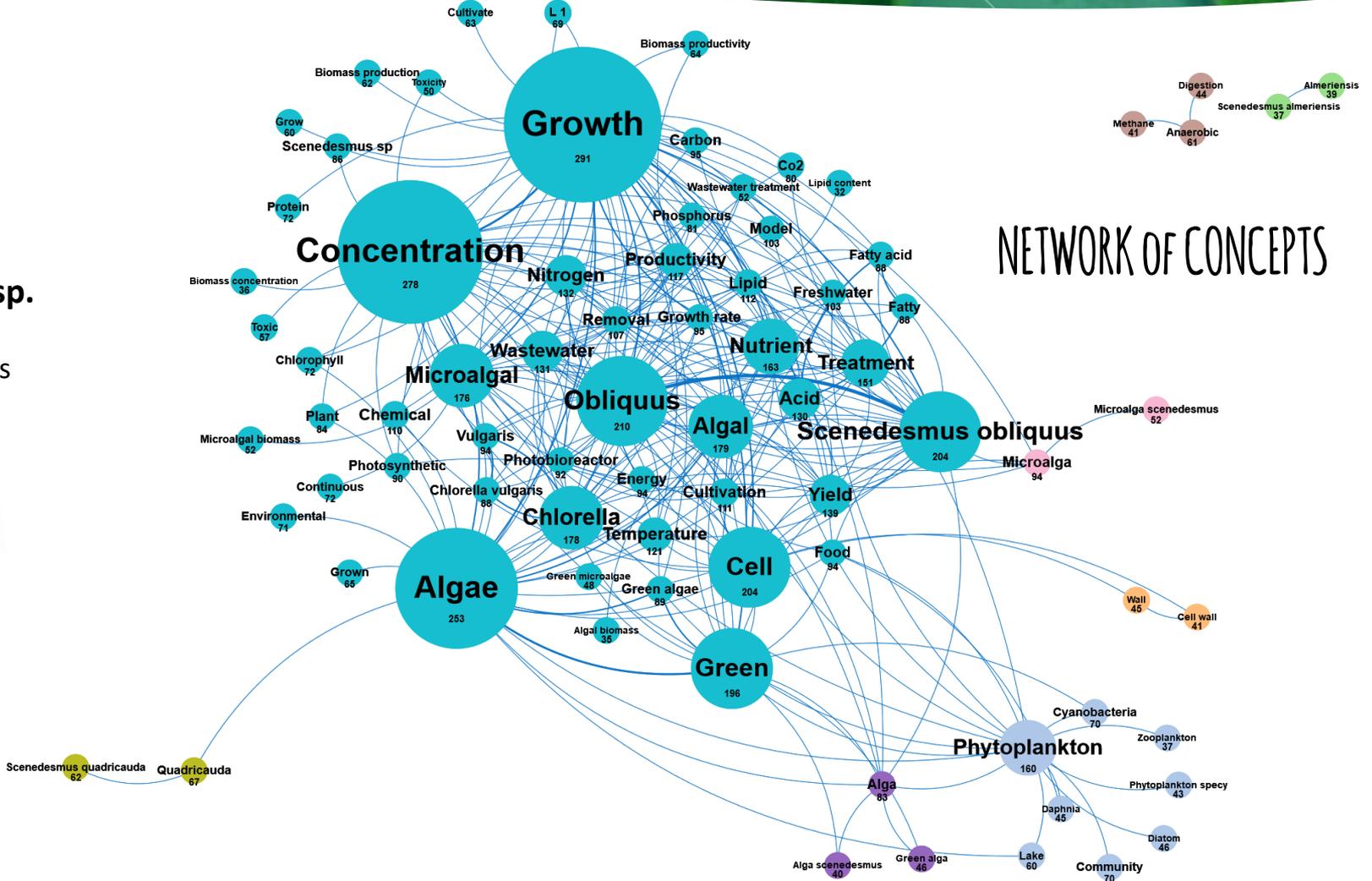




ENHANCE MICROALGAE

Scenedesmus sp.

733 publications

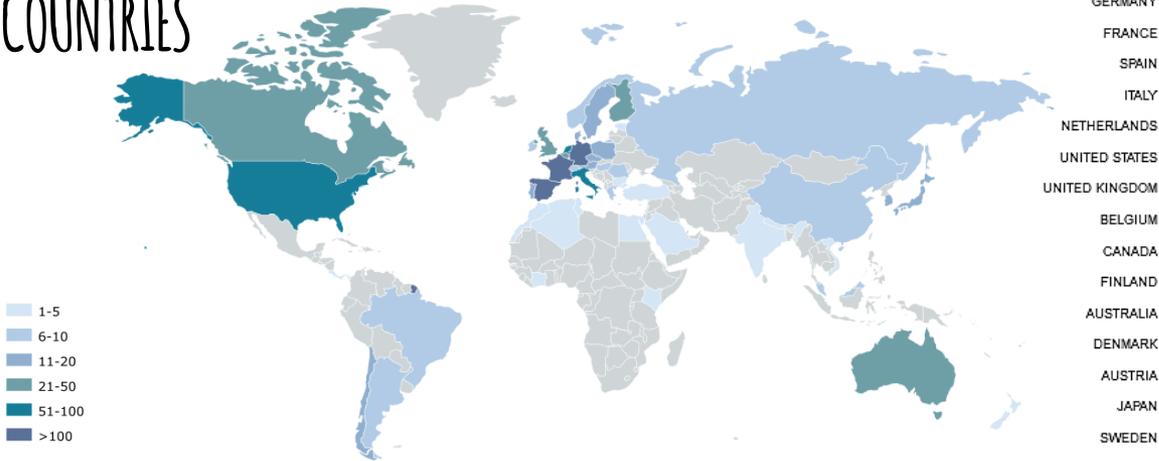


NETWORK OF CONCEPTS



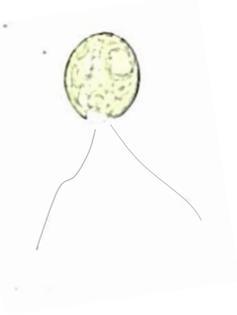
ENHANCE MICROALGAE

COUNTRIES

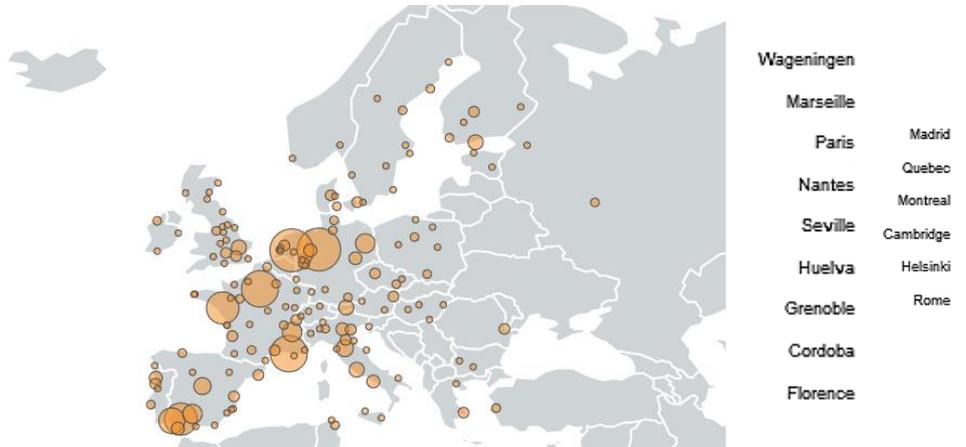


Chlamydomonas sp.

641 publications



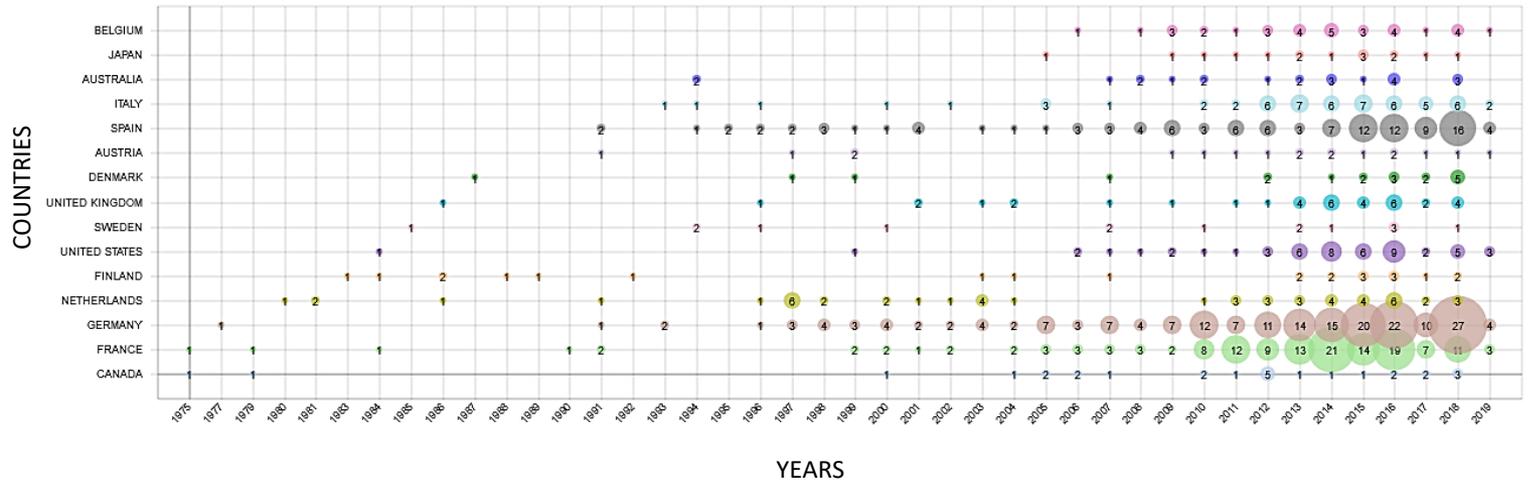
CITIES





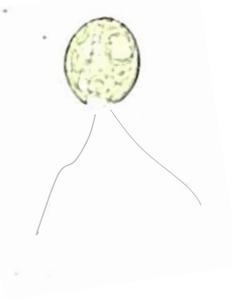
ENHANCE MICROALGAE

COUNTRIES



Chlamydomonas sp.

641 publications



SOURCES

JOURNAL (NUMBER OF PUBLICATION)	IMPACT FACTOR
Algal Research-Biomass Biofuels and Bioproducts (28)	3,745
HYDROBIOLOGIA (22)	2,165
BIORESOURCE TECHNOLOGY (21)	5,807
JOURNAL OF BIOTECHNOLOGY (19)	2,533
JOURNAL OF APPLIED PHYCOLOGY (17)	2,401
PLANT PHYSIOLOGY (15)	5,949
PHOTOSYNTHESIS RESEARCH (12)	3,091
AQUATIC TOXICOLOGY (12)	3,884
FRESHWATER BIOLOGY (11)	3,767
PLoS One (11)	2,766
EUROPEAN JOURNAL OF PHYCOLOGY (10)	2,481
INTERNATIONAL JOURNAL OF HYDROGEN ENERGY (9)	4,229
APPLIED MICROBIOLOGY AND BIOTECHNOLOGY (9)	3,34
BIOTECHNOLOGY AND BIOENGINEERING (9)	3,952
Scientific Reports (9)	4,122





ENHANCE MICROALGAE

CITATIONS

TITLE OF PUBLICATIONS

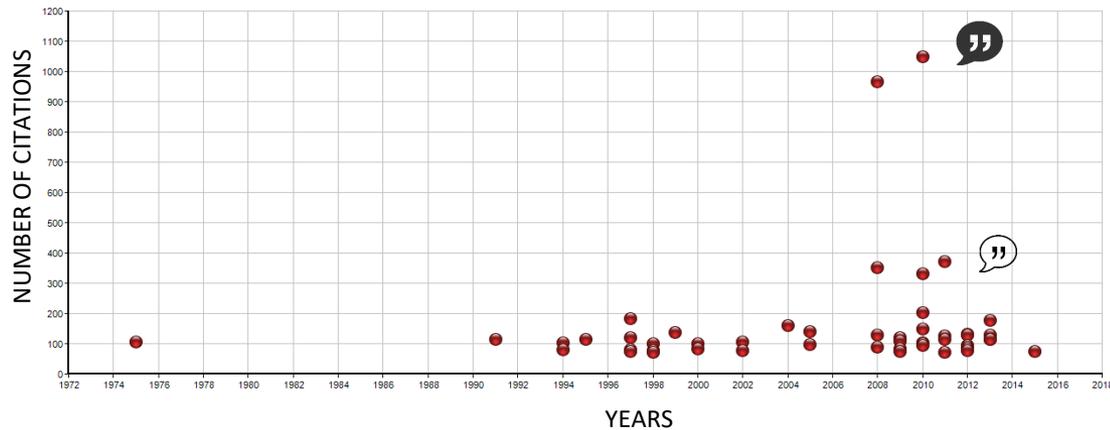
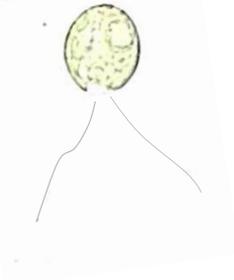
NUMBER OF CITATIONS

An outlook on microalgal biofuels	1049
Toxicity of silver nanoparticles to <i>Chlamydomonas reinhardtii</i>	965
Oil accumulation in the model green alga <i>Chlamydomonas reinhardtii</i> : Characterization, variability between common laboratory strains and relationship with starch reserves	372
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Microalgae as substrates for fermentative biogas production in a combined biorefinery concept	332
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Altered cell wall morphology in nutrient-deficient phytoplankton and its impact on grazers	183
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Transgenic microalgae as green cell-factories	159
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A fully predictive model for one-dimensional light attenuation by <i>Chlamydomonas reinhardtii</i> in a torus photobioreactor	140
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Central carbon metabolism and electron transport in <i>chlamydomonas reinhardtii</i> : Metabolic constraints for carbon partitioning between oil and starch	130
The genome of the polar eukaryotic microalga <i>Coccomyxa subellipsoidea</i> reveals traits of cold adaptation	130



Chlamydomonas sp.

641 publications



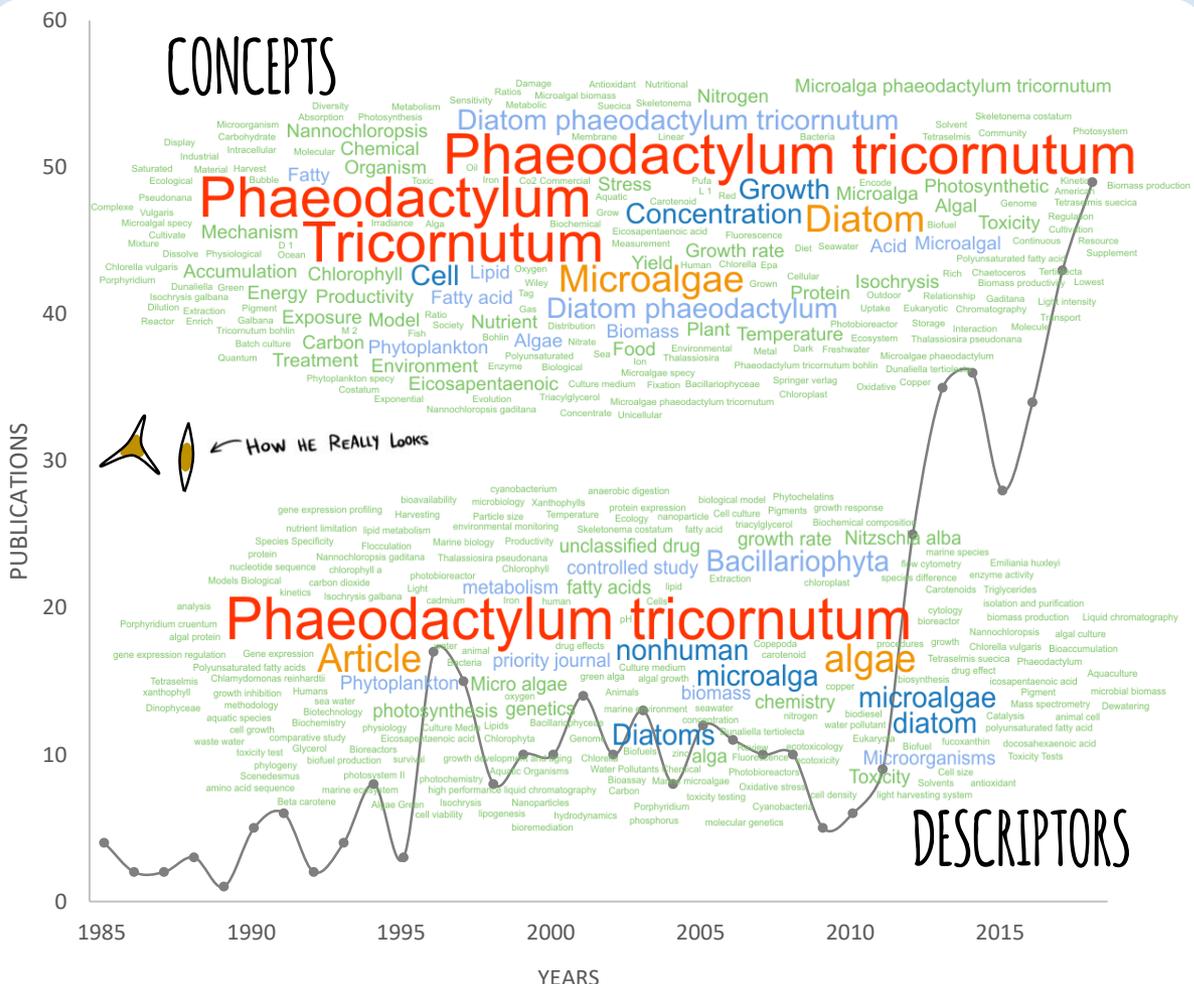
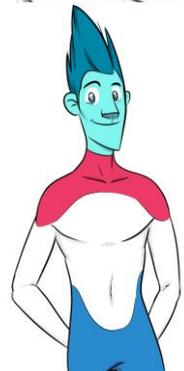


ENHANCE MICROALGAE

TOP 5 IN EUROPE

Phaeodactylum sp.

478 publications



EMERGING CONCEPTS

Edit 2017 - 2019

Genome edit

Ph value

Cas9

Crispr

Crispr cas9

Effector

Mma

Ph 8

Bioactivity

Delivery

Drug

Nannochloropsis oceanica

Native

Overview

Volumetric productivity

Algal strain

Architecture

Auto fluorescence

FEED

cell

Genome editing

Biochemical characterization

cell metabolism

CRISPR Cas system

CRISPR Cas Systems

CRISPR CAS9 system

CRISPR/CAS9

dietary supplement

gene editing

High value compounds

marine alga

2017 - 2019

EMERGING DESCRIPTORS

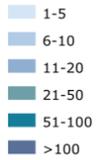
Bibliometric information from Scopus





ENHANCE MICROALGAE

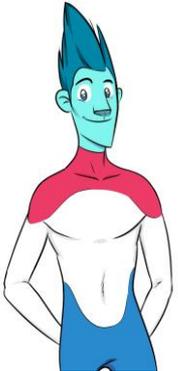
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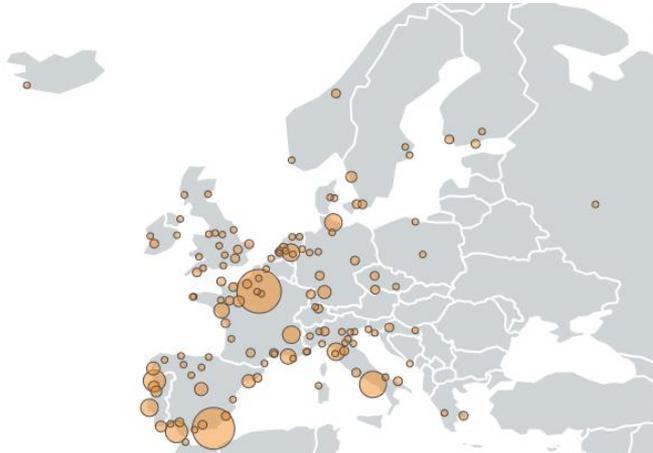
- SPAIN
- FRANCE
- GERMANY
- ITALY
- PORTUGAL
- BELGIUM
- UNITED STATES
- UNITED KINGDOM
- NETHERLANDS
- SWEDEN
- BRAZIL
- AUSTRALIA
- CHINA
- CZECH REPUBLIC
- DENMARK

Phaeodactylum sp.

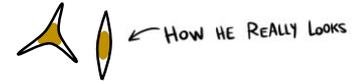
478 publications



CITIES



- Paris
- Almeria
- Naples
- Cadiz
- Porto
- Kiel
- Lisbon
- Pisa
- Pisa
- Grenoble
- Wageningen
- Marseille
- Nantes
- San Diego
- Stuttgart
- Tarragone





ENHANCE MICROALGAE

CITATIONS

TITLE OF PUBLICATIONS

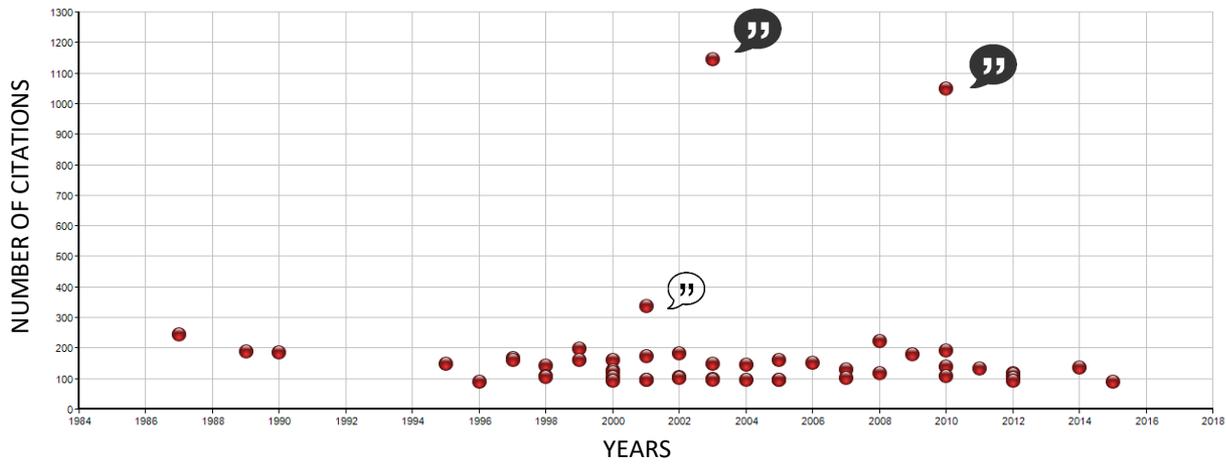
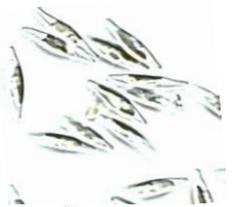
NUMBER OF CITATIONS

Recovery of microalgal biomass and metabolites: Process options and economics	1146
An outlook on microalgal biofuels	1049
Tubular photobioreactor design for algal cultures	336
Feeding and digestion by the mussel <i>Mytilus edulis</i> L. (Bivalvia: Mollusca) in mixtures of silt and algal cells at low concentrations	246
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Flocculation of microalgae using cationic starch	193
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The application of micro-FTIR spectroscopy to analyze nutrient stress-related changes in biomass composition of phytoplankton algae	161



Phaeodactylum sp.

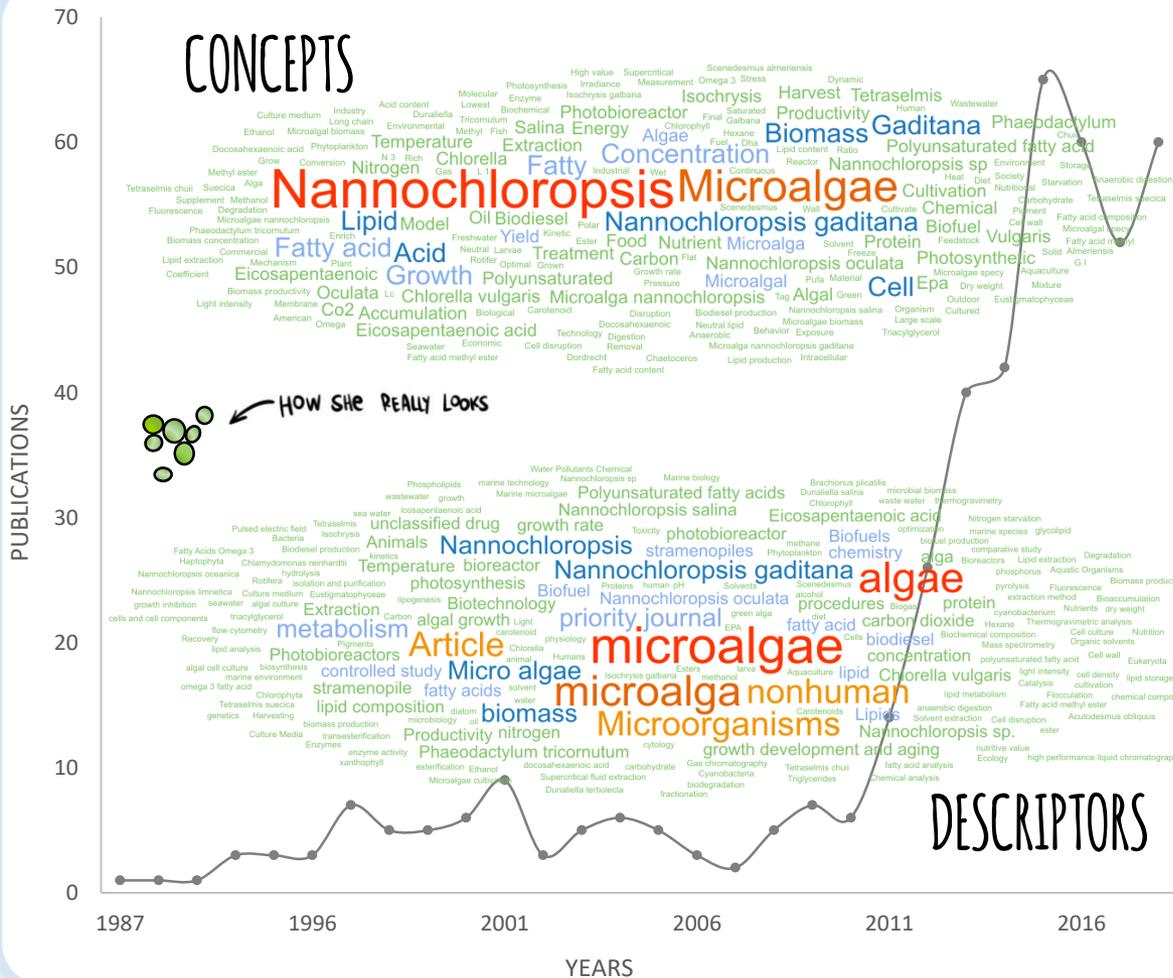
478 publications





ENHANCE MICROALGAE

TOP 5 IN EUROPE
Nannochloropsis sp.
465 publications



EMERGING CONCEPTS

2017 - 2019

- Switzerland
- Basel
- Farm
- John Wiley
- Maintenance
- Son
- Bioavailability
- Coal
- Economy
- Fishery
- Food chain
- Gamma
- Human consumption
- Nan

- FEED
- bioavailability
- drug effect
- environmental exposure
- larval development
- agricultural slurry
- Alternative source
- animal tissue
- Biomass composition
- Biomass specific photon supply...
- cell viability
- digestive system
- ecosystem

2017 - 2019

EMERGING DESCRIPTORS

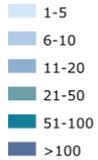
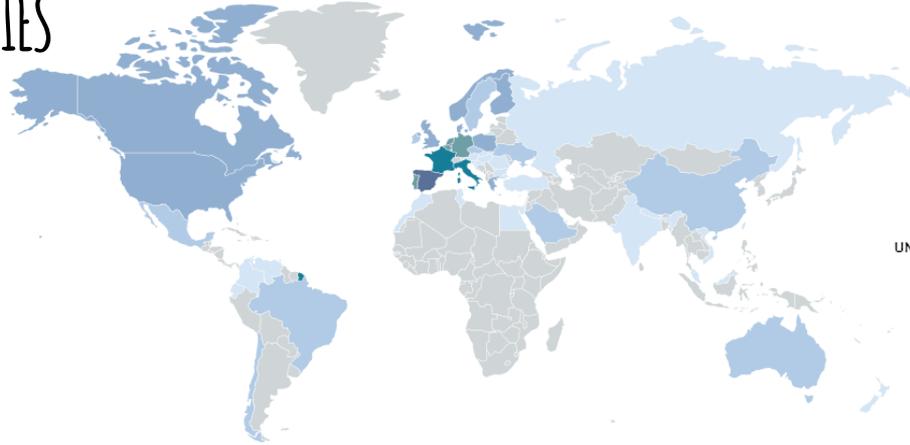
Bibliometric information from Scopus





ENHANCE MICROALGAE

COUNTRIES



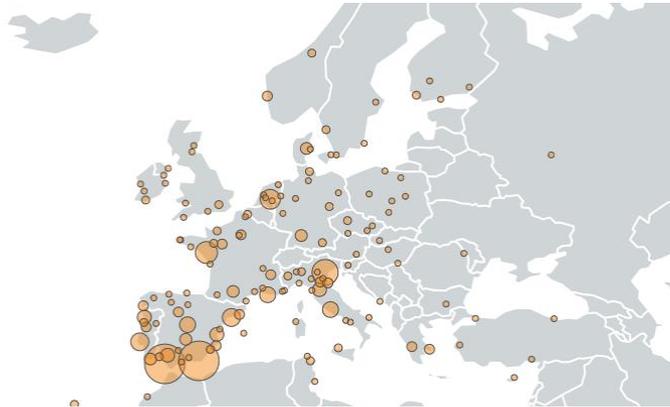
- SPAIN
- ITALY
- FRANCE
- GERMANY
- PORTUGAL
- NETHERLANDS
- BELGIUM
- NORWAY
- UNITED KINGDOM
- UNITED STATES
- CANADA
- GREECE
- DENMARK
- POLAND
- FINLAND

Nannochloropsis sp.

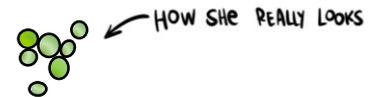
465 publications



CITIES



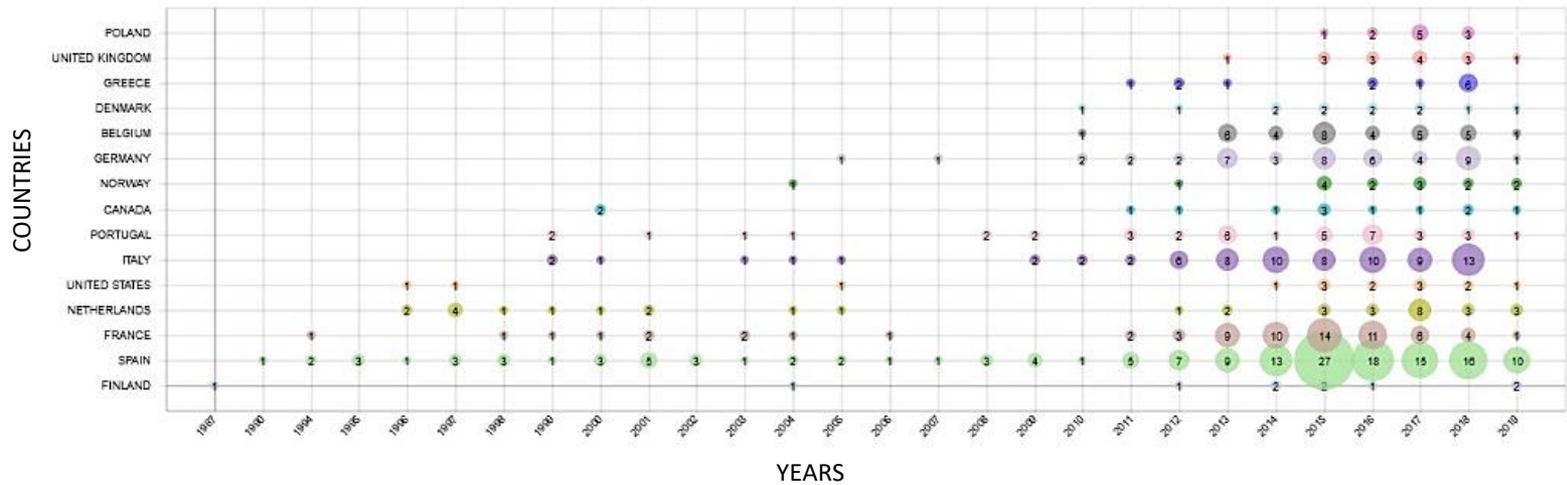
- Cadiz
- Almeria
- Padova
- Nantes
- Wageningen
- Lisbon
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- Rome
- Marseille
- Madrid
- Florence
- Porto
- Seville
- Valencia
- Stuttgart





ENHANCE MICROALGAE

COUNTRIES



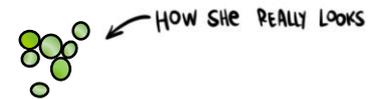
Nannochloropsis sp.

465 publications



SOURCES

JOURNAL (NUMBER OF PUBLICATION)	IMPACT FACTOR
BIORESOURCE TECHNOLOGY (62)	5,807
Algal Research-Biomass Biofuels and Bioproducts (47)	3,745
JOURNAL OF APPLIED PHYCOLOGY (25)	2,401
AQUACULTURE (14)	2,71
Marine Drugs (10)	4,379
FOOD CHEMISTRY (8)	4,946
ORGANIC GEOCHEMISTRY (7)	2,81
Biotechnology for Biofuels (7)	5,497
Chemical Engineering Transactions (7)	-
PLoS One (6)	2,766
PHYTOCHEMISTRY (6)	3,186
HYDROBIOLOGIA (6)	2,165
JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY (6)	3,412
FUEL (5)	4,908
AQUACULTURE RESEARCH (5)	1,475





ENHANCE MICROALGAE

CITATIONS

TITLE OF PUBLICATIONS

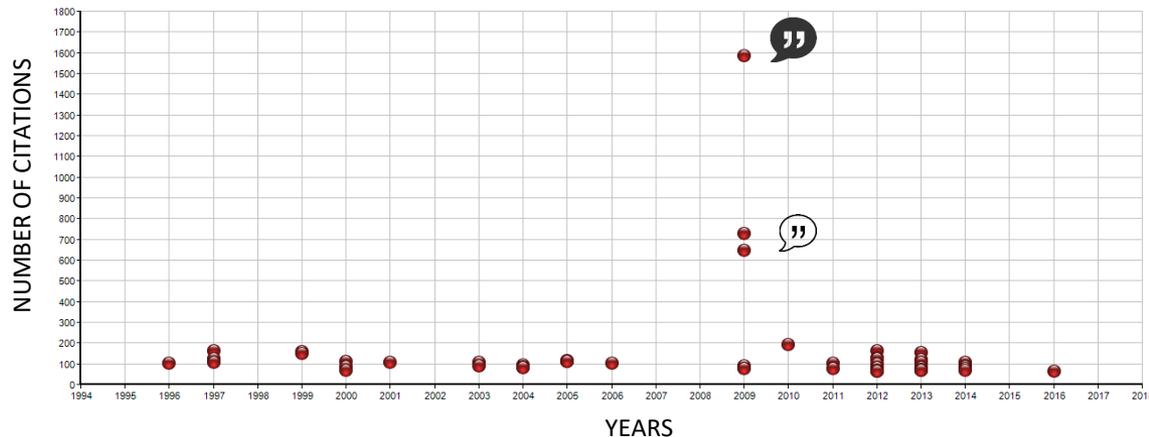
NUMBER OF CITATIONS

Microalgae for oil: Strain selection, induction of lipid synthesis and outdoor mass cultivation in a low-cost photobioreactor	1585
Microalgae as a raw material for biofuels production	727
Effect of temperature and nitrogen concentration on the growth and lipid content of <i>Nannochloropsis oculata</i> and <i>Chlorella vulgaris</i> for biodiesel production	647
Flocculation of microalgae using cationic starch	193
Thermogravimetric-mass spectrometric analysis of lignocellulosic and marine biomass pyrolysis	165
Cellular DNA content of marine phytoplankton using two new fluorochromes: Taxonomic and ecological implications	163
Distribution of aliphatic, nonhydrolyzable biopolymers in marine microalgae	157
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Production of eicosapentaenoic acid by <i>Nannochloropsis</i> sp. cultures in outdoor tubular photobioreactors	149
Oil production by the marine microalgae <i>Nannochloropsis</i> sp. F&M-M24 and <i>Tetraselmis suecica</i> F&M-M33	130
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Solvent-free' ultrasound-assisted extraction of lipids from fresh microalgae cells: A green, clean and scalable process	123
Resistant biomacromolecules in marine microalgae of the classes eustigmatophyceae and chlorophyceae: Geochemical implications	123
Pyrolysis, combustion and gasification characteristics of <i>Nannochloropsis gaditana</i> microalgae	120
Supercritical fluid extraction of carotenoids and chlorophyll a from <i>Nannochloropsis gaditana</i>	116



Nannochloropsis sp.

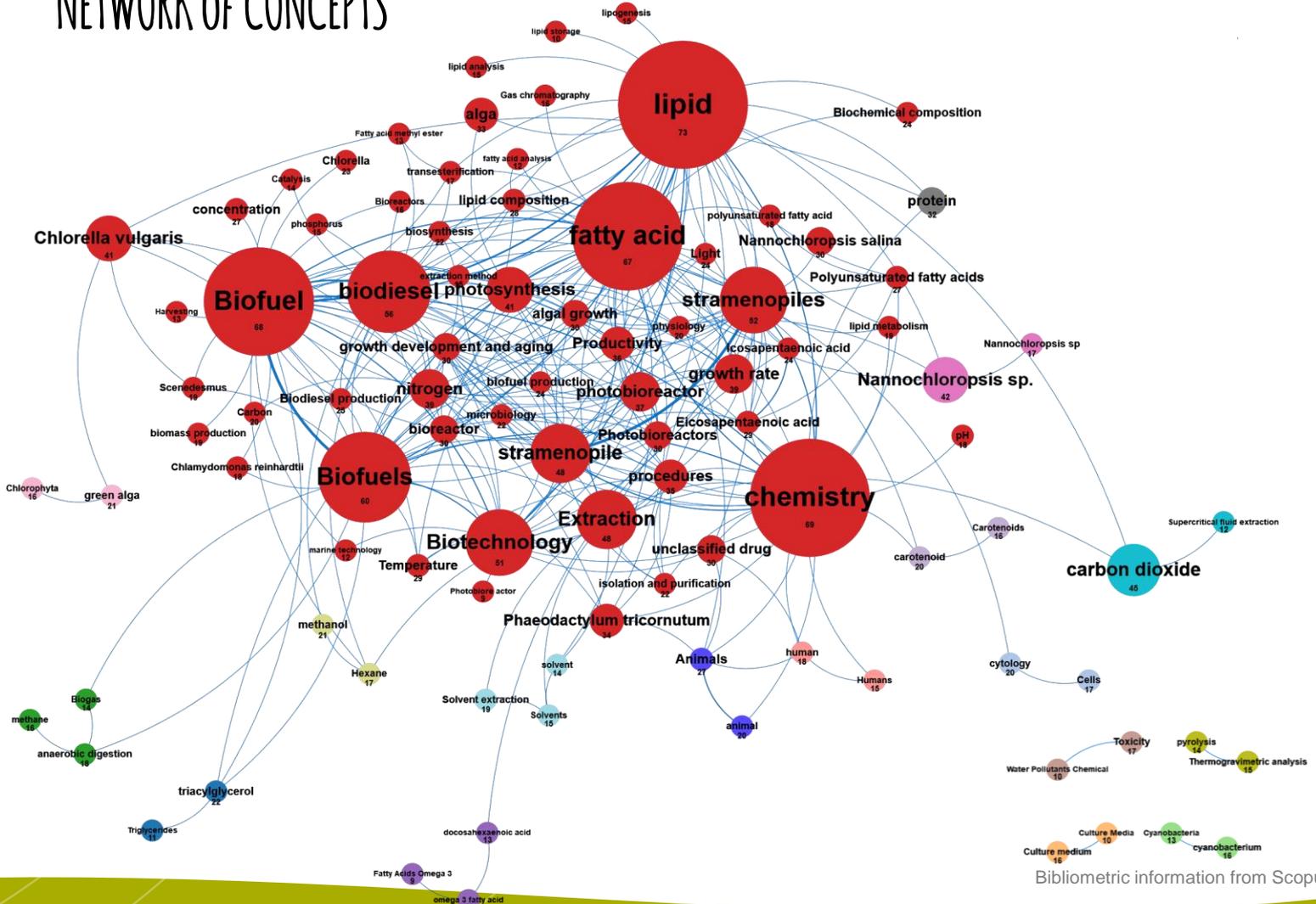
465 publications





ENHANCE MICROALGAE

NETWORK OF CONCEPTS



Nannochloropsis sp.

465 publications

