

# Think Tank 6 Marine biotech for the environment

To complement research perspectives, two contributions were made in Think Tank 6, one by J. Rauo from Marelis AS and the other by H. Bisgaard-Frantzen from Novozymes, to identify bottlenecks from a small SME and large end-user industry perspective in how to get more new marine biotech products to market.

## Moderator

Dr Johanna Wesnigk, Managing Director, EMPA, Germany

## Note taker:

Dan Leeming, PhD student at Plymouth University, UK



by Dr Johanna B. Wesnigk, Mg4U and Micro B3 project

**T**his Think Tank followed in the footsteps of Think Tank 2 which focused on health issues. Many participants were identical enabling more in-depth discussions and to promising recommendations.

Dr J. Wesnigk and Prof F.O. Glöckner - representing the MG4U and the Micro B3 EU projects - set the scene what state-of-the-art marine research and dissemination can provide. A plethora of techniques, methodologies and knowledge outputs are available to industry, especially in the field of genomics, bioinformatics and proteomics, or 'omics as these interrelated disciplines are increasingly called. Two industry interventions were made, to identify bottlenecks from a small SME and large end-user industry perspective. To promote new marine biotech products the market push needs to be strengthened. Larger industry should define their general areas of interest for academia and SMEs, who then target the enabling research and develop specific applications of new marine biotech products and services. It was emphasised that technology scouts should know what they are looking for, but be prepared to find something else. This attitude will facilitate bridging the gap between the research potential and marine biotech applications, by informing and inspiring decisions by end-user representatives on which approaches are worth developing.

Bringing about and facilitating dialogue between end-users and academia as well as SMEs is one of the core tasks of cluster representatives, to overcome bottlenecks in communication and kick-start collaborations. The internet, social media and emerging new infrastructures will help but facilitation of contacts and safeguarding IPR are still needed. Clusters can help with successful up-scaling of lab-scale production and providing market intelligence. A public-private partnership was recommended as a supra-national tool to advance marine biotechnology within Europe.

Further recommendations focused on several issues of which three will be further illustrated.

## 1) How to better understand and make use of beneficial microbes

There is a lack of understanding of microbial marine diversity and their habitats, in short: Who is out there, where are they, how many and what are they doing?

We need more academia-industry knowledge exchange on the optimum conditions for sampling, processing and cultivation, based on the diverse marine habitats of microbes including many extreme environments. Then genomics can be utilised to speed-up the application process and avoid over harvesting. Sequencing can assess potential, help with in silico activity prediction and selection. Promising case studies

were recently published, (MAMBA project, lead University. Bangor) in which several large industry partners have identified new biocatalytical activities. Compound screening still needs a high throughput approach, which is only funded if very close to industry. A case study from Geomar, Kiel, in which marine compounds were fed into existing downstream processing pipelines, showed high hit rates.

## 2) Human resources and infrastructures needed for SMEs and large industry to benefit from marine data

Large gap(s) still exist between proof-of-principle, i.e. an enzyme is identified and expressed, and proof of concept, i.e. an enzyme can be produced cost effectively and in large quantity. The perceived gaps can be addressed first through a review and analysis of what is working for an improved knowledge flow between industry and academia. Examples/case studies for best practice and knowledge transfer can be used. The need for new expertise can then be addressed through intelligently combined teams, with more biochemical know how, able to handle sub-sets of genomics data for targeted predictions and to target market-driven applications. These teams will work best in conjunction with provision of infrastructure, like mid-scale fermenter-, or proteomics facilities and dedi-

cated service-oriented staff, if possible with partial government funding.

Scientists are not aware of market interests and pressures; they need to be informed and trained. We need to mould the thinking of a next generation of scientists in a more entrepreneurial way. In the medium-term training and education should encompass business-relevant skills. The experiences from EU funded PhD networks with two mandatory industry stages are positive. Local contests for student-written business plans for marine biotech business could help, for example funding implementation of the winning business plan.

Efficient up-scaling of production is necessary, but who is responsible for different up-scaling stages, how to get it funded? Here expectations of academia, industry and funders diverge strongly: if production condi-

tions are not economically viable SMEs will not be able to offer a new product to business end-users or consumers. The next steps in the value chain for new concepts, e.g. an algal biorefinery, can still be partially funded as demonstration/pilot projects, via EU support. Thereafter proof-of-concept and further product development has to be driven by end-users.

### 3) Reaching policy makers - Visibility is key!

Urgently an excellent analysis is needed to develop a roadmap with consistent, harmonised and easy to understand message(s) on promising marine and environmental biotech options. Groupings of interests can help to present cases for policy changes and for gap-based funding. The application areas of marine-origin products

include markets like environmental monitoring, diagnostics or biocatalysis, and specialty chemicals. Consumer-facing standards and certification to create a positive image and motivation for increased demand for products 'from the sea' could be introduced.

Different ways of reaching and motivating the decision-makers for policy and investment need to be developed as part of the roadmap implementation plan. This includes using media, associations, clusters and public opinion, inter alia through targeted events to promote strategic messages or road map elements garnished with success stories.

At BioMarine 2013 the unique features and benefits of using marine diversity for environmental biotechnology applications will be further explored. In the meantime expert workshops focussing on single issues will be offered by the Micro B3 and MG4U projects to company experts to discuss and develop themes identified further and fine-tune joint strategies to promote marine and environmental applications. Case studies in the areas of genomics, bioinformatics, IPR and marine biodiversity will help improving research-industry collaboration for marine and environmental biotechnology applications.

MORE INFORMATION:

<http://www.microb3.eu/news/biomarine-think-tanks-embrace-omics-input>

#### Companies attending this Think Tank:

A-Spark Good Ventures - Algopack - Bioalvo - BioBridge - BioNova - BioTech North - Bretagne Developpement Innovation - Concordia Capital LLC - European Marine Biological Resource Centre (EMBRC) - Financonsult - FMC BioPolymer - Grette Law - Kiel Center for marine natural products - Marine Biotechnology Programme of Ireland - Marine Bio-Technologies Center of Innovation - Max Planck Institute - Novagraaf Technologies - Nautilus Biosciences Canada - Novozymes A/S - OceanGate, Inc. - Plymouth Marine Laboratory - Polytechnic Institute of Leiria - Pronova BioPharma - Roscoff Marine Station France - Technopole Maritime du Québec - Thalocea - University of Aveiro - Varicon Aqua Solutions

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