PhD fellowship within fermentation with the main focus on developing multi-organism system

About the position

The Faculty of Science and Technology at the Norwegian University of Life Sciences (NMBU) has a vacant 3-year PhD position related to the development of multi-organism system (fungi-fungi and/or fungi-algae) for the bioconversion of mixed substrates with zero-waste and zero-carbon footprint.

The PhD position is funded by the internal NMBU funding. PhD project aims at utilizing the unique potential of the versatile metabolism of oleaginous fungi and algae to develop a multi-organism system for the bioconversion of mixed substrates with zero-waste and zero-carbon footprint.

A multi-organism system is complex and consist of multiple organisms which need to be well integrated in a co-cultivation process, where they do not compete for the substrate and utilize wastes/products of each other and convert them into biomass and bioproducts. In order to find the best fungal, yeast and algal cell factories developing long-term interactions in the form of multi-organism system, there is a need to perform an extensive screening study where a large number of single fungi, yeast and algae are screened in co-culture conditions.

Currently, there is very limited research done on developing multi-organism systems. Such studies are challenging, since all products and substrates need to be monitored during the bioconversion processes. Powerful monitoring tools for at-line and on-line monitoring of multi-organisms and their metabolites do not exist due to the complexity of the fermentation biomass and substrates.

For the establishment of a multi-organism fermentation concept it is important to be able to monitor and control the consumption of substrates and the production of metabolites such as lipids, chitin/chitosan and polyphosphates. The parallel use of spectroscopic monitoring probes and data fusion tools for calibration needs to be developed for robust estimation of fermentation products and substrate consumption. Chemical analyses cannot achieve such a complex analysis where both a spatial resolution is needed on the microscopic and nano-level and multiple chemical compounds need to be monitored.

The PhD project will focus on: (1) Performing screening of co-cultivation of single organisms (fungi, algae and yeast) to find 2 or 3 the best multi-organism systems. For the screening high-throughput FTIR and Raman spectroscopy will be applied. (2) Make use of data science methods for establishment of calibration models for estimation of multiple metabolites products and substrates consumption for the multi-organism system. (3) The knowledge and technology developed in points 1 and 2 will be the basis for the upscaling a multiple-organisms cultivation process with zero waste and zero-carbon footprint;

Project and supervisor group

Assoc. Prof. Volha Shapaval and Prof. Achim Kohler, at the Faculty of Science and Technology, Norwegian University of Life Sciences, Ås, Norway.

Qualification requirements, desired experiences, knowledge and personal qualities

The successful applicant must meet the conditions defined for admission to a PhD programme at NMBU. The applicant must have an academically relevant education corresponding to a five-year Norwegian degree programme, where 120 credits are at master's degree level. The applicant must have a documented strong academic background from previous studies and document proficiency in both written and oral English. For more detailed information on the admission criteria please see the PhD Regulations and the relevant PhD programme description.

The applicant must document expertise and interest in the research subject.

Required Academic qualifications

- Master in Biotechnology / Microbiology / Biochemistry / Chemistry / Chemical Engineering
- Fluent English both written and oral

The following experiences and skills will be emphasized:

- Experience in working with algae, yeast, filamentous fungi
- Experience in working with bioreactors, being independent in performing fungal fermentations
- Experience with lipid extraction and lipid analysis by GC-FID
- Experience with infrared spectroscopy or infrared imaging
- Some knowledge in multivariate data analysis

The candidate has to be able to work both independently and in a multidisciplinary research team and needs to describe these skills in the application.

Remuneration and further information

The position is placed in government pay scale position code 1017 PhD. Fellow. PhD. Fellows are normally placed in pay grade 54 (NOK 479.600) on the Norwegian Government salary scale upon employment and follow ordinary meriting regulations.

Terms of employment are governed by Norwegian guidelines for PhD fellowships at Universities and University Colleges.
Information for PhD applicants and general Information to applicants

Application

To apply online for this vacancy, please click on the 'Apply for this job' button above. This will route you to the University's Web Recruitment System, where you will need to register an account (if you have not already) and log in before completing the online application form.

Application deadline: 07.09.2020

Applications should include (electronically) a letter of intent, curriculum vitae, full publication list, copies of degree certificates and transcripts of academic records (all certified), and a list of two persons who may act as references (with phone numbers and e-mail addresses).

Publications should be included electronically within the application deadline. The relevant NMBU Department may require further documentation, e.g. proof of English proficiency.

Printed material which cannot be sent electronically should be sent by surface mail to the Norwegian University of Life Sciences, Faculty of Science and Technology, P.O. Box 5003, NO-1432 Ås, within 07.09.2020. Please quote reference number 20/02724.

If it is difficult to judge the applicant’s contribution for publications with multiple authors, a short description of the applicant’s contribution must be included.

The Norwegian University of Life Sciences (NMBU)

NMBU has a special responsibility for research and education that ensures the basis of life for future generations.

Sustainability is rooted in everything we do and we provide knowledge for life.

NMBU has 1700 employees and 5200 students and is organized in seven faculties. NMBU has a campus in Ås and in Oslo. In 2021 we are co-located on Ås. Further information on NMBU is available at www.nmbu.no

Jobbnorge-ID: 191028, Søknadsfrist: 7. september 2020