Enhancing and controlling the quality of cultivated seaweeds for large-scale production and a sustainable supply chain to food and feed markets

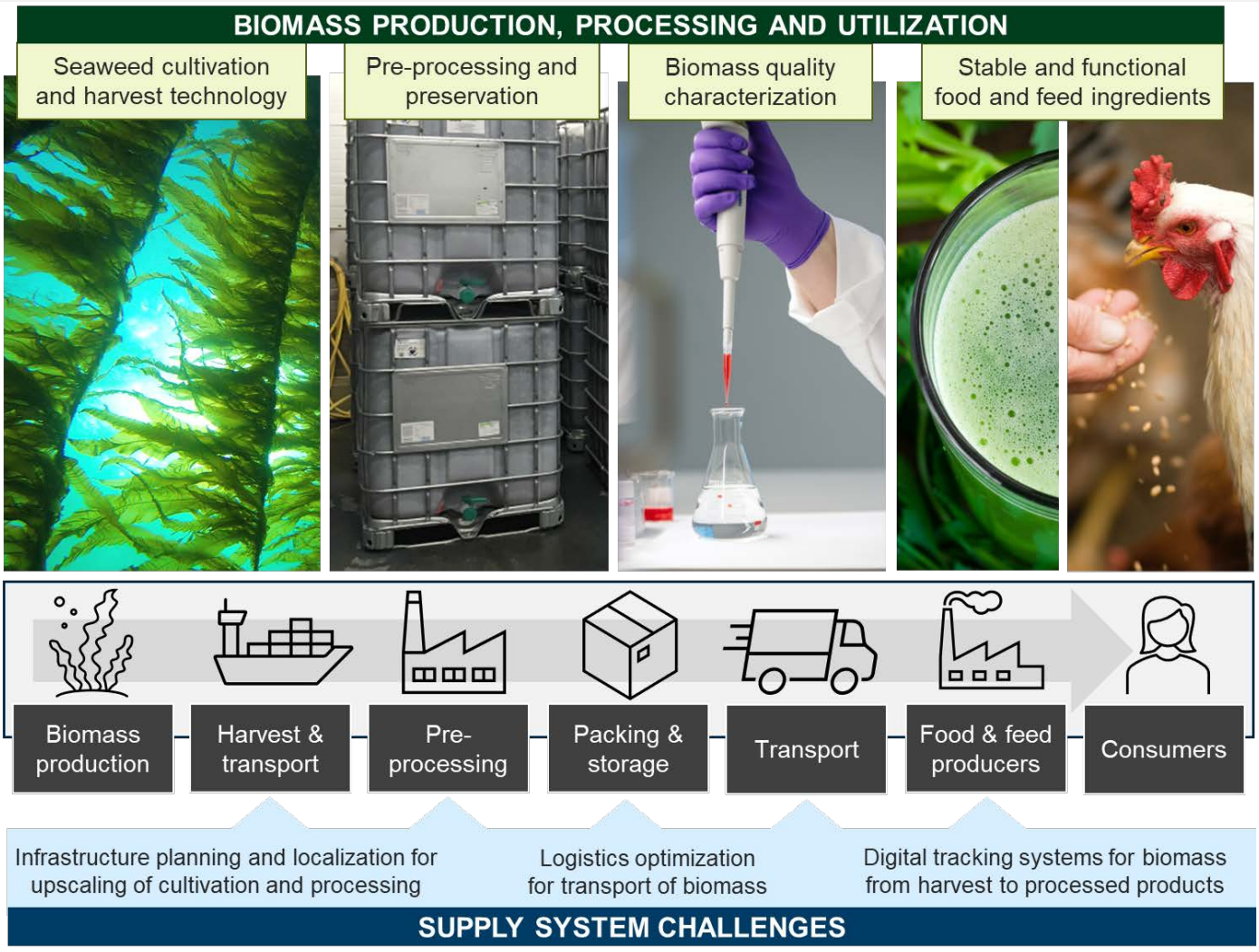
Newsletter 1
Facts about the project

The primary objective of QualiSea is to develop methods that ensure a stable and predictable quality, and to optimise the supply chain, for large-scale production of cultivated seaweed. This will be achieved by the sub-goals:

- Identification of factors that affect the stability and quality of fresh biomass and to assess methods for quality control
- Development of tracking systems for optimisation of the logistics, from harvest to processing
- Development of cost-efficient preservation methods with acids or fermentation optimised for food and feed, respectively
- Assessing the preserved biomass as food and feed ingredients using frozen biomass as reference
- Establishing digital platforms for logistic optimisation based on data from the project and existing aquaculture industries
- Development of a supply chain management model, based on models for biorefineries handling land-based biomass

Overview

►Funding: ERA-BlueBio, €1.25 M ►Duration: 2021-2024 ►Coordinator: SINTEF Industry (NO)



Consortium expertise and roles in project

SINTEF Industry is represented by the Department of Biotechnology and Nanomedicine (BTN), with Senior Scientist **Inga Marie Aasen** as project manager and research manager **Øystein Arlov**. Of relevance for QualiSea, SINTEF BTN holds specific competence on bioprocess engineering, biomass processing, microbiology, and microbial biotechnology. Utilization of marine biomasses, particularly macroalgae, is a core expertise at SINTEF, covering the value chain from harvest to industrial product development. The department currently has several ongoing national and international projects on applications of seaweed for food, feed and new materials. SINTEF is coordinating the QualiSea project and is responsible for the development of acid preservation methods and studies of the biomass stability, quality changes during storage, and the impact of the preservation method. **Contact:** inga.m.aasen@sintef.no

Seaweed Solutions (SES) cultivates sugar kelp (*Saccharina latissima*) and winged kelp (*Alaria esculenta*) outside Frøya in Norway, and is one of the largest seaweed cultivators in Europe. They currently focus on B2B delivery of high-quality seaweed to the food and feed industry, while at the same time working on establishing new products and applications, including bio-based packaging made from cultivated seaweed. SES is in the QualiSea project represented by Processing and quality Manager **Maren Sæther**. SES is mainly responsible for cultivation, harvest and processing of the seaweed biomass. The focus is on studying the effects of storage conditions on the food and feed quality of the biomass, evaluate on-site sensor and tracking technology in daily operations, and perform pre-treatment experiments. **Contact:** sather@seaweedsolutions.com

Nutrition Sciences is a Belgian private company and is well known for its R&D activities in animal production and spends much attention to the introduction of new feed ingredients, concepts, services and technologies in animal livestock production for its customers. The company's focus today is developing concepts and services for reduction of dependency for antibiotics in livestock production. Nutrition Sciences is represented by Head of R&D **Dr. Geert Bruggeman**, who has a profound experience in animal health and sustainable livestock production. In the QualiSea project, Nutrition Sciences will evaluate the nutritional as well as functional potential of algae and their derivatives in animal feed formulations. Their potential to reduce the dependency of antimicrobials for maintaining livestock health will be screened. **Contact:** g.bruggeman@agrifirm.com

VITO is represented by the department of Separation and Conversion Technology (SCT) and by project leader **Winnie Dejonghe** and researcher **Pieter Jan Kerstens**. SCT is strongly active in bioprocess development, optimization and intensification. Its PROBIO team has experience in design and operation of biocatalytic processes, including fermentative and enzymatic processes. VITO's **PROBIO team** will investigate the biological ensilage of the brown algae as a preservation technique. The effect of different microbial inocula on the ensilage of the algae but also the production of compounds that are beneficial to the health of animals will be studied, along with taste. VITO's **MooV team** will investigate the optimal supply chain configuration for the current situation as well as for potential future pathways while taking into account all relevant constraints related to e.g., quality control, processing steps and timing. **Contacts:** Winnie.dejonghe@vito.be , pieterjan.kerstens@vito.be

Anteo is a leading software supplier for the aquaculture and other maritime industries, represented with Sverre Marvik (CEO) and Peder Refsnes (CTO). Anteo focuses on decision making systems that contribute to efficient and accurate communication and reduced environmental footprint. The company develops realtime solutions to track maritime vessels and monitor and alert breach of biosecurity principles, logistical tools for transportation of biomass, sensor technology for aquaculture farms, and data collection and storage systems. In QualiSea, Anteo will develop and implement new digital solutions for logistics planning and biomass tracking to support the present as well as the future upscaled seaweed cultivation industry. This includes deployment of sensors for tracking of environmental conditions during harvesting and the biomass transport conditions, as well as logistics planning tools. **Contact:** sverre@anteo.no

Tallinn University (TLU) is represented by Prof. Rando Tuvikene, whose group is focused on valorisation of marine biomasses and structure-property relations of hydrocolloids. TLU holds expertise in chemical analysis, fractionation, purification and characterization of algal polysaccharides. In QualiSea, TLU is conducting studies related to characterization and quantification of the key constituents of seaweed biomasses (e.g. polysaccharides) from different steps of processing chain, specifically changes occurring during storage, focussed on structural changes in the algal polysaccharides. TLU will also conduct spectroscopy analyses and develops techniques for rapid quality assessment of seaweed biomasses. **Contact:** rantuv@tlu.ee

The Faculty of Food Science and Nutrition at the University of Iceland (UoI) holds diverse expertise in food science, food chemistry, food processing, product development, innovation, nutrition, and the environmental impact of food processing and sustainable healthy diets. Professor María Guðjónsdóttir is a professor in food science and the Dean at the University of Iceland, Faculty of Food Science and Nutrition, specializing in food processing and food quality monitoring by non-destructive spectroscopic methods, such as NMR, NIR, and multispectral analysis. UoI are involved in several WPs in the QualiSea project, and provide expertise of spectroscopic (NIR, NMR, hyperspectral imaging) and traditional physicochemical and sensory seaweed quality monitoring, experience of processing effects and innovative product development from the seaweed biomass. **Contact:** mariagu@hi.is