ERA-IB-2

NEWSLETTER 11 - December 2014

ERA-IB-2 and ETB launch sixth jointh call for Industrial Biotechnology research proposals

ERA-IB-2 has launched its 6th joint call for proposals. Like the previous two calls, it was in collaboration with EuroTransBio (ETB). The main purpose of this call is to generate joint European research and development activities and to stimulate researchers who specialise in IB to work closely together.

Through the collaboration between the two ERA-Nets, more funding becomes available and the geographical coverage is expanded. With this joint call, ERA-IB-2 and ETB want to foster the integration of different steps of the whole value chain. The call covers the following: 'Industrial biotechnology for Europe: an integrated approach'.

Submission of proposals is in two steps: the deadline for pre-proposals is 23rd of February 2015 (13:00 CET) and for full proposals (by invitation only!) on 15th of June 2015 (13:00 CET). Projects are expected to start in late 2015 or early 2016, depending on the funding organisations involved. The cooperative projects must have a minimum of three and maximum of eight participants from a minimum of three different ERA-IB-2 and/or EuroTransBio partner countries. The participation of an industrial partner in the consortium is mandatory.

The following ERA-IB-2 partner organisations will participate and fund one or more projects

Agentschap voor Innovatie door Wetenschap en Technologie (IWT), Belgium; Fachagentur Nachwachsende Rohstoffe (FNR), Germany; Sächsisches Staatsministerium für Wissenschaft und Kunst (SMWK)/Freistaat Sachsen, Germany; Latvian Academy of Sciences, Latvia; Netherlands Organisation for Scientific Research (NWO), Netherlands; Norges forskningsråd (RCN), Norway; Narodowe Centrum Badań i Rozwoju (NCBR), Poland; Fundação para a Ciência e a Tecnologia (FCT), Portugal; Unitatea Executiva pentru Finantarea Invatamantului Superior, a Cercetarii, Dezvoltarii si Inovarii (UEFISCDI), Romania; Foundation for Assistance to Small Innovative Enterprises (FASIE), Russia; Ministerio de Economia y Competitividad (MINECO), Spain; Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (TUBITAK), Turkey; Innovate UK, United Kingdom; Biotechnology and Biological Sciences Research Council (BBSRC), United Kingdom (the participation of BBSRC is not definitive at the moment. It will be determined by the end of 2014).

The following partners of ETB will participate

Austrian Research Promotion Agency (FFG), Austria; Service public de Wallonie, General Directorate for Economy, Employment and Research (SPW-DGO6), Belgium; and Finnish Funding Agency for Innovation (Tekes), Finland.

Funding is available for innovative, industry relevant Industrial Biotechnology projects on the following topics

1. Conversion of industrial by-products and biomass into value-added products;
2. novel systems for new or more sustainable processes e.g. the use of enzymes, micro-organism and cell-free biosynthesis systems;
3. new compounds from existing, but not well studied biological systems, through a greater understanding of their metabolic pathways;
4. modelling and optimisation of biological processes;
5. process development, intensification and/or integration in existing industrial processes e.g. upstream or downstream design, scale-up of biotechnological processes.

Projects should clearly address the product and market to be addressed, produced by biotechnological processes, e.g.
1. Bio-based materials;
2. platform chemicals e.g. bio-monomers, oligomers and polymers;
3. pharmaceuticals, functional food/ feed ingredients.

Please check national/regional regulations since some of these topics may be not suitable for all agencies. As well as describing the technical aspects of the project, proposals should describe their social, economic and environmental impact.

More info and the call documents can be found on the ERA-IB website www.era-ib.net/6th_call_documents

ERASysAPP - 2nd Joint Call for Applied Systems Biology Research

ERASysAPP – ERA-Net on Systems Biology Applications is a three-year coordination and support action (CSA) funded under the European Commission ERA-Net scheme (Contract number 321567) within the 7th Framework Programme (FP7 Cooperation Work Programme: Food, Agriculture and Fisheries, and Biotechnologies).

ERASysAPP has launched its second joint call for proposals on October 29 2014. The network partners call on research teams from ten participating countries to set up international research consortia and to submit joint project proposals. By means of this transnational call, ERASysAPP aims to encourage scientists to collaborate and share resources beyond national boundaries.

The call targets applied aspects of complex biological processes in microorganisms, plants and animals. As a common feature, all addressed proposal topics must tackle biological and physiological processes that will contribute to advancements in the field of life sciences and biotechnology. Participation in this call demands high quality modelling activities and high data management standards for an overall high sustainability of SB research and its expected outcome. More information can be found under: www.erasysapp.eu/calls/open-calls.

Overview projects recommended for funding 5th call

In February this year, ERA-IB-2, in cooperation with EuroTransBio (ETB), launched a fifth international joint call for multilateral research projects using Industrial Biotechnology (IB). The evaluation procedure was finished in October. The projects recommended for funding will receive approximately 15 Mio Euros in total.

The following projects will start in 2015

- ***ChitoTex*** Development and production of new insect chitosan and chitosan based functional coatings for yarns and textile fabrics (Germany, Austria, Netherlands and Norway
- ***CO2CHEM*** Biological conversion of CO2 to the platform chemical 3-hydroxypropanoic acid (Germany, UK, and Denmark)
- ***DYNAMICS*** Analysis and optimisation of industrial microorganisms under dynamic process conditions (Netherlands, Portugal, and Germany)
- ***EcoYeast*** Mastering the economics of adaptation through constraint-based modeling in yeast (Netherlands, Denmark, UK and France)
- ***FILAZYME*** Novel approaches to develop filamentous micro-organisms for enzyme production (Netherlands, France, Spain and Turkey)
- ***LIGBIO*** A Synthetic Biology approach for bacterial bioconversion of lignin into renewable chemicals (UK, Spain and France)
- ***MetaCat*** A metagenomic collection of novel and highly efficient biocatalysts for industrial biotechnology (Germany, Denmark, France, UK and Spain)
- ***NeBrasCa*** Next Generation Immunosuppressants: Brasilicardin synthesised by Nocardia spp (Germany, Spain and Poland)
- ***OXYPOL*** Optimised laccase systems for high-value bio-plastics production from biomass (Norway, Spain, UK, Netherlands, Germany and Russia)
- ***PROCAR*** The exploitation of Xanthophyllomyces dendrorhous as a sustainable platform for the PROduction of high-value CARotenoids (UK, Germany, Belgium, Romania, and Denmark)

Results of 2nd joint call bundled in call brochure

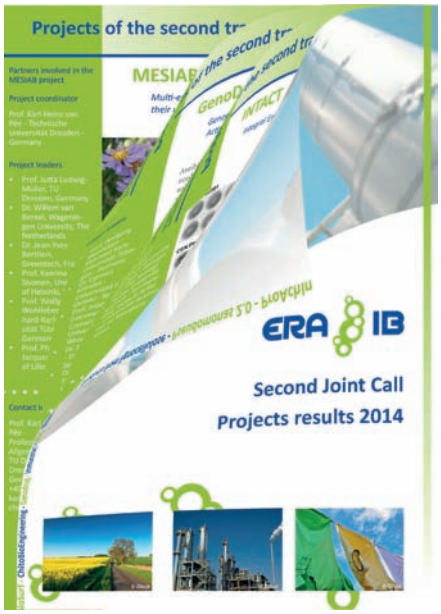
In December 2009, ERA-IB launched its second joint call, which resulted in 46 proposals being submitted, of which ten projects were selected for funding with a total granted budget of 11.1 Million Euros. The ten selected projects started in early 2011 and are mostly finished by now. Their results have been compiled in a call brochure. The results of the projects ChitoBioEngineering and Pseudomonas 2.0 will be available by 2015.

Some projects highlighted

GenoDrug – Genome mining for drug discovery: Activation of silent biosynthetic gene clusters: The ERA-IB GenoDrug consortium has worked on a new technology for drug discovery, i.e. the activation of previously "silent" biosynthetic gene clusters of microbial genomes. The recent introduction of next-generation high-throughput DNA sequencing techniques has opened an entirely new prospect for industrial biotechnology: the discovery of an enormous number of new bioactive compounds (e.g. pharmaceuticals) from the mining of microbial genomes. Sequencing of many microbial genomes, especially from actinomycetes, has revealed that the genome of each strain contains gene clusters for the formation of 10-30 bioactive compounds ("secondary metabolites"). This implies that for any actinomycete strain most of its potential as producer of bioactive compounds is yet undiscovered.

MESIAB - Multi-enzyme systems involved in astin biosynthesis and their use in heterologous astin production. The impact of this project: The identification of the producer of the antitumor compound astin as a fungus allows the production of larger amounts of these antitumor compounds by fermentation, instead of by extraction from dried aster roots, and makes possible their use for further development as an anti-tumor compound. In addition, it raises the question of whether other health-promoting compounds derived from aster root extracts as used in traditional Chinese medicine, are also produced by this fungus. If this should be the case, they could also be produced in larger amounts and could be specifically analyzed for the pharmacological properties. Using the fungus instead of the plant as the cell factory will avoid the use of herbicides, fertilizers and additional cultivation area.

The overall experience of the project members was positive. Ton Van Maris (project Intact): "The ERA-IB INTACT project brought together the complimentary expertise of international research groups in a collaborative effort to improve the understanding of acetic-acid tolerance in the important industrial microorganism Saccharomyces cerevisiae. Consequently, the INTACT project resulted in wild or engineered yeast strains with improved acetic acid tolerance and protocols to induce robustness or evolve constitutive robustness.



The end of this project coincides with the commercial realisation of first full-scale factories for yeast-based production processes from lignocellulosic feedstocks. This makes the results as relevant for the sustainable production of fuels and chemicals as envisioned at the start of the project."

You can find a complete overview of the 2nd call results on our website www.era-ib.net/publication/call-brochure-projects-second-transnational-call.

BIO-TIC business case workshops – pathways to overcome hurdles for both novel and more established IB processes

For more than two years now, the BIO-TIC project has sought to identify the hurdles to industrial biotechnology in Europe and find novel ways to overcome them. The project focusses on five product groups which show significant potential for Europe and which can drive cross-cutting technology ideas. These are bio-based plastics, bio-surfactants, bio-based chemical building blocks, advanced biofuels (aviation and bioethanol), and industrial biotechnology as a route to converting CO2 to products. The BIO-TIC consortium held a series of workshops focused on these particular product groups between September and December 2014 in order to gather expert opinion on how to tackle challenges to industrial biotechnology in the EU. In this article, we will concentrate on two of these business cases: the potential for using CO2 as a feedstock for industrial biotechnology, and the production of bio-based chemical building blocks.

CO2 as a feedstock for industrial biotechnology

The use of CO2 for industrial biotechnology processes is in its infancy and, as a result, it does not yet possess a sizeable market share. However, more and more industrial players are interested in mitigating fossil carbon emissions through its conversion to bulk and specialty chemicals in what is known as carbon capture and utilisation (CCU). IB is one of a raft of technologies which can help valorise CO2 and enable carbon capture and utilisation in Europe. As a cheap and abundant source, CO2 use can help meet the ambitious EU targets for CO2 emissions reductions. In addition, it has the potential to close CO2 cycles to form a virtuous industrial carbon cycle. Take Photanol for example, this innovative Dutch company uses cyanobacteria to generate chemicals and fuels from CO2 in a carbon neutral process. However, CO2 is not the only C1 gas which can be used for industrial processes. Companies such as Calysta for example are opting for CH4 (methane) as a feedstock to produce proteins for animal feed.

"More and more industrial players are interested in mitigating fossil carbon emissions through its conversion to bulk and specialty chemicals in what is known as carbon capture and utilization (CCU)."

Despite the great potential of carbon capture and utilisation, many barriers exist. To discuss these hurdles and possible solutions for this promising technology, the BIO-TIC partners held a dedicated workshop on 24th September 2014 alongside the Large Volume CO2-Utilisation Forum in Lyon, France.

With an audience full of experts from the chemical, climate, environment, and industrial biotechnology fields, discussions immediately sparked around the fact that CO2, as a highly thermodynamically stable molecule, requires significant amounts of energy for its capture and purification. This not only results in high energy costs but can also affect the products environmental credentials.

The participants identified this hurdle as one of the most urgent ones to tackle to enable the uptake of carbon capture and utilisation technologies. The very key to overcoming barriers related to CO2 preparation and high energy costs lies in the optimisation of selective conversion routes which simultaneously avoid the formation of coproducts which may be difficult to separate.

Subsequently, the workshop participants highlighted the crucial need for a close cooperation with the chemical industry in order to identify target molecules, which are likely to be relatively complex speciality chemicals with high value added and small volumes. It was agreed that the most effective routes for CO2 conversion using IB may be either dedicated IB routes or hybrid routes where IB is used in conjunction with chemical catalytic steps. Pathways for adapting the process to the specificities of the CO2 source were highlighted as relatively promising.

These technological developments could prove instrumental in ensuring the market uptake of carbon capture and utilisation technologies. Regardless of the different technology readiness levels of the different pathways to use CO2 to generate valuable products, a supportive policy framework should be in place to foster the rapid development of these clean technologies.

The participants stressed the need for a dedicated label for products derived from waste CO2. This would require a more supportive framework for carbon-use technologies, as the current European Emissions Trading Scheme and cheap CO2 prices only promote carbon capture and storage. As a result, it was decided that industry associations with an interest in this area should take advantage of the reform of the ETS system for the period beyond 2020 to promote the carbon utilisation agenda. Ideally, a dedicated new CEN or ISO standard would be in place by 2020 and would be based upon LCA analyses covering the entire supply chain. As an accompanying measure, but none the less important one, a communications strategy could be developed to promote CO2-based products by showcasing pioneering projects and companies which use CO2 to produce useful chemicals. It was suggested that the information necessary to support CO2 labelling could be facilitated by a Coordination and Support Action project, possibly under the auspices of the SPIRE or Horizon 2020 funding schemes.

Bio-based chemical building blocks

The EU demand for bio-based chemical building blocks accounted for 35% of the global demand in 2013. With advantages in terms of sustainability and safety, the bright future for European bio-based chemical building blocks production should be secured. Yet examples of promising European companies building their facilities outside of the EU appear to undermine the hopes of a successful EU bio-based chemicals industry.

Chemical building blocks workshop market survey

To address these concerns, the BIO-TIC consortium gathered stakeholders for a workshop at EFIB 2015 (the European Forum on Industrial Biotechnology) on 1st October 2014 in Reims, France. Workshop participants were generally positive about the development of the EU bio-based chemicals industry, expecting the initial impetus to come from new products and niche applications, especially for chemicals which are difficult to synthesise using chemical routes. In time, participants expected that the use of lignocellulosic feedstocks will become more prominent.

While delegates expressed high hopes that the EU could foster more production facilities, they nevertheless had reservations about the extent to which volatile fossil feedstock prices and the carbon footprint of traditional chemical building blocks can drive the uptake of the bio-based chemical market in the EU. To date, the biggest hurdle for biobased chemical building blocks in the EU is cost competitiveness, of which high production costs and raw material availability, quality and price are particular concerns.

Two solutions were suggested to tackle high feedstock prices. The first was the removal of import quotas and tariffs for traded sugar to allow EU chemical building block producers access to sugars at world prices, although the impact of this on EU sugar production was unclear. The second solution was to use sugars in an unrefined, syrup state for industrial biotechnology processes, in this way by passing the costs associated with sugar crystallisation.

"There is a crucial need to promote research into lignin chemistry and uses for lignin."

Building on the potential for securing large amounts of biomass from the forestry sector, the delegates considered that there is a crucial need to promote research into lignin chemistry and uses for lignin. To combat the fragmentation of the EU's land and forestry resources,

owners could be encouraged to form cooperatives to increase economies of scale and reduce costs. A supply of cheap and plentiful sugar could help reduce overall production costs, but due to high feedstock and energy prices, participants felt that the EU's best bet would be to improve technology processes by reducing the costs of the conversion process. Participants suggested that consolidated bioprocessing was one route to deal with lignocellulosic feedstocks and that the integration of pre-treatment and fermentation steps may reduce the capital expenditures of some applications. The delegates dismissed in situ product removal as unfeasible, but considered other options to reduce downstream processing costs. These included the development of microorganisms with increased fermentation selectivity to reduce the generation of contaminants, and the adaptation of downstream processing steps to the impurities produced by the microorganisms.

Perspectives

The BIO-TIC project has identified the key hurdles hampering the development of a vibrant IB sector in Europe. Practical actions by which these hurdles can be overcome have been identified. The crucial step now is to ensure that all relevant stakeholders are fully engaged with the BIO-TIC action plan to ensure that these solutions are taken forward. The BIO-TIC final conference will be on the 23rd June 2015 in Brussels and will discuss the current state of IB in Europe, showcase the solutions developed in the project, and bringing together EU, national and regional policy makers involved in innovation policies in IB. Will you be there?

Claire Gray
Ioana Popescu
BIO-TIC project

5th Forum for Industrial Biotechnology and the Biobased Economy organised by CINBIOS

On 7 November 2014, CINBIOS held the fifth Forum for Industrial Biotechnology and the Bio-based Economy in Mechelen, Belgium.

Participants from the industrial sector, universities and various government agencies attended this annual event at which challenges emerging from the transition towards a bio-based economy and new developments in the sector were discussed. The key topic of this year's Forum was the economic feasibility of bio-based initiatives.

After the welcoming, François de Bie from European Bioplastics kicked the event off and talked about the future for bioplastics in Europe and his own expectations. He expects a strong increase in the demand for bioplastics and an increase in capacity for production (mainly in polylactic acid (PLA) & PLA blends). As a consequence of this increase, the economies of scale will make bioplastics more competitive with fossil-based plastics in the near future. But according to de Bie, we have to keep in mind that these projections are based upon first generation feedstocks (i.e. products that could also be used for food or feed).

Erwin Vinck of NatureWorks continued by discussing the value of using sugar beets as 1st generation feedstocks, which are more efficient than 2nd generation feedstocks (side- and waste streams), for bioplastics in Europe. However, 2nd generation feedstocks do not compete with food and feed, but are more expensive and need more energy input. Vinck also discussed generation 'next', i.e. the possibility of direct use of Greenhouse Gases (GHG's) to produce lactic acid. Although still in the development phase, this is very promising according to him. He also mentioned that the main hurdle for bioplastics is cost, because fossil-based plastics are still cheaper. Steps that need to be taken, according to Vinck, include for the drafting and implementation of a feedstock policy which directs production of biofuels and bioenergy towards 2nd generation feedstocks and thus allows 1st generation feedstocks to be used for materials. Furthermore there is a need for a market-support policy with incentives for environmental benefits (low carbon, biodegradable).

Within the framework of 'Financing the Bio-based Economy', speakers from MINT Europe and Investment Company (PMV) explained the subsidies in Flanders and Belgium which are providing sustainable financing.

Dirk Carrez from the Bio-based Industries Consortium (BIC) explained the "Bio-based Industries Initiative", the new European Public-Private Partnership (PPP) on Bio-based Industries (BBI) in which BIC is involved as the private partner. This PPP is a Joint Technology Initiative under Horizon 2020 that organises its own research agenda and awards funding for projects on the basis of open calls. They will invest €3.7 billion in bio-based innovation between 2014 and 2020 with €975 million coming from EU funds and €2.7 billion from private investors. Recently, private banks have also joined the PPP BBI.

One of the main benefits of the PPP-construction is, the de-risking of investment in the emerging bio-industry. The PPP brings a clear framework with an earmarked budget, and thus the long-term stability and predictability which are necessary to stimulate investment. Another plus is that new bio-based products which will result from the PPP will reduce CO2 emissions by at least 50% compared to fossil fuel alternatives. Furthermore, by creating this competitive bio-based infrastructure in Europe, job creation will be boosted, especially in rural and underdeveloped areas.

In the framework of scientific excellence, Heleen de Wever from VITO talked about the potential of in-situ product recovery for intensification of bioprocesses. Stefan Ruyters from KULeuven elaborated on non-saccharomyces yeasts for fermentation of lignocellulosic biomass. Finally, Linseay Garcia-Gonzalez, also from VITO, explained the valorisation of exhaust CO2 to chemicals and fuels. They are now investigating two methods: bioplastics (PHB) production from CO2 via a fermentation process on the one hand,and, bioelectrosynthesis using bacteria as an electrocatalyst on the other hand. The latter is a very new technology.

Next, Joeri Beauprez (CSO Inbiose), Johan Jacobs (CEO Millibeter), William van der Riet (CEO TomAlgae) and Wim van der Wilden (General Manager Dyadic Netherlands) explored the bio-based economy. Beauprez talked about the efficient synthesis of specialty carbohydrates through industrial biotech. Inbiose (spin-off from InBio, UGent) also works with specialty carbohydrates, mainly very complex carbohydrates with unconventional structures that are very expensive but have broad applications (high end value in pharmaceuticals, etc.). Inbiose has succeeded in developing a very generic and scaleable technology platform. They can produce almost any specialised carbohydrate and together with the Ghent Pilot Plant, Inbiose is already able to produce those at a rather large scale.

The last sessions continued with the presentation of various company strategies. Speakers included Wim Michiels (Proviron), Jean-Christophe Bogaert (Galactic) and Herman-J Wories (DSM Innovation Center). Galactic's core business is 'lactic acid' and is based in Belgium, China and the USA. They have 20 years of bio-based innovation experience. They first started with lactic acids and have now moved to salts, esters & amides, cultures, fermentates and proteins and enzymes. In food, they focus on four pillars for innovation: food safety, health improvement, cost reduction and clean labelling. For non-food innovation, they focus on new chemicals that are bio-sourced, biodegradable and in line with REACH (Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals) without sacrificing efficiency.

CINBIOS is an initiative of FlandersBio (the networking organisation for the life sciences sector in Flanders) Ghent Bio-Economy Valley (a non-profit organisation supporting the development of bio-based activities in the region of Ghent, Belgium) and Essencia (the Belgian Federation for Chemistry and Life Sciences). This initiative tries to bridge between industrial-led companies and knowledge institutions. Their activities include: creating new cross-sectoral value chains, inventory and valorisation of waste streams, lignocellulose and biocatalysis for the bio-based chemistry. (www.cinbios.be)

Michael Carus (Nova-Institut GmbH): "New policy framework for bio-based economy

Michael Carus from Nova-Institut GmbH, a private research company working on bio-based materials, also attended the CINBIOS Forum and elaborated on the new policy framework for a bio-based economy. Nova-Institute has written two reports, in which they formulated possibilities and recommendations for policy. The first is titled 'proposals for a reform of the Renewable Energy Directive to a Renewable Energy and Materials Directive (REMD) and the other 'Options for designing a New Political Framework on the European Bio-based Economy'

Carus elaborated on the current competition between the petrochemicals sector, the bioenergy & fuels sector and the sector of industrial materials made from biomass. The bio-energy and -fuels sector is able to compete with petrochemicals thanks to all the subsidies and support mechanisms. Petrochemicals can easily compete with both other sectors as well, again because of many tax breaks. Yet, the biomaterials cannot compete with either of the other sectors because there is no support mechanism in any form.

"The big improvement is not first to second generation feedstocks, but CO2 as an input. This would be the solution for all discussions"

The consequences are a very low growth of the sector and an increase of the prices for biomass. Furthermore the battle for biomass is lost for the materials sector and raw materials are almost solely used by the bioenergy/biofuels sector. This means hundreds of potential biomass applications in the materials sector are not being materialised.

Nova-Institut already has identified more than 25 examples of support measures for bioenergy and biofuels that are directly competing with biomaterials.. This is very problematic, also from an economic point of view, as the value created and the persons employed for each unit of land used is much higher for biomaterials than for bioenergy and biofuels.

That's why the EU needs a new political framework and regulations. Unfortunately, the current political discussions include very little on this subject.

Carus advocated for keeping the existing infrastructure but with a substantial reform of the Renewable Energy Directive (RED) and not just throwing RED overboard. This would destroy everything that was built up in the last few years. Instead, Carus is in favour of RED being redesigned and for the industrial material use of biomass to be integrated because, given the high sustainability and economic advantages. RED would become REMD, the renewable energy and materials directive. As such, biomaterials and biochemical use would be included in the evaluation of Member State's emission reduction targets, by calculating the CO2 equivalent avoided. Other recommendations are the investment in sun and wind for energy and fuel rather than biomass, which is more durable and doesn't need as much land. Furthermore, new initiatives should be taken concerning market pulls where the emphasis lies on public procurements, targets, quotas and taxes on fossil carbons.

More information can be found in the Nova-Institute study 'Proposals for a reform of the Renewable Energy Directive to a Renewable Energy and Materials Directive (REMD) and 'Options for designing a New Political Framework on the European Bio-based Economy' on www.era-ib.net/events/michael-carus-nova-institut

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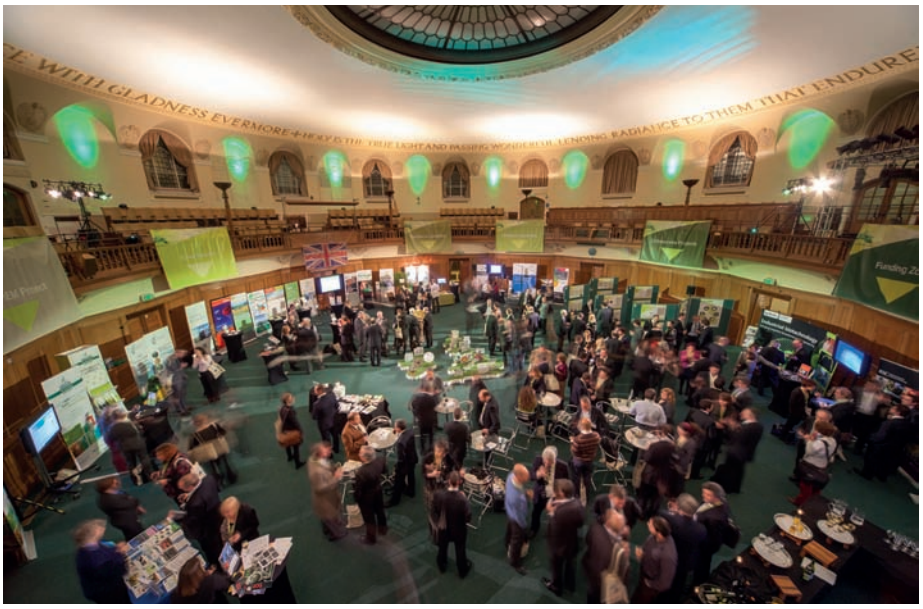
Industrial Biotechnology Showcase



On 11 and 12 February 2015 you can join the Industrial Biotechnology Showcase for a stimulating and informative two days in London. The IB Showcase is a major business conference in the UK to bring together industry, academia and government agencies working towards a bio-economy. For the second time, this event aims at highlighting innovative companies and new technologies whilst providing a forum for knowledge exchange and networking for the bio based industries and research institutes.

Organised by the Industrial Biotechnology Leadership Forum (IBLF) delivery team (led by the Knowledge Transfer Network, UK), the IB Showcase is a great opportunity for you to arrange strategic meetings and learn more about the UK strategy and investment profile for Industrial Biotechnology in the UK.

The first IB Showcase in 2013 attracted 300 delegates comprising business leaders, funders, academics and policy makers. Presentations included industry perspectives on incorporating IB into their core business plus the launch of the 'IB Done Well' report by Forum for the Future. The event also saw the announcement of a £40 million investment to boost research in Industrial Biotechnology and Bioenergy to support the creation of interdisciplinary networks plus grants for collaborative projects. The second IB Showcase is an opportunity to see how these networks have developed and how you can participate and access key capabilities and funding.

Register now for the IB Showcase 2015 and book your business meetings. During the two days you will hear from our keynote presenters: Murray Brown, Global Coordinator, Synthetic Biochemistry, GSK who will talk about GSK's experience of implementing IB in their processes; plus, Jonathan Scurlock, Chief Advisor, Renewable Energy and Climate Change, National Farmer's Union will talk about agricultural feedstocks and enhancing connectivity with farmers.

The challenges associated with scaling up processes will be addressed on Day 1 with a focus on delivering a bioeconomy on Day 2, which will see the Rt. Hon. Matthew Hancock present the outputs from the 'Waste to bioeconomy' Roadmap.

Other confirmed speakers include: David Johnson, Lucite Ltd; Kjartan Sandnes, Alkymar AS; Christian Griffin-Kemp, CEO, Cellucomp Ltd; Jason King, CEO, Oxford Biotrans; David Randall, R&D Manager, Chemoxy International Ltd; Prakash Korde, MD, ValueForm Ltd; Mike Morris, BEACON, Steve Pearson, CPI; Muriel Dewilde, Biobase Europe; Fabien Deswarte, Biorenewables Development Centre; Arno van de Kant, Bioprocess Pilot Facility; Yvon Le Hénaff, ARD; Steve Skill, Swansea University; Håvard Sletta, SINTEF; John Blacker, Leeds University; Bob Lovitt, Swansea University; Keith Waldron, IFR.

The event will also include:

- Exhibition Hall
- Technology Showcase
- BBSRC Networks in IB & bioenergy showcase
- A sample coffee from Biome Bioplastic's biodegradable coffee pods
- NE Europe Pilot Plant workshop
- Dragon's Den style session: The IB Den

For more information, visit the website www.ib-showcase.co.uk or contact Michelle Carter.

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