Austevoll Seaweed Farm: Gourmet food from cultivated seaweed

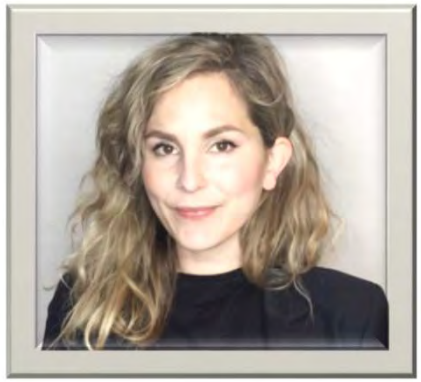
Silje Forbord

SIG Seaweed Trondheim 4.4.17

Photo: Austevoll Seaweed Farm/Marius Løbø Fimland

Who is Austevoll Seaweed Farm?

AUSTEVOLL SEAWEED FARM EST.2013



- Company established in 2013
- Located south of Bergen in the islands of Austevoll
- Cooperation with Ørjan Johannesen, chef and winner of Bocuse d'Or 2015
- Established Hardangerfjord Seaweed Farm in 2016

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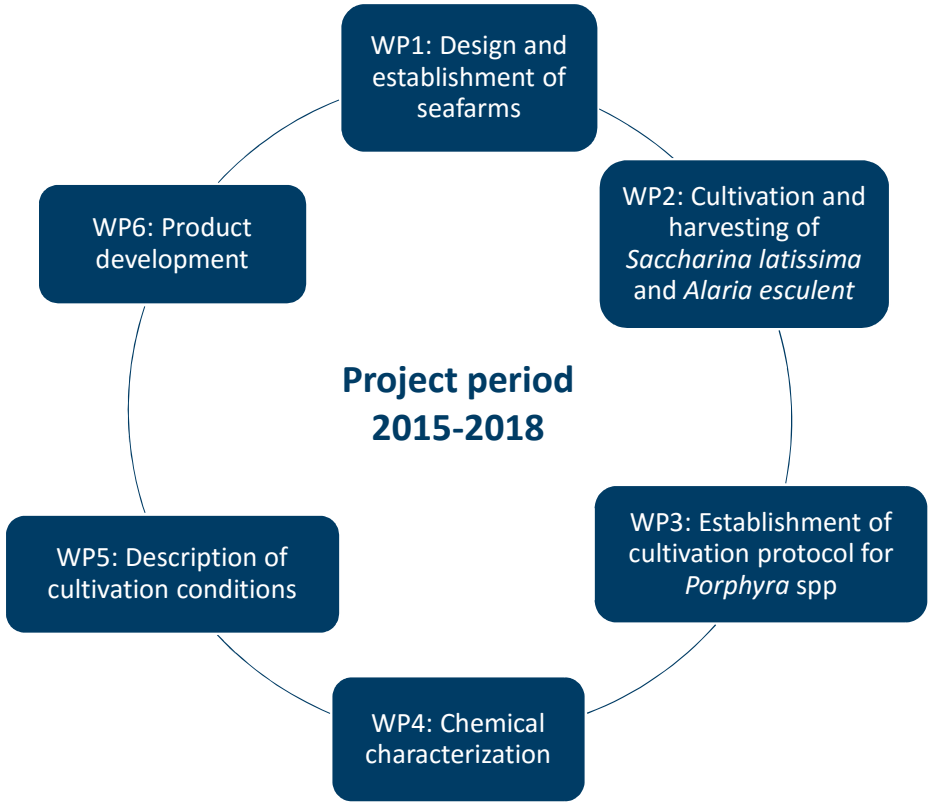
NYMAT- Cultivation and processing of high quality macroalgae for new food products

Participants:

- Austevoll Seaweed Farm (project owner)
- SINTEF Ocean (project leader)
- NTNU Departement of Biology
- Ørjan Johannesen



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AUSTEVOLL SEAWEED FARM EST.2013

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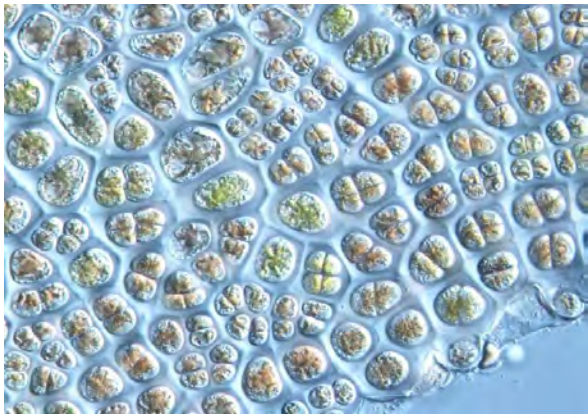
WILDEMANIA AMPLISSIMA (syn. *PORPHYRA AMPLISSIMA)*

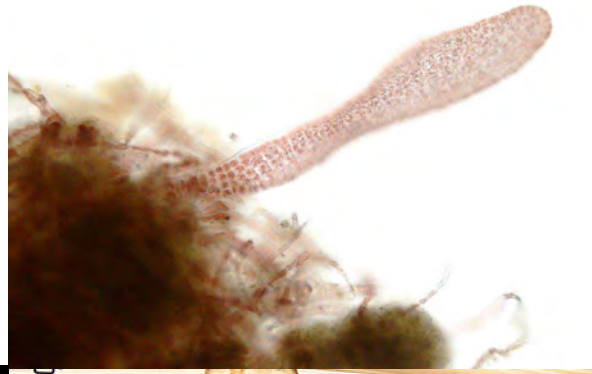
- Red cellophane, laver, nori
- One of the most valuable cultivated marine crops
  - 1.8 mill ton produced in 2014
  - Value of US$1 billion
  - Good nutritional value for human consumption
- Challenging to cultivate due to the complicated life cycle and slow growth in the hatchery

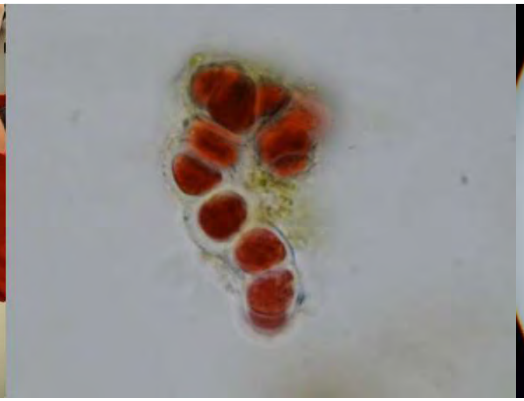
Photo: A.Q. Lavik/SINTEF

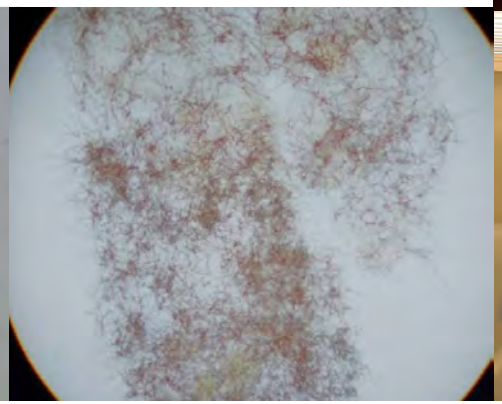
Cultivation experiments

- Establishment of a cultivation protocol started in 2015
- Need to run a DNA-analysis to identify the species
- Small scale trials were successfully accomplished in 2016
  - Spore release, growth substrate, decontamination, light intensity, quantification
- Completed the life cycle!
  - From wild collected gametophytes => through the conchochelis sporophyte stage => to growing gametophytes in the laboratory









SACCHARINA LATISSIMA

Photo: J. Fossberg/SINTEF

ALARIA ESCULENTA

Photo: SINTEF

Cultivation and deployment

- Seedlings cultivated at SINTEF Sealab from sporophytes collected at Austevoll
- Transport seedlings back to Austevoll and deploy at two different locations
- Different deployment times tested; from September to March
- October points out to be the best deployment time
  - Head start before the dark period
  - Nutrient rich water
  - Possible to harvest over a longer period

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Harvesting

- October deployment; can start to harvest in March until late April/beginning of May
  - Avoid fouling
  - Best texture and size for product development
  - Longer period to harvest and process the biomass
- January/February deployment; can harvest from late April
  - Shorter time to harvest before the fouling starts
- A combination of different deployment times
  - Optimise the hatchery capacity
  - Different quality of the biomass for different use

Photo: Austevoll Seaweed Farm/Marius Løbø Fimland

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Photo: Austevoll Seaweed Farm/Marius Løbø Fimland


Photo: Austevoll Seaweed Farm

Processing and storing

- Fresh seaweed
  - Good taste and texture
  - Shelf life is very limited
- Drying
  - Easy to store => less space demanding than frozen biomass
  - Keeps and enhance the flavour
  - Expensive and energy demanding process
- Freezing
  - Easy on big volumes
  - Can reduce the quality and alter the texture after defrosting

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Photo: Austevoll Seaweed Farm/Marius Løbø Fimland

Chemical content

- *S. latissima* harvested in April 2016 were analysed for:
  - Macronutrient (Carbohydrates, Proteins, AA, Lipids, Ash)
  - Micronutrients (Na, K, Ca, Mg, Se, P)
  - Heavy metals (Cd, Ni, Pb, Hg, Cr, Zn)
  - Vitamins (A+E, B6, B12, C)
  - Iodine, Arsenic
  - Microbiology (E.coli, Salmonella, Aerobic microorganisms)
- High values of iodine
- High values of Vitamin B12
- Low values of heavy metals and arsenic
- Promising values of flavonoids
  - Polyphenolic compounds, anti-oxidant

Photo: Austevoll Seaweed Farm/Marius Løbø Fimland

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Products and Marked

- Several products are under development and a product line is being launched soon
  - Products are delivered fresh, frozen and dried
- Restaurant segment
  - Gourmet food
- Export
- Health foods
- Cosmetics
  - Mia has 11 years experience as a makeup artist and is studying Cosmetic Science
  - Testing different ways to use and process seaweed in cosmetics
  - The goal is to launch own products and ingredients to the cosmetic industry

Photo: Austevoll Seaweed Farm/Marius Løbø Fimland

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Further work

- Chemical analysis
  - One more year with *S. latissima* to compare with 2016 data => more reliable
  - One year with *A. esculenta*
- Marked survey
- Product development
  - Food and cosmetics
- Commercialisation of products

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Thank you for the attention!

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