



EATIP SEAWEED FORUM - “NEW DEVELOPMENTS IN THE CULTIVATION OF SEAWEED AND MICROALGAE”

On 22nd January 2021, more than 215 participants took part in a virtual [European Aquaculture Technology and Innovation Platform](#) (EATIP) Forum hosted by two Mirror Platforms, the [Scottish Aquaculture Innovation Centre](#) (SAIC) and the [Irish Aquaculture Technology and Innovation Platform](#) (IATiP). This webinar, titled “New Developments in the Cultivation of Seaweed and Microalgae”, offered an insight into some of the leading novel seaweed aquaculture developments across Europe and how this emerging sector might contribute to national and European targets for decarbonising the ocean and reducing the carbon footprint of the food production cycle. The well-attended webinar offered six fascinating presentations followed by an insightful and engaging question and answer session in which the audience showed a keen desire to learn more about the results and potential applications of the presented work.

The conference was opened by **Alexandra Neyts**, EATIP General Secretary, who introduced the efforts of EATIP in identifying and supporting innovations in the production, processing and application of macro and microalgae, particularly within the context of changes in consumer behaviour and upscaled and more cost-efficient production. Describing the Forum, she noted that this was an opportunity to “share knowledge, share innovations and exchange experiences” across a wide range of participant expertise. She also explained to participants that they would have an opportunity to provide their insight to the EU through participation in a post-event survey, the results of which would be presented alongside a summary of the forum at the EU level.

The presentations commenced with **Dr Lucy Watson**, a co-host of the Forum and Aquaculture Technical Specialist from the Irish Seafood Development Agency, [Bord Iascaigh Mhara](#) (BIM), who presented the situation of seaweed cultivation from an Irish perspective. In describing the market-led approach of BIM, she noted the recent BIM Seaweed Biorefinery Report that highlighted over 2,600 new products containing seaweed that entered the market between 2008 and 2018. Pointing to the continued emergence of high-value products and research and development clusters, she described a strong opportunity for biotech growth in Ireland and introduced an anticipated BIM Seaweed Strategy that will investigate high value niche or specialised algae-derived products within the pharma, cosmetics and food sectors.

The webinar’s focus then shifted to the Scottish seaweed aquaculture sector as **Prof. Michelle Stanley** from the [Scottish Association for Marine Science](#) (SAMS) described advancements there linked to two innovative projects [ASTRAL](#) and [IMPAQT](#). Her presentation described the opportunities for growing the seaweed sector through mutually-beneficial low trophic integrated multitrophic agriculture (IMTA), where seaweed cultivation is integrated with shellfish production. She underlined the importance of developing the whole value chain in order to support resilient and producer-supported IMTA. She showed several avenues of approach for making the sector more economically and environmentally feasible for commercial application, including optimising seeding techniques, rope diameter, shellfish types, stocking densities, using recycled polymers and more.

Dr Sushanta Saha from [Shannon ABC](#) was the next speaker and he introduced the audience to the microalgal innovations being carried out there. Shannon ABC began by producing a sustainable Irish source of astaxanthin and have continued to build upon their learnings, now boasting a biobank comprising over 100 types of microalgae found naturally in Irish coastal waters. While already working with industry partners to identify key commercial opportunities for microalgal products, Shannon ABC has also recently begun work on a microalgae cultivation suite through an Enterprise Ireland Capital Grant, which will be one of the first labs in Ireland capable of developing food-grade applications. He finished with an open invitation for collaboration to any participants interested in further developing any types of microalgae biotechnology.

Next to present was **Dr Bertrand Jacquemin**, who represented the [Algae Technology and Innovation Centre](#) (CEVA), a technical centre dedicated to promoting a green, circular and sustainable economy with both macro and microalgae. While demand for algal products has continued to grow rapidly, Dr Jacquemin noted that in reality seaweed aquaculture has progressed little from ancient times, with a great deal of algae still harvested from wild stocks. As he outlined the bottlenecks and challenges facing the establishment of a sustainable farming model, a critical gap was shown to be appropriate biobanks of cultivated and selected strains. He pointed out that while several promising cultivation processes involving IMTA exist around Europe, it is crucial that these now be given the support required to advance beyond the pilot scale. CEVA is trying to address this need and has developed several promising IMTA systems involving dulse and nori. However, going back to the previously described bottlenecks he reminded the forum that even as Europe begins to make its shift towards better cultivation systems, the lack of sufficient biobanks of high-value species and strains will need to be addressed, otherwise the sector will struggle to be truly sustainable.

Presenting a commercial cultivation perspective, **Freddie O Mahony** presented the work being carried out by **Cartron Point Shellfish** and [Bantry Marine Research Station](#) (BMRS). She described how outdoor cultivation in Ireland has traditionally faced major issues in the form of epiphytes, grazers and bleaching. Their work has therefore focussed on identifying asexual strains of *Porphyra umbilicalis* which they can cultivate indoors during early stages, before moving it outdoors. Their recent efforts with this practice have shown great promise in avoiding the epiphyte problems. Even as they continue to refine the process, she stated that they are looking for a potential IMTA partner site with which they can explore growing this method to a commercial scale.

Concluding the presentations was a joint delivery from **Dr Annette Bruhn** of [Aarhus University](#) and **Dr Susan Løvstad Holdt** from the [Technical University of Denmark](#) (DTU Food). Together, they delivered a Danish and European perspective on the future of seaweed aquaculture. Dr Bruhn began by noting that there are already examples in Europe that could be worth emulating, such as the Faroes, where special rig systems have allowed them to scale up their rough-water seaweed cultivation. She pointed out that while seaweed-containing products are indeed major drivers of the market, there is also a growing food demand. She described how there is a debate worth having on whether invasive strains, such as popular food species, should be cultivated. Indeed, she opined how the sector needs to better work at working with end users to match suppliers to demand, so all of the recent efforts in improved cultivation are transferable to the market at the end of the day. She suggested attendees look into a recently published Danish guidelines on the organic production of seaweed and consider potential ethical and legislative questions on the horizon around topics such as biosecurity, transport of seeding material and environmental impacts across the entire life-cycle.

Building on Dr Bruhn's points, Dr Løvstad Holdt illustrated just how large the gap between aquaculture and wild harvesting remains in terms of both total biomass and number of actors involved in the sectors. While Norway and the Netherlands produce more through cultivation, across Europe cultivated seaweed represents only 0.2% of the total harvest. The average company involved in such aquaculture produces only 10 tonnes per annum. She also reiterated the issue of low-diversification, with the aquaculture sector reliant on a worryingly few species. In concluding, she pointed out how the many of the constraints and challenges facing the sector will need to be solved in parallel and urged attendees to consider that such efforts will require new partnerships and collaboration across academia, industry and policy.

The forum concluded with a robust question and answer session, in which questions collected during the presentations were presented to each speaker in turn. The questions demonstrated an audience keenly interested in engaging with the presented research and each other and interested in jointly exploring how emerging innovations might be translated into step-changes in the seaweed aquaculture sector. Many of the questions revolved around the speakers' opinions and experiences on pivoting their work to the market and the obstacles and opportunities in doing so.



While the forum was structured as a series of presentations, the organisers wanted to engage all attendees to gain a fuller understanding of the motivations, barriers and ideas present across all 200+ participants. To this end, they asked everyone to complete an online seaweed cultivation poll after the event's conclusion. The survey showed an audience involved in developing a wide range of species, with respondents most interested in a fairly even representation of red algae, green algae, microalgae and others. Similarly, as suggested by the speakers the respondents painted a picture of a varied market for algae applications. Unsurprisingly, human food products and additives as well as animal feed were dominant target applications, but the third most common application area was split evenly across cosmetics, medicinal uses and agriculture applications such as extracts and fertilizers.

The survey found that while regulations and seed availability are notable challenges for researchers in Europe, the overwhelming barrier facing development in the sector centres on profitability. This seems to echo the repeated refrain from the forum that research in this area needs to be better supported and integrated with end users. In response to this challenge, the participants were asked what the most important factor should then be when considering the business potential of cultivated algae. Nearly half of respondents said the environmental sustainability benefits are the key, followed closely by economic benefits such as job creation, suggesting that while challenges exist, the benefits are of a critical nature to a future sustainable economy.

The organisers also wanted to develop an idea of how the participants might like EATIP to direct their further webinars. There was an overwhelming support for the organisation of a joint EU-China forum on the status of seaweed farming and processing in China. Among the other topics the respondents asked for, some of the most common were further explorations of IMTA and integrations of IMTA with other physical resources such as wind farms, a forum focussed more on the market and business landscape of Europe and expected evolutions thereof in the near future, addressing regulatory considerations, how to better engage with potential producers, end users and young researchers and microalgae-centric forums.

Overall, the forum was a great success in not only delivering a useful insight into the latest seaweed aquaculture research and perspectives from EATIP members, but also in sparking and fostering a continuing discussion on the critical importance of developing the sector. The forum highlighted the urgent need for a whole-value chain approach and the transfer of knowledge both from researcher to end user as well as vice versa while also engaging with policy makers and the general public.

For further information on this webinar, as well as any other queries, please contact EATIP (secretariat@eatip.eu).