

Novel biorefinery supply chains for wastewater valorization and production of high market value bio products using microalgae

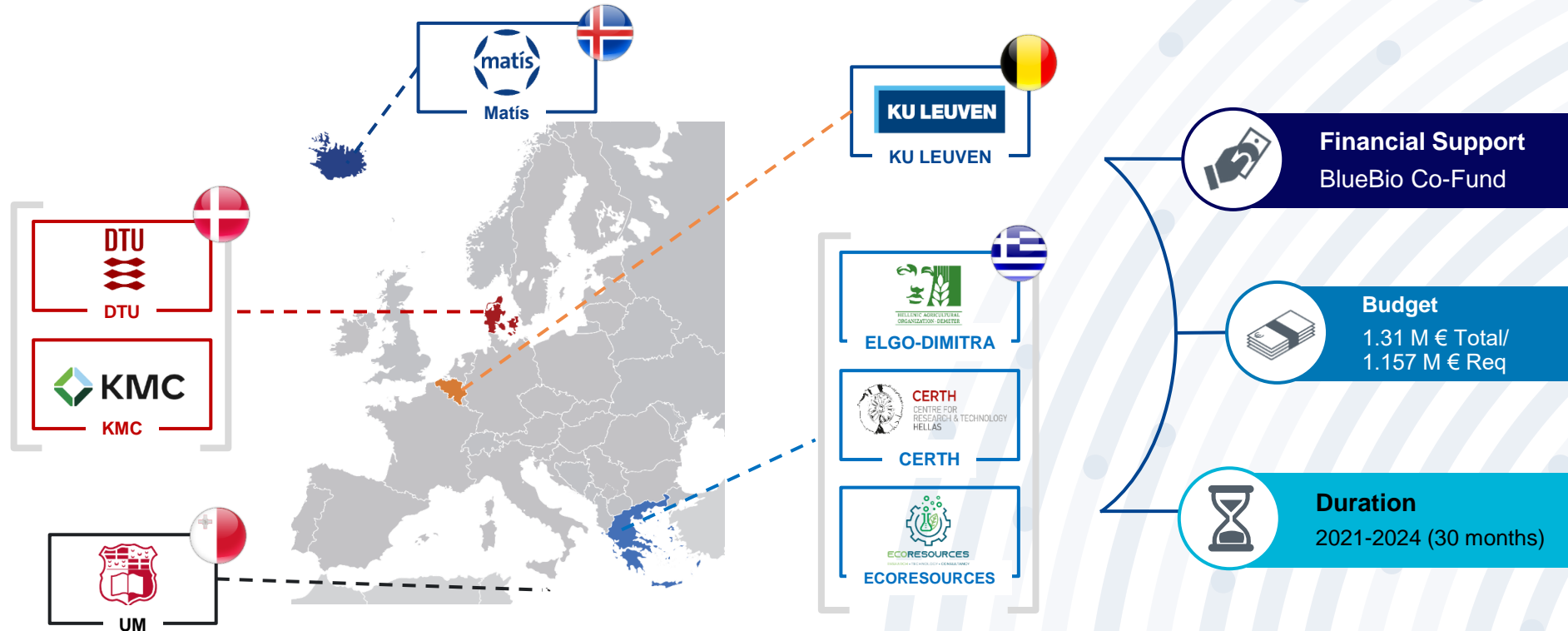


From science to policy and regulatory solutions
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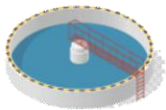
Project in a nutshell



Goals and achievements

Efficient wastewater valorisation

Through intelligent system for nutrient recycling & upcycling via microalgae cultivation



Delivery of high market value end-products

Through the pilot scale production of
(i) cosmeceuticals (skin care cream),
(ii) food additives (coloring agents),
(iii) aquaculture feed



Model-based optimization

By applying advanced models to optimise the process in respect to
a) nutrient upcycling and recycling,
b) productivity rates
c) efficiency



Improved Biosecurity

By producing functional compounds allowing better availability of nutritious products to end-users.

By monitoring & controlling the prevalence of contaminants, which may have an impact on suitability of the use of **BlueBioChain** raw material.



BlueBioChain e-marketplace

Through an online tool providing information regarding water use, carbon footprint, and traceability control of end-products in a given pilot case scenario



The BlueBioChain survey

1.Familiarity with Concepts: Most participants have **some familiarity with circularity** and bio-based products, but the biorefinery concept is less known.

2.Previous Experience with Valorized Products: About **1/4 have experience** with products derived from wastewater.

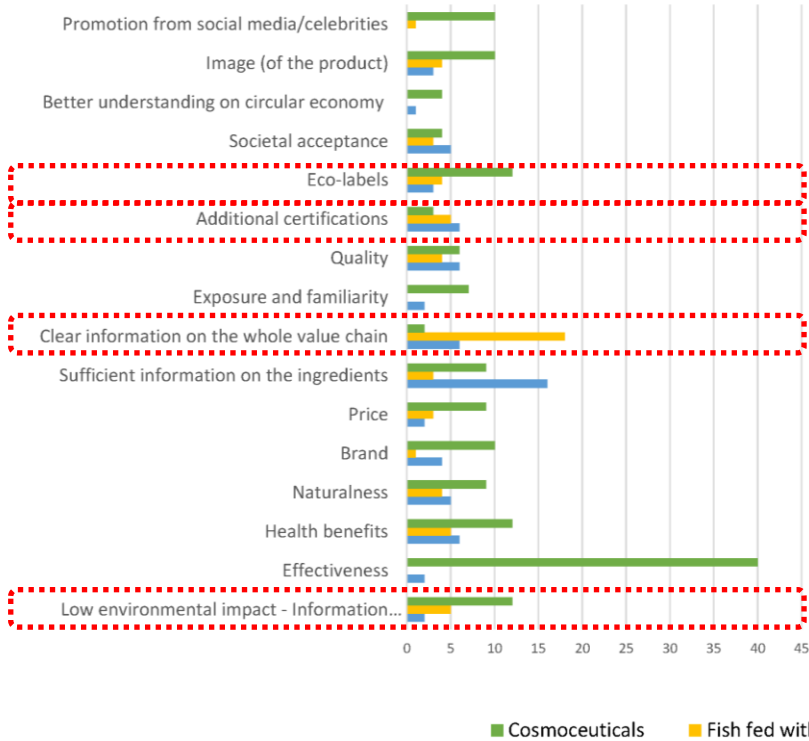
3.High Awareness and Positive Perception: There is high awareness (85% for wastewater use and 75% for microalgae use) and an overwhelmingly positive perception (negative opinions <3%) about using wastewater and microalgae for bio-based products. However, about **8% are skeptical about consuming products cultivated in industrial wastewater**.

4.Consumer Willingness to Purchase: Consumers show varying levels of willingness to purchase different bio-based products. For cosmeceuticals, 63% are willing to buy, with 11% opposed. For food additives, 56% are willing with 20% opposed. The willingness is lowest for fish, with 52% in favor and 19% against. **A considerable number (24-28%) are undecided in all cases**.

5.Willingness to Pay a Premium: Consumers are generally reluctant to pay a premium for food additives and fish (39% and 40% wouldn't pay more, respectively). However, they are more willing to pay a premium for cosmeceuticals (only 27% are reluctant). **The majority would pay a premium of less than 5€ for food additives and fish, whereas for cosmeceuticals, most would pay a premium of 5€ - 20€.**

Drivers & Barriers identified

Drivers



Barriers



Keypoints in respect to regulatory barriers

- 1. Safety and Toxicity Concerns:** There are stringent regulations regarding the safety of products intended for human consumption or topical application.
- 2. Quality and Purity Standards:** Products used as food supplements or in cosmeceuticals must meet high standards of purity and quality.
- 3. Environmental Regulations:** The use of wastewater for cultivating microalgae might be subject to environmental regulations (e.g. release of contaminants into the environment).
- 4. Approval and Certification Processes:** This includes proving that the product is safe, effective, and meets all regulatory requirements.
- 5. Labeling and Marketing Regulations:** Claims made about the benefits of microalgae extracts would need to be substantiated and compliant with these regulations.
- 6. Traceability and Supply Chain Oversight:** Regulators may require detailed documentation of the entire supply chain, from the source of the wastewater to the final product.
- 7. International Trade and Compliance:** Comply with the regulatory requirements of each target country.

Thank you

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