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Addendum to the ERA-MBT Marine Biotechnology Research and Innovation Roadmap

Work Package 2

Strategy for the marine biotechnology ERA-NET and beyond in the context of the European Bioeconomy

Publication date: November 2017

Marine Biotechnology ERA-NET (ERA-MBT) is funded under the European Commission's Seventh Framework Programme. | Grant Agreement Number 604814
December 2013 - November 2017

MarineBiotech

PROJECT & PUBLICATION INFORMATION

Project full title: **Marine Biotechnology ERA-NET**
Project acronym: **ERA-MBT**
Website: **www.marinebiotech.eu**

Grant agreement no.: **604814**
Project start date: **1st December 2013**
Duration: **48 months**
Funding scheme: **Coordination and support action**
Call identifier: **FP7-ERANET-2013-RTD**

Deliverable number: **2.6**
Deliverable name: **Addendum to the ERA-MBT Marine Biotechnology Research and Innovation Roadmap**
Lead Beneficiary: **Marine Institute (MI)**

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Publication Date: **November 2017**
Nature: **Report**
Dissemination level: **Public**

Work Package: **WP2 - Strategy for the marine biotechnology ERA-NET and beyond in the context of the European Bioeconomy**
Work Package leader: **Marine Institute (MI)**
Task 2.2

Cite as: **Addendum to the ERA-MBT Marine Biotechnology Research and Innovation Roadmap, 2017. Marine Biotechnology ERA-NET.**

Acknowledgements:

ERA-MBT is grateful for the support and encouragement of members of the ERA-MBT International Advisory Group — Dr. Fernando de la Calle, Prof. Alan Dobson, Dr. Fredrika Gullfot, Prof. Frank Oliver Glöckner, Prof. Adrianna Ianora, Dr. Ernst Kloosterman, Ms. Nathalie Moll, Dr. Rachael Ritchie, Prof. Patrick Sorgeloos, Dr. Helena Vieira and Prof. Uwe Waller over the course of this project, and appreciates the contribution of the International Advisory Group in defining the marine biotechnology roadmap.

EXECUTIVE SUMMARY

This addendum completes the ERA-MBT work on the development of the **Marine Biotechnology Research and Innovation Roadmap**[1] concluding that no major update is needed since it was published. The roadmap has been widely acknowledged, and its impact has been clearly demonstrated at national, regional and Europeal level. This report will thus be an addendum to go with the originally printed and e-version of the ERA-MBT Roadmap.

[1] Hurst, D.; Børresen, T.; Almesjö, L.; De Raedemaecker, F.; Bergseth, S. (2016). Marine biotechnology strategic research and innovation roadmap: Insights to the future direction of European marine biotechnology. Marine Biotechnology ERA-NET: Oostende.

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BENCHMARKING THE ROADMAP

The launch of the ERA-MBT roadmap in October 2016 coincided with other marine biotechnology related policy statements made around the same time. The OECD in its Science, Technology and Innovation Policy Paper No. 43[2], and the EU Food 2030 Conference[3] provided two perspectives on the future role of marine biotechnology in supporting the growth of the bioeconomy. The convergence of views expressed by both initiatives coincided with the core themes of the ERA-MBT Marine Biotechnology Research and Innovation Roadmap. Indeed, the spread of opportunities identified for marine biotechnology mirrored the roadmap. Together, the OECD and EU identified roles for marine biotechnology in supporting aquaculture and fisheries, maximising the utilisation of underused marine biomass, enabling new value-chains based on algae for food, feed and other products across different industry sectors. The OECD was emphatic in describing marine biotechnology as contributing to the "Next Production Revolution", with algae becoming a major source of biomass. And a key element of the OECD position was its focus on the role of research infrastructures in enabling research, and the need to continue to develop them. Repositories for marine organisms and associated data were identified as in need of development, and in this regard the value and impact of national facilities can reach beyond national borders.

Recognition of the potential of marine biotechnology was behind the emphasis of marine biotechnology in the announcement of calls for research proposals by the EU H2020 programme and the industry oriented public-private partnership of the Biobased Industries Consortium . Both initiatives sought to stimulate research on the conversion of marine biomass and its role in the bioeconomy The work of the ERA-MBT project in defining and publishing its roadmap, was taken up in the call from the H2020 programme for a CoFund initiative to support the production, harvest and exploitation of marine biomass (including underutilised materials from harvesting and processing).

[2] OECD (2017). Marine Biotechnology Definitions, Infrastructures and Directions for Innovation OECD Science, Technology and Innovation Policy Papers, September 2017 NO. 43 OECD Paris

[3] http://ec.europa.eu/research/conferences/2017/food2030/index.cfm

IMPACT AND FURTHER DEVELOPMENT OF THE ROADMAP

The publication of the ERA-MBT research and innovation roadmap attracted significant interests at national and international levels. The European Marine Board together with ERA-MBT published a policy brief[4] promoting the roadmap, which recognised the role of marine biotechnology in adding value to marine biomass and advancing innovation in Europe's bioeconomy[5]. Beyond this, the marine graduate training aspect is emphasised as a key action to build the necessary technical capacity and attractive career opportunities. The Marine Biotechnology ERA-NET was amongst the many projects reviewed in the context of new policy regarding sustainable Oceans and the Blue Economy[6].

Since publishing the roadmap the ERA-MBT project continued to engage in activities to disseminate it and secure feedback on its scope. An industry workshop in June 2017, whilst confirming the thematic direction of the road-map, drew attention to the need for a deeper understanding of the processes involved in translating the research outputs of marine biotechnology related projects into commercial products. In doing so, it singled out the need for actions to encourage an earlier involvement of industry and more intensive collaboration of research performers in projects.

A further opportunity to consider the impact of the roadmap was the ERA-MBT project's final conference; November 2017 in Oslo. Feedback from the policy, industry and research communities stressed the benefits and validity of having a clear roadmap for marine biotechnology. This event, in addition to demonstrating the impact of the strategic approach adopted by the ERA-MBT project in defining research calls, provided an opportunity to reflect on the research and innovation roadmap. Feedback received during the conference identified new further challenges that broaden the scope of the roadmap. These included:

- Steps are required to retain the focus of the roadmap on marine biotechnology research and innovation whilst maximising its contribution to the sustainable use of the oceans through a continued development of robust and cutting edge biotechnologies (-omics) and provision of new infrastructure.
- The importance of continued support for marine biotechnology in enabling the use of marine bioresources in the food chain and in other industry sectors.
- The increased attention on the use of algal biomass as food and other elements of the bioeconomy requires the development of standards and regulatory systems to assure the quality of raw materials at all stages from harvesting to consumption.

[4] European Marine Board and Marine Biotechnology ERA-NET (2017). Marine Biotechnology: Advancing Innovation in Europe's Bioeconomy. EMB Policy Brief No. 4, September, 2017. ISSN: 0778-3590 ISBN: 978-94-92043-35-1

[5] http://marineboard.eu/publication/marine-biotechnology-advancing-innovation-europe's-bioeconomy-policy-brief

[6] European Commission (2017). Sustainable Blue Economy - productive seas and oceans, Directorate-General for Research and Innovation. European Commission, B-1049 Brussels

- Funded marine biotechnology research and innovation projects provides the foundation on which to build a community of scientists for the discovery of new drugs and other products relevant to aging populations and maintaining wellbeing.
- Continue to build on the concept of research driven innovation, which is already proven in creating value from underutilised marine biomass, and apply this to multiple valuable products to create a competitive advantage in international markets.
- Continue to direct attention to the potential of the marine origin microorganisms and microbiomes as sources of novel materials. and maximise the use of omics and bioinformatics in exploring and applying these resources.
- The inherent long-term risks involved in value creation from biological resources needs strong and diverse de-risking instruments during the early phases of developments. This applies to areas such as developing multi-stream biorefineries, and pilot plants to explore new knowledge-based in early stage innovation projects that involve industry participation.
- Early industry involvement in trans-disciplinary integrative projects is required to secure the applied perspective and strong market interest in research and innovation activities.
- Marine graduate training programmes that create technical capacity, and highlight attractive marine career options, are key in expanding efforts to harness value from marine resources.
- Targeted communication, dissemination and networking is the basis for building new collaborations and a greater recognition of marine resources as the basis for new interesting developments.