

Realising the economic potential of sustainable resources – bioproducts from non-food crops

You can now translate any page of the EPOBIO website into German, Spanish, French, Italian or Portuguese. A similar facility will be added to the BioMatNet Database of EU-Funded Projects in the near future (details below).

Editorial

Welcome to the second edition of the EPOBIO Newsletter.

Quite a lot has happened in the intervening months since our launch. We have appointed our desk officers for both our Flagship Themes and our Support Themes. We introduce them below and then continue with a description of the underpinning actions forming our Support Themes and Dissemination Activities.

We also provide a report from the First EPOBIO workshop and details from the Executive Summary of the Workshop report. The Workshop fulfilled all expectations when over 180 scientists came together in Wageningen at the end of May and was a key step both in identifying products with potential to be in the market place in 10-15 years from now and focussing the EPOBIO work programme for the next few months.

The input from formal presentations, informal discussion and meetings between the Partners, Funding Bodies and members of the Advisory Board helped develop the basis for our future activities which are geared to wards identifying priority areas for research, not only within the Seventh Framework Programme (FP7) of the European Union, but also in the development of Biorefineries and related bioproducts in the USA.

Obviously, much has yet to be discussed. However, we are pleased to outline our main initial conclusions and present an idea of our future plans.

We are planning a survey to cover Public Attitudes to Renewable Bioproducts and will soon have a questionnaire on the website and welcome your input through this. We also look forward to any other comments or contributions from you as we truly wish to involve as many people as possible in this important project.

The EPOBIO Management Team

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Alle ruimte



WICC, Wageningen, Netherlands, venue for
the first EPOBIO workshop, May 2006

First EPOBIO Workshop

The first EPOBIO workshop attracted around 180 participants who enjoyed three days of talks, discussions, reports and conclusions focused on the three technical Flagship Themes covering Plant Cell Walls, Plant Oils and Biopolymers. These open sessions of the workshop, were attended by representatives of the two funding bodies (The EC and the USDA), the project Partners, members of the Advisory Board and invited speakers as well as many enthusiasts from as far away as New Zealand.



A crowded auditorium pays close attention to the one of the many discussion sessions

Both before and after the open workshop, additional meetings were held in order to refine further the tasks ahead, taking advantage of the presence of both Consortium Partners and representatives of the funding bodies. The main aim was to determine how to incorporate the 'lessons learned' at the workshop into the future activities of the group, with an emphasis in the short term on how the results of the discussion could be used to help the EC as they finalised the work programme for FP7 and the text for the first two calls for projects in this area. A further objective was to define the activities of the Support Themes in more detail to decide how they can best add to the deliberations of the Flagship themes.

The Programme Agenda and papers issued prior to the meeting have been added to the website, along with a summary overview of the meeting to which contributions to the various sessions are being added as they become available. The general conclusions from the three breakout sessions have also been

added to the website and will be enhanced as they are integrated with further discussions which continued after the open session.

In addition to the main sessions the participants were fortunate to learn a little more about the plans for the Seventh RTD Framework Programme and the role EPOBIO would play in shaping these. This information, presented by Christian Paterman (Programme Director for *Biotechnology, Agricultural and Food Research*, within the Research DG of the European Commission) following the Conference Dinner, is outlined below.

While all the results of the workshop will become available through the website in due course, it is realised that this newsletter may reach some of you in a printed form and you may not have direct access to the internet. So the main take home messages from breakout sessions for the three Flagship themes are summarised below. The detailed discussions will be included in the full report of the Workshop.

Plant Cell Walls

The plant cell walls discussion was led by Markus Pauly and Sarah Hake and supported by the desk researcher Ralf Möller. Short presentations were given on cellulose (Simon Turner), hemicellulose (Ken Keegstra), pectin (Henrik Scheller), lignin (Lise Jouanin), cell wall development (Maureen McCann), genomics/proteomics (Sarah Hake), grasses (John Vogel), forestry (Mattias Dieter), novel biocomposites (Innes Ezcurra), cell wall degradation (Katia Johanson), ethanol (Walter Elbersen) and lignin-derived products (Ron Hatfield).

Improving the efficiency and reducing the cost of saccharification was noted as a key priority. Plant-based feedstocks, whether biomass crops, agricultural by-products or waste, mainly consist of cell walls, a complex composite and high energy resource. To reduce the costs, improve the energy balance and optimise the value of products from biorefining, the process of saccharification is all-important. New work is needed to design new bench-based micro-assays to determine the molecular characteristics of feedstocks (different species, different vegetable-based waste, natural genetic variation and introduced genetic

variation), to link these to their digestibility and range of products formed under controlled chemo/enzymatic conditions. The design of new strategies for gene discovery of novel hydrolases and their targeting to key components of the wall is also needed; approaches might include, for example, the use of metagenomics and proteomics for gene discovery and the use of microbial carbohydrate-binding modules to target enzyme delivery. The development of new microsystems to mimic miniature biorefineries to confirm the generic utility of laboratory-based method design was seen as important.

Alongside the priorities listed above, a tailor-made platform to maximise cell wall utility in biorefineries is needed. Current understanding of plant cell walls is limited, particularly the regulatory processes that determine the relative composition of polymers, whether protein, lipid, polysaccharide, or those based on phenylpropanoids. Regulation is both developmental and defence/stress related and the changes directly affect the efficiency of saccharification as well as the nature and quantity of value added products that can be extracted from the wall in the biorefinery process. New work is needed to investigate carbon partitioning, the regulation of polymer synthesis and their assembly in the wall to underpin novel in planta strategies to decouple the synthesis of the different cell wall components and thereby design the raw material quality of the biorefinery feedstocks.

Plant oils

Breakout discussions on plant oils were led by Sten Stymne and John Dyer, supported by desk researcher Anders Carlsson. The subject was introduced by Ian Graham and short presentations were end products, traits and targets (Jan Jaworski), biodiesel (Ivo Feussner), non-food oilseeds platforms (Robert van Loo), metabolic constraints (John Ohlrogge), metabolic tools and knowledge base (Ed Cahoon) and issues of intellectual property (Sten Stymne).

The first activities will be focused on new lubricants as replacements to the current use of mineral and synthetic oil derivatives. The analysis of research needs and support themes will look at the means by which a diverse range of wax esters can be produced

by the agricultural crop, *Crambe*. The following were also discussed:

Crop	Strength	Weakness
<i>Crambe</i>	High yield, geographical distribution, transformation, similarity to <i>Arabidopsis</i>	Pod shatter
Cotton	High yield, processing infrastructure exists, geographical distribution, transformation, identity preserved, low value of seed oil and protein meal	Food crop in some areas
Flax	Processing infrastructure in place, transformation, IP	Food crop in some areas
Tobacco	Excellent transformation and genetic resources, good oil composition and yield	Lack of infrastructure for seed harvesting and processing, yield
<i>Brassica carinata</i>	Transformation, geographic distribution, processing infrastructure	Yield

As the global market for lubricants, including engine oils, is immense and is currently dependent on fossil reserves. Plant oils offer a sustainable alternative, with wax ester replacements produced by agricultural crops. The oil crop, *Crambe*, has considerable potential to synthesise a diversity of wax esters, with their ratios in the oil tailored for different applications. New work is needed to optimise *Crambe* for this purpose, specifically to establish transformation methods, applicable to different sources of germplasm and discover the genes, pathways and regulatory processes governing synthesis of defined wax ester species. It will also be important to improve wax ester yield and agronomic performance of new, engineered varieties and design improved processing technologies tailored to the use of oil products and the by-products from oil extraction.

In parallel there will be work on the development of a generic non-food oil crop platform. Plant oils have the potential to fulfil market needs in a wide range of industrial sectors from health, bulk and speciality chemicals to energy and transport. The sustainable production of oil by agricultural crops offers major opportunities to reduce global economic dependence on mineral oil. There are key issues that must be addressed to realise this potential. New work is needed

to investigate the regulatory processes controlling yield of native and novel oils to underpin in planta strategies for optimising a non-food oil crop platform that can be used as a generic field-based system to produce bespoke oils in quantities that make mineral oil replacements economically viable.

Biopolymers

For biopolymers discussions were led by Yves Poirier and Bill Orts with desk researcher Jan van Beilen. Introductions by Robert Anex and Martin Patel (economics of biopolymers) were followed by short presentations on starch (Francesco Degli Innocenti, Waltraud Vorwerg, Peter Bruinenberg), natural rubber (Katrina Cornish, Hans Mooibroek), PHA (Oliver Peoples, Dietrich Scherzer) and protein polymers (David Kaplan, Udo Conrad).

The first project/product will be aimed at the development of new natural sources of rubber with the aim of replacing and contributing to the supply of rubber for high value medical uses as well as high volume products such as vehicle tyres. Rubber is a natural plant-based commodity used for high value and/or high volume applications for which there are often no alternative feedstocks. Its global supply is limited and at risk from plant disease. New work is needed in two related areas, firstly, greater understanding of the genes and metabolic processes involved in rubber production in planta to underpin the development of alternative rubber crops. Second, a detailed analysis is needed of the potential for new sources of rubber production, for example, in terms of the products formed, potential presence of allergens, agronomy, extraction process and environmental impacts.

It was also seen to be important to develop a non-food crop platform for monomer and biopolymer production. The scale of current use of petrochemicals for monomer/polymer production by the global chemical industry is at threat from rising oil prices. Field crops offer the potential for high volume production of commodities. It will become increasingly necessary to underpin the chemical industry with agricultural feedstocks and sustainable replacements to those products currently made from petrochemicals. New work is needed to investigate the synthesis of those

monomers and biopolymers that can be more effectively and cheaply produced in plants compared to microbial fermentation. Production of polymers or building blocks in plants will require the development of novel extraction and processing systems for cost-effective fractionation.

Support themes

Specialists in economics, the environment, agronomy and life-cycle analysis contributed to a detailed discussion and planning session on parameters for inclusion in these support themes. It was agreed that the two support themes of economics and environment should work seamlessly together, linked through a common life-cycle analysis framework. Process flow diagrams would be prepared for each prioritised project/product to establish the key points for data collection and analysis. Technical input and validation of these frameworks would be essential, drawing on the diverse range of expertise in the EPOBIO Advisory Board and beyond. It was also agreed that the two support themes addressing social expectations/attitudes and the development of communication strategies should also work together.

Concluding Session

The final day of the Workshop was chaired by Dr Christian Patermann (Programme Director, DG Research, European Commission) and Dr Antoinette Betschart (Associate Administrator, Agricultural Research Service USDA). Each of the Flagship themes reported back from their breakout sessions and the reports were extensively discussed both by the two Chairs and by the Workshop participants. In each case, priorities (as indicated above) were highlighted for further development. These would be taken forward for further analyses within EPOBIO, but also form the basis of recommendations to policy-makers and the national and international funding agencies. The reports were also discussed within the wider context of the support themes and how the projects would be developed in a process of iteration and reiteration involving specialists from industry and academia world-wide.

View the Workshop Presentations and Executive Summary online at:

www.epobio.net/workshop0605.htm

Flagship Desk Officers

Plant Cell Walls



Dr Ralf Möller is the desk researcher for the EPOBIO project who is responsible for the **Plant Cell Walls Flagship**. Ralf's background is in Wood Science and Technology. He specialized in the area of wood formation. For the last 3 years he has worked as research scientist in the cell wall group of the New Zealand Forest Research Institute Limited and was responsible for the development of a tissue culture based assay system for the functional testing of the genes involved in secondary cell wall formation.

Plant Oils



Dr Anders Carlsson from the University of Agricultural Sciences, Sweden is the EPOBIO desk researcher responsible for the

Plant Oils Flagship. For more than 12 years, Anders has focused his research on different aspects of oil biosynthesis in plants. He has often used a molecular approach in order to identify genes coding for the enzymes responsible for specific pathways in the biosynthesis of lipids. For the past 6 years much of Anders' attention has been turned towards understanding the biosynthetic pathways responsible for the storage of lipids in the seeds. An area that specifically has attracted his interest is the difficulty so far to genetically engineer plants to produce high levels of unusual fatty acids. Progress in this field will allow us to develop new oilseed plants that produce designed industrial oils for the chemical industry.

Biopolymers



Dr Jan van Beilen from the Université de Lausanne in Switzerland is the EPOBIO desk researcher responsible for the **Biopolymers Flagship**. After MSc work on NAD-biosynthesis at the University of Groningen in the Netherlands, Jan worked for one year at Genencor in San Francisco. He then returned to Groningen for his PhD studies on alkane degradation by *Pseudomonas putida*, again in Groningen. From 1994, Jan headed a team working on alkane oxygenase diversity and applications at the Swiss Federal Institute of Technology in Zürich. Since January 2005, he has been investigating the current status and prospects of research in the biopolymer field.

Support Themes

Each of the Flagship Themes is being developed in the context of its environmental impact, economics and regulatory frameworks, attitudes and expectations of policy makers and the public, and a communication strategy.

This holistic approach means that EPOBIO will be working closely with environmental scientists, agronomists, experts in legislation and regulations, socio-economists, policy-makers and the public to evaluate proposed products and ensure the products developed are beneficial to our society

and for our planet. In this way EPOBIO will place the scientific potential into this wider social context.

The four Support Themes are:

- Environment and agronomic analysis
- Economic potential and impacts of regulations
- Analysis of public and politicians attitudes and expectations
- Science to society communication strategy

Environment and agronomic analysis

The leader of this Support Theme is Dr Andy Pereira supported by Desk researchers: Dr Elma Salentijn & Dr Marcel Toonen.

The introduction of non-food crops with novel traits into Europe will need to be considered for various topics. The issues will be specific for the crop, the application and the geographical regions of cultivation and these wider perspectives will be integrated into the planning of the new RTD challenges as they are defined and developed for each Flagship area. The environment/agronomy Support Theme provides a framework to analyse the crop-product combinations defined in the three Flagship themes (biopolymers, cell walls, plant oils) with relation to the following topics:

- Breeding and agronomy of non-food crops as a feedstock for bio-based products
- Risk/benefit analysis of introduced novel traits
- Environmental impact of the cultivation of non-food crops and the production and disposal of bio-based products

Environmental assessment of the production of bio-based feedstock with respect to cultivation and processing of the crop and production and disposal of the bio-based products will, amongst other things, have to consider the following points:

- Global warming potential
- Acidification potential
- Ozone depleting potential
- Photochemical ozone creation potential
- Eutrophication potential
- Aquatic oxygen demand
- Occupational health impacts



Dr Andy Pereira from Plant Research International, The Netherlands, is a partner in EPOBIO and responsible for the Environmental and Agronomic Analysis Support Theme. Andy did his PhD in Plant Breeding at Iowa State University in the US. During a subsequent postdoc at the Max-Planck Institute für Züchtungsforschung in Cologne Germany, and a Scientist position in Wageningen (institutes ITAL, CPO, CPRO, PRI) he developed transposon strategies for tagging and later functional genomics in Arabidopsis and rice. Currently he is involved in identifying genes for crop traits such as abiotic/biotic stress resistance/adaptation, fertility, and metabolic pathways involved in plant structure, towards translational genomics applications in crops.



Dr Elma Salentijn from Plant Research International, The Netherlands, is a desk researcher for the EPOBIO project and is responsible for the Environmental and Agronomic Analysis Support Theme. Elma started as a junior scientist in the department of Molecular Cell Biology at the University of Utrecht. In 1995 she obtained her PhD at Wageningen Agricultural University on the molecular characterisation of the beet cyst nematode (*Heterodera schachtii*) resistance locus Hs1. Currently, she is involved in the Celiac Disease Consortium, studying the gluten genes of wheat and in the molecular mutation breeding of the industrial oil crop *Crambe abyssinica* using an EMS-mutated population.



Dr Marcel Toonen from Plant Research International, The Netherlands, is a desk researcher for the EPOBIO project and is responsible for the Environmental and Agronomic Analysis Support Support Theme. Marcel obtained his PhD at Wageningen Agricultural University on embryo-forming cells in carrot suspension cultures in 1997. During his postdoc period at the Eberhard-Karls Universität Tübingen he studied the role of heat shock proteins during microspore embryogenesis. Since 1998 he has been working at Plant Research International on improvement of industrial crops. The work covers a broad spectrum of research themes which include a hemp breeding programme, molecular improvement of fibre quality and chain project to develop new fibre-based products.

Economic potential and impacts of regulations

The leader of this Support Theme is Dr Uwe Schneider, supported by the desk researcher Thomas Heinzow.

This Support Theme will address economic and regulatory issues surrounding the bioproduct development from non-food crops and applications emerging from the RTD content of the Flagship Themes. Through collaborating closely with the European Non-food Agriculture (ENFA) SSP, we will gain data, analyses and a modelling system to analyse the issues arising from the Flagship Programmes of EPOBIO, as well as gain access to the wider European links of ENFA to other EC-funded and national programmes of economic and regulatory analyses.

Technological improvements of EPOBIO's new agricultural products (biopolymers, industrial oils, cell wall products) involve two steps:

- **Microeconomic analysis:** Entering and penetrating established markets with new products will be only possible if the products are better or cheaper. Full cost analysis for the whole cycle of biological based products from seeding through production to waste disposal is necessary to find cost reduction potentials. Nevertheless benefits to the environment have to be estimated and external costs of petrochemical-based products have to be estimated to find regulations to speed up the market penetration without subsidisation of the new products.
- **Macroeconomic analysis:** Formatted, microeconomic technological data will be input to the ENFA model. This model allows an estimation of the competitive economic potential of new products taking into account:
 - Competition for agricultural and forest land between food and non-food products
 - Heterogeneity of natural conditions, crop technologies, and farms
 - Changes in aggregate commodity supplies, trade volumes, market prices
 - Land management adjustments for each crop relating to tillage, irrigation, fertilizer use Multi-environmental impacts
 - Existing and potential policies



Dr Uwe Schneider from Hamburg University, Germany, is a partner in the EPOBIO project and responsible for the Economic Potential Including Impacts from

Regulations / Legislation Support Theme. Uwe is assistant professor in the research unit Sustainability and Global Change at Hamburg University. His main research focuses on the economic and environmental impact assessment of policies and technical change in the agricultural and forest sectors. Recent work involves agricultural implications of climate policies related to land use, carbon sinks, bioenergy demand, and animal production. Currently, he is the coordinator and main developer of the European Non-Food Agricultural (ENFA) model.



Thomas Heinzow from Hamburg University, Germany, is a desk researcher for the EPOBIO project and is responsible for the Economic Potential

Including Impacts from Regulations / Legislation Support Theme. Thomas has a natural science and social background in business and political economics. He has studied Meteorology at Hamburg University and Business Administration and Social Economics at Hamburg University of Economics and Politics, where he received his Diploma. He is working at the Research Unit Sustainability and Global Change at Hamburg University. His major research interests are modelling agricultural damage costs due to Global Warming.

Analysis of public and politicians attitudes and expectations

This Theme is led by Professor Giorgos Sakellaris, supported by the desk researcher: Maria Paschou.

While there is a broad existing knowledge-base to support the use of bio-renewables for energy and manufacture of consumer products in order to sustain economic growth, a number of non-technical, social barriers continue to prevent the realisation of this potential. These barriers may be attributed to market factors (i.e. high cost of the raw materials used as feedstock or lack of established supply chains), administrative complexity and deficient regulatory frameworks, as well as differing social acceptance of the applications involving genetic modification.

Alongside scientific innovation and technical infrastructure it is important to take into consideration the social background that affects both the adoption of new technologies and the market uptake of novel bio-products. This requires quantitative and qualitative social research of the public, private sector and policy makers' attitudes and expectations upon which support or opposition is based. Scientific awareness, risk and benefit perception, media effects, widespread beliefs and social fears, as well as trust in institutions involved in the debate associated with agricultural and industrial biotechnology, all are intertwined in the formation of attitudes and expectations. In addition, their study becomes more complicated if different outputs of non-food applications or different stages of the production process are considered and compared. Thus, the "Attitudes and Expectations" Support Theme faces the challenge of integrating analysis of technical and non-technical barriers for every individual project to define the content of Flagship Themes.



Professor Giorgos Sakellaris from National Hellenic Research Foundation, Greece, is a partner in the EPOBIO project responsible for the Analysis of Public and Politicians Attitudes Support Theme. Giorgos is a Senior Researcher in the Institute of Biotechnology at the National Hellenic Research Foundation in Athens (Greece). He is the head of the communication office of the Institute and he is responsible for the ethical legal and social issues of biotechnology and he participates in the Public Perceptions Group of the European Federation of Biotechnology. He is a member of the GMO panel at EFSA, member of the International Research and Regulation network on Biosafety and member of the advisory committee of the European Parliament on GMOs.



Maria Paschou from the National Hellenic Research Foundation, Greece, is a desk researcher for the EPOBIO project and is responsible for the Analysis of Public and Politicians Attitudes Support Theme. Maria has an educational background in the social sciences. She has studied social anthropology and social policy in the Panteion University of Athens and received her MSc degree from the London School of Economics and Political Science, where she studied Social Research Methods and Social and Public Communication. Her particular research interests are public attitudes to science, social representations of biotechnology and science communication.

Science to society communication strategy

This Support Theme is led by Dr Caroline Calvert, supported by the Desk researcher: Dr Louisa Wright

The focus of this Support Theme is the design of good practice and implementation of a strategy for science-society communication to convey the benefits of non-food crops via the media and other mechanisms. The focus of the Support Theme will be communicating the opportunities and benefits of the use of non-food crops. These opportunities and benefits, such as bioproducts and new applications, will be identified and defined by the activities of the three Flagship Themes, and set in context by the work of the other Support Themes.



Dr Louisa Wright from the University of York, United Kingdom, is a desk researcher for the EPOBIO project and is responsible for the Science-Society Communication Support Theme. Louisa has worked as an Information and Funding Officer for the Centre for Novel Agricultural Products (CNAP) for 2 years. During this time she has been involved in information researching, writing and preparing funding applications, developing science outreach activities and science communication. Louisa has a scientific background in plant molecular biology.

The aims of the media strategy are to:

- develop and implement the media and science communication strategy based upon and extending current good practice procedures;
- increase the public's awareness of the potential of biorenewables and the use of non-food crops;
- aid communication of the results of the EPOBIO project to agriculture, industry and policy-makers through the development of media and other networks.

Information Dissemination

This activity is jointly managed by Dr Jim Coombs, responsible for the scientific content and Katy Hall who manages the database and website. The aim is to disseminate information from the EPOBIO workshop, Flagship Themes and other activities through this website. In addition, it maintains a database of relevant European-funded research and players involved in non-food use of crops. Working in parallel with the research activities, it builds on the database and information dissemination service (www.biomatnet.org) which has been supported by the European Commission (AIR, FAIR, FP5 QLK5 and now FP6) since the early 1990s. Its purpose is not only to feed information into EPOBIO, but also to serve as a portal for those working on renewable bioproducts and sustainable biofuels.

Since February 2006, information concerning developments in non-food agro-industrial research and development funded by the EC, has once again become available through EPOBIO. This Support Theme in part represents a continuation of previous activities that bore the acronym BioMatNet. However, EPOBIO has a much wider remit than that of the previous BioMatNet activity as described in the first issue of the EPOBIO Newsletter, which also falls within the dissemination Support Theme. The scope of information reported on the BioMatNet dissemination website will be widened as the project progresses to reflect this. The dissemination site is being extended to include relevant aspects of environment, economics, legislation and public perception on a more global basis, extending to the US in particular.

Website Statistics

Statistics are collected concerning the use of both the new EPOBIO website and the well-established BioMatnet activity. The website use is shown right. The number of individual visitors to BioMatNet site continues to increase. However, these visitors are not looking at as many pages per visit as they did for the previous activity. The EPOBIO site being relatively new and hence less obvious on search engines relies to some extent on users being informed of additions through our email alerts. This is clearly shown by the series of peaks which match the dates of such mailings.

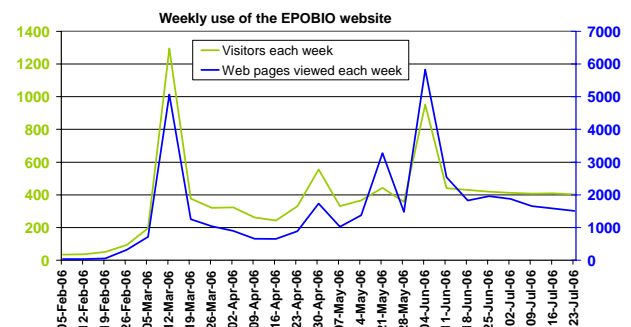
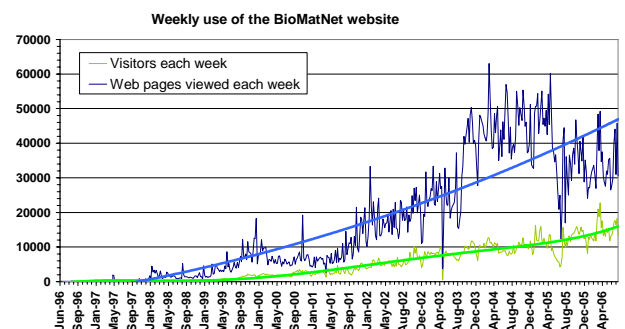
A review of current good practice in science communication in the European media has been undertaken to inform the project's media strategy. The review analyses the current mechanisms of science-media communication, including how science news is consumed by the European public, how science stories are sourced by the media, science news distributors and science coverage and impact on a European scale. The EPOBIO media communication strategy will build upon existing good practice by adapting and utilising proven effective formats and mechanisms.



Dr Jim Coombs from CPL Press, UK, is the partner in the EPOBIO project responsible for the EPOBIO website. Jim is the owner/director of CPL Press, has over 40 years experience in research, industry, consultancy, management and publishing, with an emphasis on life sciences, biomass energy and renewable bioproducts, analysis, process modelling, environment, agriculture and food - including aspects of photosynthesis, nitrogen metabolism, anaerobic digestion, fermentation, composting, cellulose hydrolysis and biopolymers.



Katy Hall, Managing Director of CPL Press, has qualifications in IT and extensive experience in the design, programming and management of databases and websites, as well as in editing and publishing of printed material, from newsletters to multi-volume scientific texts.



Using the Websites

While over 5,000 existing registrants from previous BioMatnet activities will be familiar with most of the features of this dissemination activity, this may not be the case for those new registrants whom we have welcomed since joining the EPOBIO consortium and who have contributed to the continuing growth in use of this site as indicated above. Hence, the following information and updates are provided to help you get the most out of this site.

Translation

Users of the EPOBIO website can now obtain a computer-generated translation of the complete text (excluding pdf files) of each page of this website using the "Translate this Page" dropdown box at the top right of the header.

This facility is provided courtesy of the Google Language Service and enables the original information to be translated into German, Spanish, French, Italian or Portuguese. Please note that once a page has been translated, all pages will appear in the selected language. It is not possible to translate a translated page - attempts to do this will result in an error message generated by the Google translation service. The language can only be changed by reverting to English (click on 'View Original Webpage', which appears in the Google box above the website header on the translated page) and then choosing an alternative language. Third-party websites linked to from the translated pages will also be translated. This is an automated translation service, hence we cannot guarantee the accuracy of the translated pages.

Update on BioMatNet database

As indicated previously, efforts to bring the format and operation of the EPOBIO and BioMatNet sections of the website together are continuing, although some of this is 'behind the scenes' and not as yet apparent.

Since the activity was refunded under EPOBIO, over 200 new ITEMS (unique pages of information) have been added. These are detailed in the periodic ITEM News, which is sent out to registrants requesting this information. The lists of additions to date can be found at:

www.biomatnet.org/news/news.html

Apart from this, the visible changes (current at the time this Newsletter was produced) include harmonization of the Contact details and a complete revision of the Database of Websites with the existing links checked for accuracy and further links added. The aim is to make this the entry point for information on 'organisations' as the information on 'EC funded projects' and related 'International and National Initiatives' is re-organised on a 'Programme' and 'Topic' basis, increasing the ease with which required information can be found. Once this is done, translation will also be added to this

part of the site (www.biomatnet.org) further increasing the benefits to a wider range of users.

Other facilities

The website also provides rapid access to a regularly up-dated Diary of Events. At present this is largely compiled by the EPOBIO Management. However, we are always happy to consider further additions of any relevant events of a similar nature. If you are involved with the organisation, or just know of an event which you feel should be added, but we have missed – please let us know.

The website also provides direct access to three 'news services' provided by other organizations (BIS, EuroActive and Google). These can be accessed from any EPOBIO page by clicking on the 'Global News' link at the bottom of the right hand box titled News, or from any BioMatnet page by clicking on Global News which appears on the equivalent left hand box. Again this will be harmonized in the near future, at which time registrants will receive details by email. If you wish to receive such notification as well as other news concerning EPOBIO developments and BioMatNet updates, please register using the online form at: www.epobio.net/register.htm

In the meantime you may find it easier to get to the Global News page by book-marking the following link: www.biomatnet.org/biobased.html

From here you can log onto the various information systems including [Biobased Information System \(BIS\)](#), which provides daily information on biofuel related activities in the USA. The same page also provides links to European Information through [EuroActiv](#), which provides "EU News, policy positions and 'EU Actors' online". As a policy portal, it provides more in-depth information than available through traditional news sites. The home page provides the latest in general policy; click on BioTech in the lefthand menu to access more relevant information.

The third option is to use [Google News](#) which has been set up to enable you to directly search for news items concerning the topics listed below:

- | | |
|-------------------------|---------------------------|
| ■ renewable bioproducts | ■ biodegradable packaging |
| ■ bioplastics | ■ biorefinery |
| ■ biopolymers | ■ cellulosic ethanol |
| ■ biofuels | ■ biocomposites |
| ■ bio oils | |

We are happy to consider adding further keywords to this list - please contact us to make your proposal.

The final link is to [GMO-COMPASS](#), a European consumer-oriented website providing easily comprehensible information on issues of the safety evaluation of GMOs and GMO-products. Information on risk analysis, assessment and risk management as well as the GMO debate is presented. This website is produced by

independent science journalists and is supported within FP6. You are encouraged to use these services which are there to shorten your search time on the Internet, focusing directly on relevant information, as we aim to make this the premier source of information on renewable bioproducts and biofuels.

Future Activities

Overview

The First EPOBIO workshop and associated consortia meetings enabled very full and detailed discussion between all concerned putting the project well on track to meet both short term and long term objectives. The overall approach was endorsed by the representatives from the EC and US, while many new ideas came from discussions, both formal and informal, with the delegates. These ideas will be set out in detail in the Workshop report, enabling specific actions to be implemented by the Support Themes and discussed with members of the Advisory Board. The ideas will become embedded within a series of reports which will be prepared for discussion at the second EPOBIO workshop, planned to be held in Greece in May 2007.

Interactions with the public and the Press

At the same time the Public parts of the programme are now being brought into play. The aim is two-fold, in part to garner public opinion and in part to influence it by providing clear evidence of the benefits of non-food crops in providing new raw materials, processes and products of benefit to everyone along the 'product chain', from farmers to processors, to manufacturers and to the ultimate consumer – members of the public. The evidence will be generated by the work of the Support Themes and made public through the website with the introduction of a section addressing such issues, at two levels. First providing background information to all interested and

second, acting as a reliable source for the media through providing 'Press releases' focused on the key areas identified by the Flagship themes.

Public Opinion

The attitude of the public in general will be gauged by use of survey questionnaires. In part these will be targeted to specific recipients in a number of Member States in order to get a representative and statistically valid response. However, in addition anyone will be able to express their views through responding to the same questionnaire which will be posted on the EPOBIO website. Registrants will be informed by email when this is available and are encouraged to respond.

Information from the USA

A key feature of EPOBIO is the collaboration between European and American scientists. The USA recognised the development of the biorefinery concept, which they view as a means of converting woody raw materials to bioethanol in particular, as a key feature in their drive to reduce imports of oil and increase security of supply of liquid transport fuel. They have a longer lead-time on this aspect than that in Europe, where biofuels are still in their infancy, and hence have produced a large amount of background information. In order to enable this information to be easily found, a specific area has been added to the website covering US Activities.

Seventh Framework Programme

A key objective of the EPOBIO programme is to help the European Commission focus on areas of potential long-term benefit to the citizens of the EU, as well as to strengthen the future well-being of industry through innovation. As is often repeated, Europe spends less in terms of percent of GDP (around 2%) than the other major industrialised regions, but hopes to raise this with a target for 2010 of reaching 3%.

The Seventh Framework Programme (FP7) will play a key role, extending the concept of the European Research

Area and encouraging greater participation of industry, focusing on those aspects highlighted by the work of the Technology Platforms, many of which EPOBIO is in close contact with.

While extensive funding was available in Non-Food Programmes in all the Framework Programmes up to and including FP5 as detailed in the BioMatnet part of the EPOBIO site, this aspect was not formally recognised in FP6. This omission has now been redressed and specific actions related to Non-Food are included.

Food, agriculture and biotechnology

Under the banner heading Building a European Knowledge Based Bio-Economy, a call will be directed to all industries and economic sectors that produce, manage and otherwise exploit biological resources and related services, supply or consumer industries, such as agriculture, food, fisheries, forestry, etc. The aim is to bring together science, industry and other stakeholders, to exploit new and emerging research opportunities that address social and economic challenges that include the growing demand for sustainable use and production of renewable bio-resources linked to threats to the sustainability and security of agricultural production resulting in particular from climate change. This includes two 'pillars' as follows:

- **Sustainable production and management of biological resources from land, forest, and aquatic environments:** Enabling research, including 'omics' technologies, such as genomics, proteomics, metabolomics, systems biology and converging technologies for micro-organisms, plants and animals, including exploitation of their biodiversity; improved crops and production systems, including organic farming, quality production schemes and GMO impacts; sustainable, competitive and multifunctional agriculture, and forestry; rural development; animal welfare, breeding and production; plant health; sustainable and competitive fisheries and aquaculture; infectious diseases in animals, including zoonoses; safe disposal of animal waste; conservation,

management and exploitation of living aquatic resources, developing the tools needed by policy makers and other actors in agriculture and rural development (landscape, land management practices etc.).

- **Life sciences and biotechnology for sustainable non-food products and processes:** Improved crops, feed-stocks, marine products and biomass (including marine resources) for energy, environment, and high added value products such as materials and chemicals, including novel farming systems, bio-processes and bio-refinery concepts; bio-catalysis; forestry and forest based products and processes; environmental remediation and cleaner processing.

At the same time, as for FP6 funding in other areas such as Nanosciences, Nanotechnologies, Materials and new Production Technologies, Energy: Environment and Transport, FP7 will also include opportunities for investigations of the industrial use of plant material for both biofuels and other bioproducts.

These proposals give a clear indication of the importance now attached to the non-food use of plants. However, the ideas listed above cover broad generic ideas aspects from which a list of priorities has to be determined. EPOBIO has an important roll in helping the Commission in their deliberations. The texts for the first two calls are in preparation and are expected to be issued by the Autumn.

EC Biorefinery Workshop

We have been asked by the Commission to bring to your attention the **European Conference on Biorefinery Research** which is being held at the Marina Congress Center, Helsinki, Finland on **19-20 October 2006**. This major conference on biorefinery research is organised by the EC with the support of the Finnish Presidency. Participation is free of charge. However, attendance will be limited to 400 participants, so you are encouraged to register early in order to avoid disappointment. The final deadline for registration is **15 September 2006**.

Registration can be made on-line at:

webgate.cec.eu.int/fmi/iwp/cgi?-db=biorefinery&-loadframes

Further information about the event can be found at:

ec.europa.eu/research/energy/gp/gp_events/biorefinery/article_3764_en.htm

Registration

If you are interested in the activities of EPOBIO and want to be notified when new editions of this Newsletter become available, or to receive more information concerning additions to the website and other aspects of the project and related issues, you are encouraged to register your interests at:

www.epobio.net/register.htm

Contribute

One of our objectives is to make EPOBIO fully interactive with both the scientific community and the public at large. Hence, we are happy to hear from anyone with a contribution to make to the on-going debate concerning application of biotechnology for non-food uses as well as wider issues concerning renewable bioproducts or biofuels.

For more details on how to contact us, see:

www.epobio.net/contact.htm