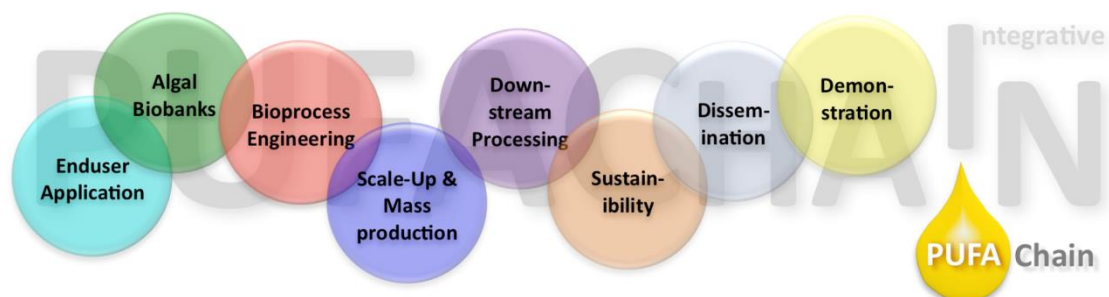


1<sup>st</sup> Issue  
April 2014

# NEWS



## PUFAChain: The Value Chain from Microalgae to PUFA



# The Value Chain from Microalgae to PUFA

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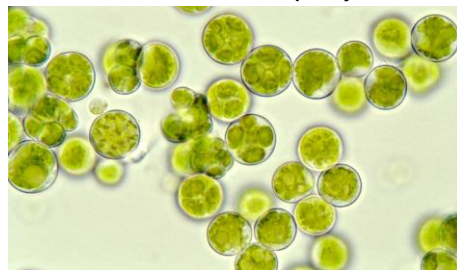
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## Introduction

The overall goal of the project PUFACHain is to develop a robust scientific and technological basis for substantiating strategic and technical decisions for the industrial development of high-value products from algae. This shall contribute to develop this new and sustainable resource for market. The concept of the proposal is strictly oriented to the value chain of microalgae. Starting at the very end of the value chain the proposal picks up a concrete application of high market relevance. The main targeted application is the use of high purified omega 3 fatty acids (DHA/EPA) as building blocks in modern oleo chemistry to gain high value products for nutrition and pharmaceutical applications. These applications will define specifications that propagate backwards along the various value-adding stages of the value chain. These stages include biology, cultivation technology and downstream technology.

So the aim of this project is to realize a concrete exemplary value



chain, develop the technical interfaces between the different value adding stages and investigate the still open research aspects on every single stage while addressing the needs of the value chain as a whole. Finally, an integrated processing, combining all technical steps, will be implemented for demonstration. A comprehensive and holistic sustainability approach will complement the scientific and commercial advances on each value-adding stage.



A consortium with 6 companies and 3 research institutes will integrate state of the art science and technologies in order to assemble a complete process from feedstock production and harvesting to oil extraction and purification. Innovative technologies will be combined taking advantage of a complimentary partnership with the best available expertise in the sector in Europe. These processes will be evaluated for their sustainability and scaled-up from lab to demonstrative prototype level.



# The Value Chain from Microalgae to PUFA

## Consortium

### GEORG-AUGUST-UNIVERSITY GOETTINGEN



GEORG-AUGUST-UNIVERSITÄT  
GÖTTINGEN

The University of Goettingen is known for outstanding quality in several research areas and deeply anchored interdisciplinarity within natural and life sciences. The SAG, Culture Collection of Algae at the University, is among the three largest algal service culture collections in the world and a most comprehensive resource of micro algal cultures. It is supporting research in biotechnology and biodiversity through ex situ conservation of algae and expert knowledge on identifying and isolating. In addition to the characterization of and the provision of the partners with algae strains, the University of Goettingen also holds the role as overall project coordinator. These administrative tasks will be performed by the dedicated EU-Office of the University.

### A4F ALGAFUEL



The Portuguese company A4F AlgaFuel, S.A. is a spin-out from Necton S.A., dedicated to the development and delivering bioengineering projects for the industrial production of microalgae. A4F develops microalgae production units in high-emitting industries for CO<sub>2</sub> mitigation. The prototype unit, already implemented on a cement plant, is the first set of tubular photobioreactor systems, from cell to biomass, on a scale that establishes "proof of concept". A4F proposes an innovative approach through a gradual scale-up, to maximize performance of each process. Within the project PUFACHain, A4F is coordinating two work packages and will be mainly responsible for the bioprocess engineering and the industrial scale.

### MAHLE INNOWA



MAHLE InnoWa GmbH is a specialist in the development and application of membrane technologies in various application fields. Through the production of capillary membranes for micro- and ultrafiltration that are built into module housing with filter areas ranging from 0.1 m<sup>2</sup> to 60 m<sup>2</sup>, a variety of applications can be covered. This comprises e.g. a large selection of hollow fibre membranes with different dimensions and cut-offs, point-of-use and point-of-entry systems for water filtration, systems and modules for the crossflow-filtration of wine and fruit juice, as well as the possibility of customer specific filter system design. In PUFACHain MAHLE is responsible for a new integrated membrane based filtration and the reuse of process water.



# The Value Chain from Microalgae to PUFA

## Consortium

### NATEX PROZESSTECHNOLOGIE



NATEX has gathered experience in supercritical fluid extraction technology for more than 25 years, predominantly in process development, plant design and the operation of CO<sub>2</sub>-extraction plants. Nowadays the company is well established as a specialist in supercritical fluid extraction technology and can offer its clients a "one stop shop" covering process development for new applications of CO<sub>2</sub> processes, scale-up and design of industrial plants as well as manufacturing of main components, erection and start-up. NATEX will lead the work package involving the downstream processing and will investigate algae biomass in its liquid extraction and supercritical fluid technology.

### CREMER OLEO



CREMER OLEO as the oleochemical division of the globally active company CREMER produces raw materials based on vegetable origin like fatty acids, glycerol, and esters up to structured lipids. With a strong commitment to R&D the company provides its customers with state-of-the-art tailor-made oleochemical solutions. The broad product range contains individual solutions for pharmaceutical excipients as well as oleochemical based active pharmaceutical ingredients for enteral and parenteral formulations. Apart from their role as scientific project coordinator, CREMER OLEO will also be heavily involved in the crude oil refinery and product preparation and engage as end-user.

### FRAUNHOFER INSTITUTE FOR BIOMEDICAL ENGINEERING



The Fraunhofer Institute for Biomedical Engineering (IBMT) offers solutions in the areas of biomedical engineering, biotechnology, environmental control systems and material testing, as well as industrial process automation for food, chemical and pharmaceutical industry. Its Extremophile Research & Biobank CCCryo group studies cold-adapted snow and permafrost algae. Aims of the group's applied research are the use of algal strains for production of high quality substances and development of product-optimised photobioreactors for high purity algal mass production and the extraction of high-value metabolites for health and cosmetics. Within the project, the Fraunhofer IBMT acts as provider of well characterized algae strains.



# The Value Chain from Microalgae to PUFA

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## Consortium

### INSTITUTE FOR ENERGY AND ENVIRONMENTAL RESEARCH



Founded in 1978, the ifeu – Institut für Energie- und Umweltforschung Heidelberg – GmbH is an independent non-profit organisation for environmental research and consulting. IFEU has an extensive track record in areas such as waste management and packaging materials, transport & mobility, renewable energies and energy efficiency as well as food and bio-based systems. IFEU is especially renowned for its expertise (>20 years) in the field of life cycle assessment (LCA) and environmental impact assessment (EIA). At European level, IFEU is involved in a number of projects on bio-based products. In the project PUFACHain, IFEU will lead and perform in the work package focusing on the integrated assessment of sustainability.

### STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK



Wageningen University and Research Centre (Wageningen UR) is a collaboration between Wageningen University and the specialised former research institutes (Stichting Dienst Landbouwkundig Onderzoek - DLO) from the Dutch Ministry of Agriculture. This combination of knowledge and experience enables Wageningen UR to contribute actively to solving scientific, social and commercial problems in the field of life sciences and natural resources. DLO embodies strategic and fundamental research as well as applied research in which researchers are operating in close co-operation with farmers, companies and governments. The main tasks for DLO in the project concerns the assessment of the economics and social sustainability.

### EURA CONSULT



EurA Consult has been established in 1999. As an innovation service provider the company advises more than 800 medium-sized companies in Germany, covering all industrial sectors. EurA Consult mainly focuses on consulting and assisting companies in national and European R&D projects. This comprises the entire innovation process, including the generation of promising ideas, the search for suitable partners, the establishment of the project consortium, the technical and administrative coordination of the project as well as the project controlling. Within the project PUFACHain, the company will act as assistance of the project coordinator and will furthermore be responsible for the dissemination activities.





# The Value Chain from Microalgae to PUFA

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## Kick-off Meeting

**Date:** 11<sup>th</sup>/12<sup>th</sup> December 2013

**Location:** Representation of Lower Saxony, Brussels



After the Grant Agreement for the project "PUFACHain: The Value Chain from Microalgae to PUFA" was officially signed at the end of October 2013, it was agreed on holding the kick-off meeting in the representation of Lower Saxony in Brussels, Belgium.

Within this two-day event that had been organised and moderated by the University of Goettingen and EurA Consult, all partners had plenty of time to get to know each other, share their ideas and thoughts, and discuss in detail the project plan, the project management, and the collaboration within the consortium.

In order to give the project a proper start, all partners agreed on having a common dinner on the evening before the actual kick-off meeting. This occasion provided the partners with the opportunity of getting to know each other and already starting vivid discussions about their ideas regarding the best approaches for the project.

The actual kick-off meeting began with a general introduction by the project coordinator Prof. Thomas Friedl from the University of Goettingen. Subsequently, his colleague Dr. Christian Schoepper provided all project partners with an overview over the project, important facts, figures, deadlines, and milestones as well as extensive information regarding the project management, official procedures, and financial issues. This information laid the groundwork for first interesting discussions and also allowed a fluent passage to the more scientific part of the meeting.

Within the next hours, the goals, tasks and planned approaches of each work package was presented and discussed in detailed and, in the end, all emerging questions could be answered.

So after two intense, but very interesting days, everyone returned home satisfied and very motivated to get the project started.

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# The Value Chain from Microalgae to PUFA

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## Project Progress

The project officially started on Friday, 1<sup>st</sup> November 2013. The first six months mainly focused on the installation of proper management and communication structures, the establishment of a biological basis, and the conduction of first tests.

The main tasks and results of the first six months of the project shall be outlined subsequently:

- **Project Management:**

The consortium agreement was signed shortly after the project start on 6<sup>th</sup> November 2013. The kick-off meeting was held on 11<sup>th</sup>/12<sup>th</sup> December 2013 in Brussels (see *Kick-off Meeting*). A detailed management plan was created to provide the partners with all contact details, general project information, and guidelines for the collaboration in order to establish an appropriate basis.

- **Research and Development:**

In the scientific field, the partners started by establishing preliminary specifications of the preferred crude algae oil based on the previously identified target products.

Simultaneously, a variety of potential algae strains has been tested in order to determine their ideal growth rate and PUFA yield. So far, tests have been performed on almost 100 algae strains.

Apart from the testing of the algae strains, it was also very important to define the conditions most suitable for shipping the tested samples to the project partners and to store them safely. After these conditions were de-

finied, first algae samples could be sent to the project partners for further testing.



Additionally to the biological basis, the development and modification of the technical equipment (e.g. membrane systems, extraction units) is also in progress and first test results might be available in the next six months.

Finally, a basic procedure for the sustainability assessment has been developed.

- **Dissemination Activities:**

As far as the dissemination of project results is concerned, first activities could already be conducted successfully.

The project website has been launched in January 2014 and is available via [www.pufachain.eu](http://www.pufachain.eu).

The project has furthermore been presented at the *2nd European Workshop on LCA* in Brussels and first short papers have been submitted for the magazine *Biobased Future* and the *Göttingen International Newsletter*. Furthermore, it is planned to submit a poster for the *7<sup>th</sup> Bundesalgenstammtisch* in Germany.



# The Value Chain from Microalgae to PUFA

## Event Watch

### 22<sup>nd</sup> European Biomass Conference and Exhibition

**Date:** 23<sup>th</sup> - 26<sup>th</sup> June 2014 **Location:** Hamburg, Germany



The **European Biomass Conference and Exhibition** (EU BC&E) is one of the world's leading events in the Biomass sector. This four-day event combines a high-class conference with lots of esteemed international speakers and an exhibition presenting the newest developments in the industrial sector.

For this year's conference, more than 850 presentations in visual, oral, or plenary form have been selected and will be presented in the course of the four-day event. These presentations will cover the entire biomass supply chain. Amongst others, the focus of the 22<sup>nd</sup> EU BC&E will lie on biomass conversion technologies for intermediates, liquid and gaseous fuels, chemicals and materials.



©EU BC&E 2013

The exhibition takes place simultaneously to the conference and gives visitors and exhibitors the possibility to connect with more than 2,000 industrial and scientific experts.



The parallel event to the 22<sup>nd</sup> EU BC&E will be the **Algae Event 2014**. It will take place on 25<sup>th</sup> June 2014 and focus entirely on the use of macro- and microalgae as sources of biomass for various industrial purposes. This event will be subdivided into four sessions, covering the areas Cultivation, Conversion methods and biorefineries, Products and applications, and Sustainability and economics. These sessions will be accompanied by a variety of oral and visual presentations and will provide an excellent opportunity for intense discussions regarding the integration of algae into the current biomass industry as well the possibilities algae might provide for the future.

For further information please visit [www.conference-biomass.com](http://www.conference-biomass.com) and [www.algae-event.com](http://www.algae-event.com)



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