NTNU

Faculty of Natural Sciences and Technology
Department of Biotechnology

Date 04.05-2011 | Our reference ostgaard
Your letter dated | Your reference

Research Topic / Declaration of Intent:

SEAWEED BIOREFINERY SYSTEMS

According to Wikipedia, a biorefinery is a facility that integrates biomass conversion processes and equipment to produce fuels, power, heat, and value-added chemicals from biomass. The IEA Bioenergy Task 42 on Biorefineries has defined Biorefining as the sustainable processing of biomass into a spectrum of bio-based products (food, feed, chemicals, materials) and bioenergy (biofuels, power and/or heat) .

Seaweeds and their utilization constitute an essential part of this Department's cultural heritage, as a direct descendant of the former Norwegian Institute of Seaweed Research (NITT) founded in 1949. Straight from the beginning, a fruitful mixture of biologists and chemists managed to combine resource mapping with research on seaweed composition and use. Thus, this insitute rapidly became an international actor of significance in seaweed research in general as well as alginate polymer chemistry in particular.

Accordingly changing the name to the Department of Marine Biochemistry, alginate research developed into studies of marine polysaccharides in general, including red algal galactans as well as microbial glucans, forming the historical basis for our still strong groups on marine biochemistry and on general biopolymer research, see separate web sites.

Entering the era of Department of Biotechnology in 1985, we participated in the foundation of seaweed biotechnology as a field of science, including the development of protoplast isolation from brown algae in cooperation with Station Biologique de Roscoff. Ruth Solveig Hagen Rødde finished her PhD: "Chemical composition and alginate biosynthesis in protoplasts from *Laminaria digitata* and *Laminaria saccharina*" in 1997.

Seaweed biomass degradation and fermentation research led to successful studies of fertilizer applications of fermentate. Biogas production was an important part of the PhDs of Einar Moen: "Biological degradation of seaweeds" 1997 and Svein Jarle Horn: "Bioenergy from brown seaweeds" 2000. In the latter case, also fermentation to ethanol was developed, in cooperation with Sintef Biotechnology. Since then, a multitude of projects and Master students has successfully continued this work.

Based on this experience, it is our firm belief that the biorefinery approach is the key factor to sustainable seaweed utilization for the future. A balanced and diversified production of biochemicals, bioethanol, biogas and fertilizers may create a healthy and profitable basis for future coastal development. Recent development in downscaled cryotechnology will facilitate marketing biogas as LBG for the transport sector. Such entreprises could be based not only on harvesting wild stock, but also on large scale cultivation once efficient seeding and cultivation methods become available.

It is our intention to participate in this development.

Kjetill Østgaard Olav Vadstein Kurt I. Draget Kjell Morten Vårum

Address
Sem Sælands vei 6/8
NO-7491 Trondheim

Org.no. 974 767 880
E-mail:
postmottak@biotech.ntnu.no
http://www.biotech.ntnu.no

Location
Kjemiblokk III/IV
Sem Sælands vei 6/8
NO-7034 Trondheim

Phone
+ 47 73 59 33 20
Fax
+ 47 73 59 12 83

Professor
Kjetill Østgaard
ostgaard@biotech.ntnu.no
Phone: + 47 73 59 40 68