

ALGAL BIOTECHNOLOGY TECHNIQUES AND OPPORTUNITIES FOR THE SUSTAINABLE BIOECONOMY

The aim of this professional development course is to provide introductory hands-on training and theory in algal biology, culturing and growth, tailored production of algal ingredients, analysis and subsequent downstream processing under laboratory and small scale pilot facilities. The workshop will run for two days at the Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB in Stuttgart, Germany.

The format includes a daily programme of lecture/seminars introducing the theory of techniques, SOPs best practice (mornings), followed by a demonstration of equipment and hands-on session in the afternoon. The programme will provide an unrivalled opportunity for decision-makers from industry and other business representatives as well as researchers to be trained in algal biotechnology research and to understand its potential within the framework of a sustainable food bioeconomy.

LOCATION: Fraunhofer IGB, Nobelstrasse 12, 70569 Stuttgart

DAY 1: Tuesday 12th of November 2019

MORNING THEORY

- 08:45 – 09:15** Arrival and registration of participants
- 09:15 – 09:30** Welcome and introduction of Fraunhofer IGB (Dr. Markus Wolperdinger, Head of Fraunhofer IGB)
- 09:30 – 10:00** What are algae? Introduction to algal biology and diversity (Dr. Katrin Geisler, University of Cambridge)
- 10:00 – 10:30** Algal ingredients and tailored production thereof in photobioreactors (Dr. Ulrike Schmid-Staiger, Fraunhofer IGB)
- 10:30 – 11:00** Coffee break
- 11:00 – 11:30** Industrial algae photobioreactors (Dr. Peter Bergmann, Subitec GmbH)
- 11:30 – 12:00** Modelling of microalgae cultivation: indoor and outdoor conditions, important parameters, strict models vs. data-driven models, from modeling to control (M. Sc. Yen-Cheng Yeh, Fraunhofer IGB)
- 12:00 – 12:30** Fire & Ice – Algal-based industries and opportunities in Iceland (Dr. René Groben, Matís, Iceland)
- 12:30 – 13:00** General Discussion
- 13:00 – 14:00** Lunch

AFTERNOON PRACTICAL (SMALL GROUP ROTATION)

- 14:00 – 14:15** Introduction
- 14:15 – 16:45** Afternoon practical sessions
 - Session 1: Scale-up of algal production, CBP pilot plant tour** (Dipl.-Ing. Gordon Brinitzer, Fraunhofer CBP)
 - Session 2: Best practice lab reactors: cultivation conditions, important parameters, sterilisation and inoculation, control and feeding system, sampling and OD/DW determination** (Konstantin Frick M. Sc., Fraunhofer IGB)
- 17:00** End
- 17:30** Bus transfer to restaurant
- 18:00 – 21:00** DINNER AND NETWORKING – Restaurant AMADEUS in Stuttgart (individual return to hotels)

DAY 2: Wednesday 13th of November 2019

MORNING THEORY (9am start)

Introduction to algal downstream processes for recovery of algal ingredients, legal framework and risk assessment for algal ingredients.

09:00 – 09:30 **EFSA's role in novel foods with a focus on algae-based products (online presentation)**
(Dr. Wolfgang Gelbmann, EFSA)

09:30 – 10:00 **Up- and down-stream processing of microalgae at Fraunhofer IGB** (Felix Derwenskus M. Eng., Fraunhofer IGB)

10:00 – 10:30 Coffee break

10:30– 11:00 **Novel cell disruption and extraction techniques for ingredients recovery**
(Dr. Ana Lucia Vásquez-Caicedo, Fraunhofer IGB)

11:00 – 11:30 **Algae in human nutrition** (Prof. Stephan Bischoff, University of Hohenheim)

11:30 – 12:00 **General Discussion**

12:00 - 13:30 Lunch + photo shooting

AFTERNOON PRACTICAL (SMALL GROUP ROTATION)

13:30 – 13:45 Introduction

13:45 – 16:30 Afternoon practical sessions

Session 1: Visit IGB pilot PCT plants (Dr. Ana Lucia Vásquez-Caicedo, Fraunhofer IGB, and other lab members)

Session 2: Biomass drying with superheated steam (Dr.-Ing. Antoine Dalibard, Fraunhofer IGB)

Session 3: Characterization/analysis of extracts (fatty acids, proteins, carotenoids, antioxidative activity etc.)
(Felix Derwenskus M. Eng., Fraunhofer IGB, and others)

16:30 – 17:00 Course close and feedback on algal course

* Changes in the program reserved.