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Updated mapping of the MBT environments

Work Package 3

Interactions with industry

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EXECUTIVE SUMMARY

This report summarises the results of a survey made by ERA-MBT in June-August 2014, and makes a comparison with a comparable survey made by DG MARE early 2014.

Deliverable 3.1, concerning an updated mapping of the marine biotechnology environment, concludes that the complete area of marine biotechnology is very complex, on the industry side comprising mostly SMEs, but otherwise including a large variety of stakeholder categories such as industry clusters, associations, networks, consultants, TTOs, funding agencies, academic institutes and a range of organisations at national, regional and European level.

Raw material being processed contains all different biomass categories, counting both macro- and micro-organisms. Similarly the products coming out of marine biotechnology processing include a large variety of product categories, ranging from food and feed over health products to the materials and chemical industries' products. Further to that, environmental applications have a high priority.

Comparing the results of the ERA-MBT survey with the DG MARE survey the mapping picture of both came out quite similar. Although the number of identified stakeholders in the ERA-MBT survey was only 127, and in the DG MARE survey was 286, the distribution between the European countries was not too different, with France, Germany and UK as the leading responders in both surveys.

The stakeholder type was categorized a bit different in the two surveys, but SMEs could be compared as 26% in the DG MARE study and 23% in the ERA-MBT study, and 4% and 5% respectively as larger companies in the two studies. Networks and clusters were categorized a bit differently in the two studies, but was about 16% in the DG MARE study and about 8-9% in the ERA-MBT study.

The categorisation of stakeholders by industry sectors could also be compared with about 25% in both studies representing the health and pharmaceutical sector, and 16% from the food sector. Environmental services were represented by 19% of the stakeholders in the DG MARE study, and 14% in the ERA-MBT study, and cosmeceuticals by 8% and 13% respectively in the two studies.

In both studies about 30% of the respondents were from industry, with a majority from SMEs, and the other respondents representing a variety of stakeholders more or less connected to industry and otherwise from academia and governmental institutions.

It is concluded that the marine biotechnology environment in Europe is very diverse. Considering raw material being processed it contains all the different biomass categories thought of, counting both macro- and micro-organisms. Similarly the products coming out of marine biotechnology processing include a large variety of product categories, ranging from food and feed over health products to the materials and chemical industries' products.

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INTRODUCTION

This report presents results from deliverable D3.1, which constitutes a part of Task 3.1, WP3.

The ERA-MBT DoW specifies the following for D3.1: ‘The CSA MarineBiotech have identified European and international stakeholders, strategies and programs and started a mapping of relevant activities within this area. These will be utilised and further developed with a questionnaire designed to cover needs for further information’. It is further specified that ‘results will be aggregated and disseminated to increase the awareness in industrial development environments about potentials within marine biotechnology’.

A questionnaire was prepared for updating mapping information as stated above. In addition to the questions giving answers feeding into deliverable D3.1, questions were also asked on IPP/IPR issues, mapping of tech-transfer practice and funding schemes. The results on these parts of the questionnaire are reported in separate delivery reports (D3.2, D3.3 and D3.5). Further, the survey also contained questions on quality and accessibility of infrastructures and tools. The results on this part of the survey are given in a separate report covering the total answers to the questionnaire and delivered to the respondents to the survey.

It must be emphasised that the survey is a quantitative analysis where a picture of the category of respondents have been mapped, and respondents marketing products have been asked what kind of raw material they use and what kind of products they deliver. The respondents wanting feedback on the results of the survey were asked to provide contact information, but the survey is per se anonymous and shall not, and must not be coupled to the responses given.

The results obtained in the ERA-MBT survey are compared with another recent survey on marine biotechnology. A study co-developed by the ECORYS/s.Pro/MRAG consortium contracted by DG MARE contained a questionnaire on some of the issues also raised in the ERA-MBT survey. The results are published in the publication "Study in support of impact assessment work on Blue Biotechnology"¹. Reference is made to this study as the ‘DG MARE study’.

¹ http://ec.europa.eu/maritimeaffairs/documentation/studies/documents/study-blue-biotechnology_en.pdf

STAKEHOLDER IDENTIFICATION

The mapping as performed here is restricted to the respondents having answered the questions presented in the survey. The questionnaire used was published on the ERA-MBT website and sent by direct mail to more than 900 stakeholders as given in the ERA-MBT contact mailing list. An outline of the questionnaire is presented in Appendix 1 to this report. A total of 127 responses were received within the deadline set.

The majority of the stakeholders were those identified in the CSA-MBT, which were grouped into a Stakeholder Forum, mainly funding agencies, and a Stakeholder Group, mainly industry and associations. Lists of both groups are given in Appendix 2 and 3.

The Stakeholder Group was categorised as research, industries, policy makers, outreach professionals, infrastructures and networks, of which most were research, industries and networks.

Further to these stakeholders a range of new stakeholders had been identified as participants to conferences held and contacts supplied by the members of the ERA-MBT. The MBT environments has thus been continuously updated as concerns mapping of stakeholders of all categories, but a picture of their activities and opinions to relevant questions such as collaboration within the area, access to infrastructure and the funding situation have not been obtained. The present survey was thus an attempt to get an updated mapping of the different categories of stakeholders as well as their activities and opinions of the MBT environment. Due to limited resources within the ERA-MBT consortium, a quantitative survey was used, knowing that there might be shortcomings if the population of answers to the questionnaire was limited.

1.1 STAKEHOLDER DISTRIBUTION

127 responses were received from 24 countries (Figure 1). 94% of these responses originate from European entities (including entities from French Polynesia). Only seven responses are from non-European entities. Five responses came from America and one from Africa and Asia (Figure 2).

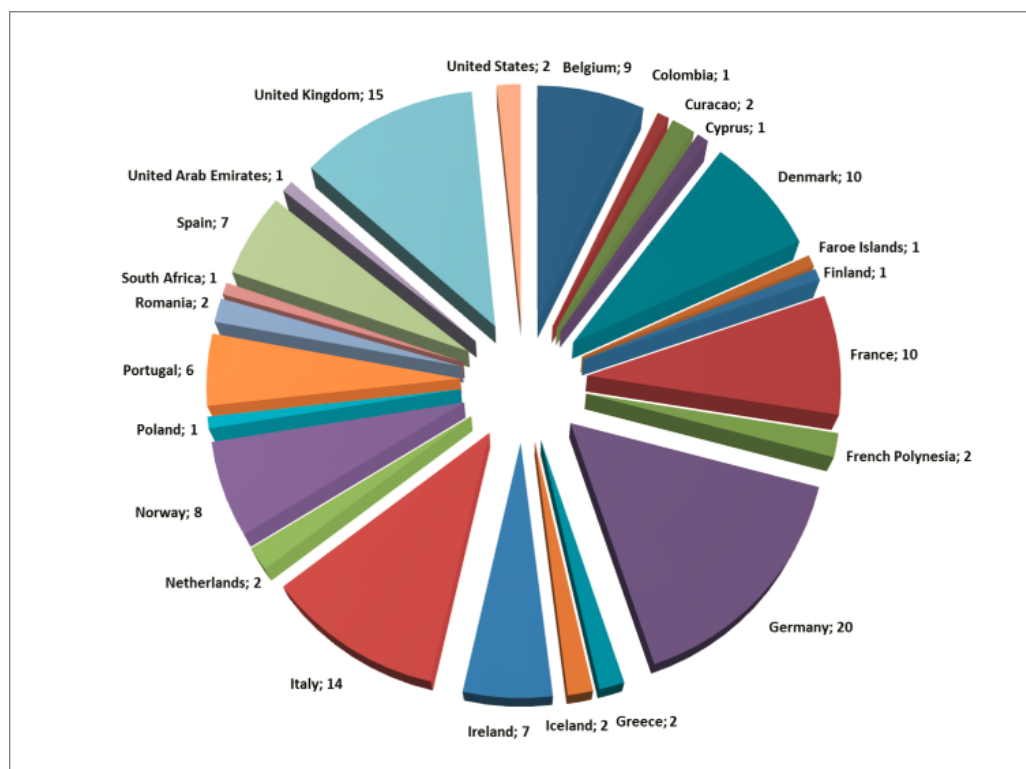


Figure 1. Responses by country

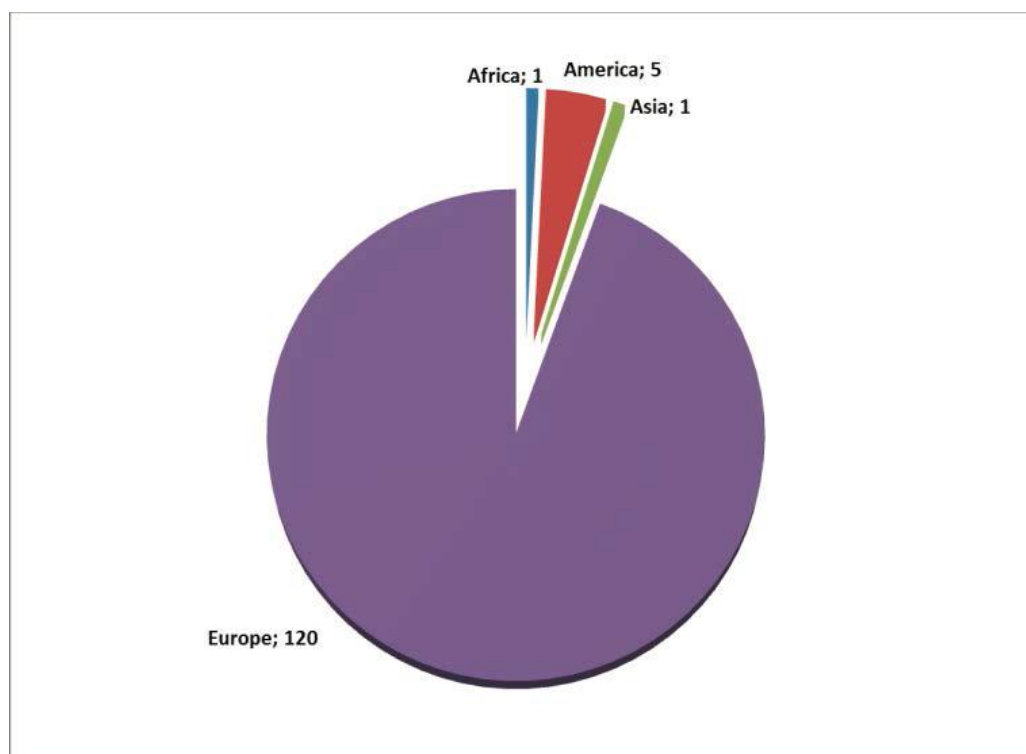


Figure 2. Responses by continents

1.2 STAKEHOLDER CATEGORIES

The respondents were given the opportunity to identify themselves within a list of stakeholder type. The private sector is about one third of the responses and the public sector about two thirds (Table 1). 28% of the respondents classify themselves as large industrial company or as a SME. Some identified themselves as overlapping type of stakeholder (chose more than one option) and this was much more common for government bodies than the private sector entities.

Table 1. Stakeholder response

STAKEHOLDERTYPE	RESPONSE PERCENT	RESPONSE COUNT
Larger industrial company (international)	4,7%	6
SME	22,8%	29
Industry cluster	3,1%	4
Industry association	1,6%	2
Industry network	1,6%	2
Consultant	4,7%	6
Technology transfer organisation	8,7%	11
Regional organisation	3,9%	5
European organisation	3,1%	4
National organisation	28,3%	36
Funding agency/venture capital provider	3,9%	5
Other (please specify, max. 2000 characters):	38,6%	49
<i>answered question</i>		127
<i>skipped question</i>		5

Almost all those who responded as ‘other’ to ‘What type of stakeholder are you?’ are from governmental agencies, research institutes and universities. Of the 35 who identified themselves as large industrial companies or SMEs three did not answer the specific company questions and seven replied the specific company questions but are not marked as large industrial company or SME in the list of stakeholders. With careful filtration of answers probably eight of the responses to the question ‘Are you a company?’ are not responses from large companies or SMEs with active marine biotechnology R&D projects. However, the statistics below is based on total unmodified pool of responses.

1.3 MARINE BIOTECHNOLOGY ACTIVITY OF COMPANIES

There is no apparent trend in what kind of activities the companies are engaged in (Table 2). Many companies indicated multiple activities, e.g. about half of those using raw material are using marine related bio information for development of products or services.

Table 2. Marine biotechnology activity of the companies

MARINE BIOTECHNOLOGY ACTIVITY	COUNT
We use raw material from marine biomass	22
We use marine related bio information for development of products/services	19
We develop product/services for use in marine bio environment	17

We do not have any marine biotech activity	4
Blank (did not mark any of the above)	1

No specific type of biomass used by the companies is dominant in the R&D or production of the companies (Table 3). Filtering for those who use biomass as a raw material does not change that scenario. The source of material is diverse, fish, invertebrates, micro- and macroalgae, bacteria, sponges and fungi. If looking only at the large industrial companies their market is either food/feed (4) or pharmaceuticals (2) and four out of the six are using macroalgae, three as food/feed and one is a pharmaceutical company.

Table 3. Marine biomass used for R&D or production

MARINE BIOMASS USED FOR R&D OR PRODUCTION	COUNT
Fish	15
Molluscs	11
Microalgae	14
Macroalgae	14
Bacteria	12
My company does not use raw material from marine sources.	2
Other	7
Blank (did not mark any of the above)	5

The respondents identified their main target market(s) and again the responses are evenly divided among the categories given (Table 4), with the exception of energy. The target market(s) for the companies are diverse but at least two market clusters can be identified. One is food and feed. 70% of those who marked food as the main market also selected feed. Out of 13 that selected feed 11 are also in food. The other market cluster is cosmeceuticals, health and pharmaceuticals. Most of those who selected one of these three markets marked the other two as well. Presumably, the companies have bioactive material with potential opportunities in all these three markets. The third strong target market area is environment and monitoring.

Table 4. The companies' main target market(s)

WHAT IS THE MAIN TARGET MARKET FOR YOUR MARINE RELATED PRODUCTS?	COUNT
Food	16
Feed	13
Energy	7
Materials	12
Cosmeceuticals (e.g. skincare)	13
Health (e.g. food supplements)	13
Pharmaceuticals	12
Environment and monitoring (e.g. biosensors, anti-fouling technology, bioremediation....)	14
Production of commodities or services other than above	4
Blank (did not mark any of the above)	5

MAIN FINDINGS ON RESPONDENTS TO THE ERA-MBT QUESTIONNAIRE

- This is a European survey, less than 5% of responses are outside Europe
- The marine biotechnology industry is a relatively young industry, most of the companies are SMEs although several large industrial companies are very much involved in the utilisation of marine biomass (four out of six large industrial respondents are using macroalgae)
- The MBT environment having answered the questionnaire is dominated by public national and research institutions
- More than half of the SMEs that answered the specific company questions use raw material directly from marine biomass, others are in marine related services
- The market for the Large industrial companies is:
 - Food and Feed, and
 - Pharmaceuticals
- The main market focus for the SMEs can be categorized in three pillars, two of them as market clusters:
 - Cluster of food and feed, and
 - cluster of cosmeceuticals, health and pharmaceuticals, and
 - environment and monitoring

COMPARISON WITH DG MARE STUDY

Based on the questionnaire in the DG MARE public consultation a stakeholder database was compiled. It comprised contacts from industry, academia, networks including industry associations, research- and knowledge centres, public and private funding agencies, Member state authorities etc. A total of 286 stakeholders covering 25 countries and 238 institutions were identified.

Although the number of identified stakeholders in the ERA-MBT survey was only 127, the number of countries represented was 24, and the distribution between the European countries was not too different, with France, Germany and UK as the leading responders in both surveys, but a higher relative response from Italy and Denmark in the ERA-MBT survey. This could be due to the partner distribution in ERA-MBT reflecting the contact addresses.

The stakeholder type was categorized a bit different in the two surveys, but SMEs could be compared as 26% in the DG MARE study and 23% in the ERA-MBT study, and 4% and 5% respectively as larger companies in the two studies. Networks and clusters were categorized a bit differently in the two studies, but was about 16% in the DG MARE study and about 8-9% in the ERA-MBT study. Academic institutions, research and governmental and funding agencies were about 38% in the DG MARE study and about 49% in the ERA-MBT study. The remaining 14-16% in both studies could not easily be compared as categories, but were not producing companies. The percentages of industry represented in the two studies are thus comparable.

The categorisation of stakeholders by industry sectors could also be compared with about 25% in both studies representing the health and pharmaceutical sector, and 16% from the food sector.

Environmental services were represented by 19% of the stakeholders in the DG MARE study, and 14% in the ERA-MBT study, and cosmeceuticals by 8% and 13% respectively in the two studies.

In both studies about 30 % of the respondents were from industry, with a majority from SMEs, and the other respondents representing a variety of stakeholders more or less connected to industry and otherwise from academia and governmental institutions.

CONCLUSION

The marine biotechnology environment in Europe is very diverse. Considering raw material being processed it contains all the different biomass categories thought of, counting both macro- and micro-organisms. Similarly the products coming out of marine biotechnology processing include a large variety of product categories, ranging from food and feed over health products to the materials and chemical industries' products. Further to that, environmental applications have a high priority. It may then not be surprising that there is also a large variety of stakeholder categories, not only counting industries, but industry clusters, associations, networks, consultants, TTOs, funding agencies and a range of organisations at national, regional and European level. In short, the marine biotechnology environment is very complex.

FURTHER STUDIES

It has been emphasised that the ERA-MBT questionnaire was a quantitative study. In many cases it was not possible to break down results for specific stakeholder categories as the number of answers were too small for being statistically reliable. Instead of making a new quantitative survey among groups of stakeholders, qualitative studies should be performed, but the resources of the ERA-MBT does not allow for extensive studies, as they are usually very expensive. Limitation of specific questions to a well defined area could be feasible, and could be of great use for feeding further information into Task 2.2, the Strategic Roadmap in WP2.

Such a roadmap will provide information relevant to the creation of a lasting MBT network (Task2.3), and as such it will be important to identify who should be included, i.e. which stakeholders are relevant for the MBT network. Several attempts have been made to map the stakeholders of the environment, as described in the present report, where the CSA MarineBiotech delivered lists of potential stakeholders, and the mapping has been further developed in the present survey. The DG MARE study also attempted to establish a database of stakeholders, but at the workshop where the study was discussed it had to be concluded that 'there is currently no clear definition of a Blue Biotechnology sector' and that 'Perhaps the 'sector' is too complex to delineate and to do so would be counterproductive'. The last expression is very interesting and should be considered when extracting data to be delivered for the roadmap in WP2. If the final aim is to create a lasting MBT network it is probably advisable to include all the different categories of stakeholders identified in the ERA-MBT survey and in the DG MARE survey. If only the industries identified are included or any other sub-fraction of the stakeholders, the network may be not only too narrow, but could risk lacking some essential elements contained in the complexity of the MBT environment.

APPENDICES

APPENDIX 1: OUTLINE OF QUESTIONNAIRE

General

1. **Please identify the country where your headquarters are based**
Dropdown list of all countries
2. **Please identify the country/countries in which your organisation operates. If multi-national within Europe, choose „Europe“, if global choose „International“**
Dropdown Europe, International
3. **Please identify your category/categories** (tick boxes; multiple answers allowed)
 - Larger industrial company (international)
 - SME
 - Industry cluster
 - Industry association
 - Industry network
 - Consultant
 - Technology Transfer organisation
 - Regional organisation
 - European organisation
 - National organisation
 - Funding agency/venture capital provider
4. **If you are representing a company please answer the following, otherwise go to question 5.**
 - a. **What is the main marine biotechnology² activity of your company?** (tick box, multiple answers allowed)
 - We use raw material from marine biomass
 - We use marine related bio-information for development of products/services
 - We develop product/services for use in marine bio-environment
 - We do not have any marine biotech activity (if ticked then go straight to Q5)
 - b. **What type of marine biomass does your company use for R&D or for production?** (tick box, multiple answers allowed)

² *Marine biotechnology company applies biological knowledge and relevant technology to generate knowledge, goods or services either a) by using marine biomass as source material or b) by using non-marine material for use in marine biotic environment (e.g. bioremediation, biosensors....). Add web ref if available.*

- Fish
- Molluscs
- Microalgae
- Macroalgae
- Bacteria
- Other, explain
- The company does not use raw material from marine source

c. **What is the main target market for your marine related products?** (tick box, multiple answers allowed)

- Food
- Energy
- Materials
- Cosmetics (e.g. skincare)
- Health (e.g. food supplements)
- Pharmaceuticals
- Environment and monitoring (e.g. biosensors, anti-fouling technology, bioremediation....)
- Production of commodities or services other than above, explain

Technical Transfer Practise and Policy

5. What do you consider the main technical transfer problem(s) in marine biotechnology (please only choose 3 issues from the list below in order of importance, where 1 is the most important) (Three dropdown lists):

3x,

i.e. after each tick the textbox appears

- Insufficient co-operation between academia and industry
- Level of public funding to bridge the gap between academia and industry
- Lack of national policy and strategy for tech transfer and start-up companies
- Lack of incentives for public-private collaboration and problems associated with such partnerships
- IPR issues – Benefit sharing
- Limited access to resource material for R&D and pilot studies
- Other
-

Please elaborate....

Suggested solutions or comments:

6. Are there specific technical IPR/IPP issues for marine biotechnology? (Text box text length is max 2000 characters)

7. Infrastructure and tools

Please provide your opinion on the quality of infrastructure and tools available for Marine Biotechnology at the different levels listed below:

- Quality of academic infrastructure and tools (dropdown - low, good, excellent)
- Availability of academic infrastructure and tools (dropdown - low, good, excellent)

Please elaborate

- Quality of industry infrastructure and tools (dropdown - low, good, excellent)
- Availability of industry infrastructure and tools (dropdown - low, good, excellent)

Please elaborate

- Quality of public organisation infrastructure and tools (dropdown - low, good, excellent)
- Availability of public organisation infrastructure and tools (dropdown - low, good, excellent)

Please elaborate

Funding schemes and Marine biotechnology specific funding issues

8. Sources of funding.

- What is your main source of funding? (dropdown with following options, choose one and choose also share of funding 0-25%, 26-50%, 51-75%, 76-100%))
 - domestic public funding
 - EU or international funding
 - venture capital
 - other

Please elaborate....

- Are there additional sources of funding? (choose one from dropdown list)
 - domestic public funding
 - EU or international funding
 - venture capital
 - Charity foundations (NGOs)
 - other

Please elaborate....

9. What do you consider the main bottleneck for funding of marine biotechnology R&D (please only choose 1 or 2 issues) (Dropdown list):

- Access to domestic public funding
- Access to EU or international funding
- Availability of funding for infrastructure and tools
- Access to venture capital
- Access to charity foundation (NGOs) funding
- Successful public-private partnerships
- Other

Please elaborate....

Suggested solutions or comments:

2x,

i.e. after
each
tick the
textbox
appears



APPENDIX 2: STRATEGIC FORUM CSA MARINEBIOTECH

Country	Funding agency
Belgium	Belgian Federal Public Planning Service Science Policy
	National Fund for Scientific Research
	Department for Economy, Science and Innovation - Flanders
	The Research Foundation - Flanders
	Agency for Innovation in Science and Technology
	Flanders Marine Institute
Bulgaria	Ministry of Education, Youth and Science
Croatia	Ministry of Science, Education and Sport
Denmark	Danish Agency for Science, Innovation and Higher Education
	DTU Fodevareinstitutet
Estonia	Estonian Academy of Sciences
Finland	Academy of Finland
	The Finnish Funding Agency for Technology and Innovation
France	L'Agence National de la recherche
	Institut français de recherche pour l'exploitation de la mer
	Centre Nationale de la Recherche Scientifique
Georgia	Shota Rustaveli National Science Foundation
Germany	Federal Ministry of Education and Research
	German Research Foundation
	Agency for Renewable Resources
	Deutsche Bundesstiftung Umwelt
	Federal Ministry of economics and Technology
Greece	General Secretariat for Research and Technology
Iceland	The Icelandic Centre for Research
Ireland	Marine Institute
Israel	Ministry of Agriculture and Rural development
Italy	Ministry of Education, University and Research
Veneto region	Regione del Veneto – Project Unit Research and Innovation
Sicilian region	Regione Sicilia - Dipartimento regionale delle attività produttive
Latvia	LATVIJAS ZINATNU AKADEMIJA (Academy of Sciences)
	Investment and Development Agency of Latvia
Malta	Malta Council for Science and Technology
Netherlands	Netherlands Organisation for Scientific Research
	Department for Earth and Life Sciences -

Country	Funding agency
New Caledonia	Agence de Développement Economique de la Nouvelle-Calédonie
Norway	Innovation Norway
	The Research Council of Norway
Poland	National Centre for Research and Development
	National Science Centre
	Institute of Oceanology of the Polish Academy of Sciences
Portugal	Fundaç�o para a Ci�ncia e a Tecnologia
Romania	Executive Agency for Higher Education, Research, Development and Innovation Funding
Slovenia	Ministry of Education, Science, Culture and Sport
Spain	Ministerio de Econom�a y Competitividad
Sweden	Swedish innovation agency
	The Swedish Research Council
	The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning
Ukraine	Kyiv State Center for Scientific, Technical and Economic Information
UK	Technology Strategy Board
	Biotechnology and Biological Sciences Research Council
	Natural Environment Research Council
	Department for Environment, food and rural affairs
	Research Councils UK

APPENDIX 3: STAKEHOLDER FORUM CSA MARINEBIOTECH

country	organization	webpage	research	industries	policy makers	outreach professionals	infrastructures	network
Belgium	FlandersBio	flandersbio.be						
	VIB	www.vib.be/en/Pages/default.aspx						
Denmark	Dansk Biotek	www.danskiotek.dk						
Baltic region	ScanBalt	www.scanbalt.org						
Finland	SYKE	www.environment.fi						
	CIM	www.cimfunds.com/news.html						
France	Adebiotech	www.adebiotech.org						
	AllEnvi	www.allenvi.fr						
	IASP/Atlanpole	www.atlanpole.fr						
	OOB/EMBRC	www.embrc.eu						
	Pôle Mer Bretagne	www.pole-mer-bretagne.com						
	GreenStars	-						
Germany	BioCon Valley	www.bcv.org						
	DECHEMA	www.dechema.de						
	GEOMAR/Helmholtz Association	www.geomar.de						
	KDM German Marine Research Consortium	www.deutsche-meeresforschung.de/en						
	MPI for Marine Microbiology	www.mpg.de www.mpi-bremen.de						
	Fraunhofer RI for Marine Biotechnology	www.fraunhofer.de/www.emb.fraunhofer.de/en.html						
Greece	IBRB, the National Hellenic Research Foundation	ctwww.eie.gr/index-en.html						
Iceland	Matis	www.matis.is/english/home						
Italy	BIONAT ITALIA S.r.l	www.bionatitalia.it						
	Stazione Zoologica Anton Dohrn	www.szn.it						
Luxembourg	LBMCC	www.lbmcc.lu						
Mediterranean region	CIESM	www.ciesm.org						
Netherlands	Algae ARC	www.algaeparc.nl						
Norway	The Norwegian Bioindustry Association	www.biotekforum.no						
	UMB	www.umb.no						
	Biotech North	www.biotechnorth.no						
	Arcticzymes	www.arcticzymes.com						
Poland	Institute of Oceanology PAS	www.iopan.gda.pl						

country	organization	webpage	research	industries	policy makers	outreach professionals	infrastructures	network
Portugal	IMAR, Uni Azores	www.imar.pt						
	Algarve CMS, Uni Algarve	www.ccmr.uaalg.pt						
	Bioalvo	www.bioalvo.com						
	EurOceans	www.eurocean.org						
	Biocant	www.biocant.pt						
	Biotrend	www.biotrend.biz						
	University of Aveiro	www.ua.pt						
Slovenia	Marine Biology Station Piran	www.mbss.org						
Spain	PharmaMar	www.pharmamar.com						
	IMR, Vigo	www.iim.csic.es						
Sweden	Linnaeus University	lnu.se						
Switzerland	Swiss Biotech Association	www.swissbiotech.org						
Turkey	Ege University	ege.edu.tr						
UK	Biosciences KTN	connect.innovateuk.org/web/biosciencesktn						
	MBC, Aberdeen	www.abdn.ac.uk						
	Industrial Biotechnology Leadership Forum	https://connect.innovateuk.org/web/industrial-biotechnology						
	Marine Scotland	www.scotland.gov.uk/About/Directorates/marinescotland						
	PML, Plymouth	www.pml.ac.uk						
Europe/regional	EuropaBio	www.europabio.org						
	Nordic Pharma	www.nordicpharmagroup.com						
International industry	CEVA	www.ceva.com						
	Croda Chemicals	www.croda.com						
	DSM	www.dsm.com						
	L'Oréal	www.loreal.com						
	Novozymes	www.novozymes.com						
	Pierre Fabre	www.pierre-fabre.com						
	Unilever	www.unilever.com						
	World Ocean Council	www.oceancouncil.org						
	DuPont	www.dupont.com						
	Sanofi	en.sanofi.com						
USA	Woods Hole Oceanographic Inst	www.whoi.edu						
Russian Federation	Genetika	eng.genetika.ru						
Japan	Foundation for Biomedical Research and Innovation	www.ibri-kobe.org						
	OP BIO Factory	www.opbio.com						