BIOCHEM
First Accelerator Forum

Milan, 5 – 7 October 2011

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cip competitiveness and innovation framework programme 2007–2013

European Commission
Enterprise and Industry

BIOCHEM – putting SMEs at the core of bio-based products innovation

- European Funding for Innovation
- Drivers and Challenges to Innovation
- Bio-based Products
  - Definition and Potential
- The BIOCHEM Project
  - Achievements to Date & Next Steps
- Conclusions

European Funding for Innovation

- **Research versus Innovation**
  - **Research** is the generation of new knowledge
  - **Innovation** is the conversion of knowledge into successful business
  - Research consumes money whilst innovation generates money
- **Within the European Commission**
  - Research is supported by DG Research
  - Innovation is supported by DG Enterprise & Industry
- **Over the period 2007 – 2013**
  - Research budget is approx. **€ 53 billion** *(FP7)*
  - Innovation budget is approx **€ 1.1 billion**

Europe INNOVA

- **The principal initiative within DG Enterprise & Industry to support industrial innovation, mainly by funding the development of new tools and instruments**
- **Three eco-innovation projects funded to start in 2010**
  - BIOCHEM
  - REMAKE
  - INNOWATER
- **Total BIOCHEM budget is €4.4 million**
  - Including €2.85 million from the EC (65%)
- **BIOCHEM supports one of the EU 'Lead Markets' – bio-based products**

Drivers and Challenges to Innovation

SOCIETAL DRIVERS

- **Climate Change**
  - EU target of 20% GHG reduction by 2020
- **Security of raw material supply**
  - Reducing dependency on fossil fuels
- **Creation of new jobs**

Drivers and Challenges to Innovation

BUSINESS DRIVERS

- **Growth in demand**
  - Switching from hydrocarbon to carbohydrate feed stocks for making chemicals
    - 2010- $125 billion global
    - 2020- $250 billion global
  - One third of chemicals and materials will be produced from biological sources by 2030
  - Demand for ‘green’ products
- **Cost Benefits**
  - Cost of petroleum feed stocks will at some point exceed the cost of renewable biomass
  - ... and technology costs will reduce

Bio-Based Products

Definition: Non-food products derived from biomass (plants, algae, crops, trees, marine organisms and biological waste from households, animals and food production). Bio-based products may range from high-value added fine chemicals such as pharmaceuticals, cosmetics, food additives, etc., to high volume materials such as general bio-polymers or chemical feed stocks.

IMPORTANCE

- **7% of global sales $ 77 billion in value within the chemical sector (2005)**
- **EU industry accounting for ~ 30% of this value**

	2005	2010	2020
Volume of the new bio-based product markets	$77 billion (global)	$125billion (global)	$250 billion (global)
Jobs dependent on new products	120.000	190.000	380.000

Accelerating the Development of the Market for Bio-based Products in Europe REPORT OF THE TASKFORCE ON BIO-BASED PRODUCTS Composed in preparation of the Communication "A Lead Market Initiative for Europe" {COM(2007) 860 final}

Estimated EU production volumes of bio-based chemicals

EU, million tonne	Total consumption, 2008	Bio-based consumption, 2008	Bio-based potential, 2020	Growth potential, % pa
Plastics	48	0.13	0.9	16
Lubricants	5.2	0.15	0.23	3.6
Solvents	5.0	0.63	1.1	4.8
Surfactants	2.7	1.52	2.3	3.5

Source: “Assessment of the Bio-based Products Market Potential for Innovation” (Poyry, BIOCHEM Deliverable 2.3)

Estimated EU market share and employment opportunities in bio-based chemicals

EU	2008	2020
Market Value (€ billion)	21	40
Bio-based share of total chemical value	4.0	6.0
Employment in bio-based chemical production	50,200	93,700

Source: “Assessment of the Bio-based Products Market Potential for Innovation” (Poyry, BIOCHEM Deliverable 2.3)

Some examples of innovation in bio-based products

Pfizer – Biocatalytic Route to Pregabalin

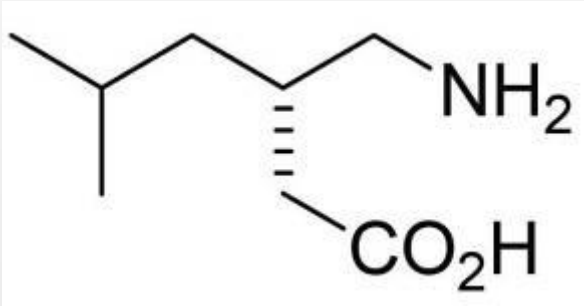
Problem

Pregabalin is an anti-convulsant used in the treatment of neuropathic pain. The production route involved a last step resolution with the undesired enantiomer difficult to recycle. An efficient, highly enantioselective route was needed for production.

Technical Solution

Use of a biocatalytic kinetic resolution at the first step vastly improved the process and allowed recycling of the wrong enantiomer.

Benefits



- **three synthetic steps, all in water**
- **high throughput (over 3 kg/litre water)**
- **low raw material cost**
- **short development time (concept to pilot)**
- **solvent use reduced by calculated 40 million litres per annum**
- **over 2000 tonnes less material required per annum**

From Sugar cane to tyres.....

- Genencor, a Division of Danisco, has developed technology for manufacturing isoprene from sugar cane, corn, corn cobs, switchgrass or other biomass, involving
  - Microbial strain development
  - Large scale fermentation
  - Recovery and purification

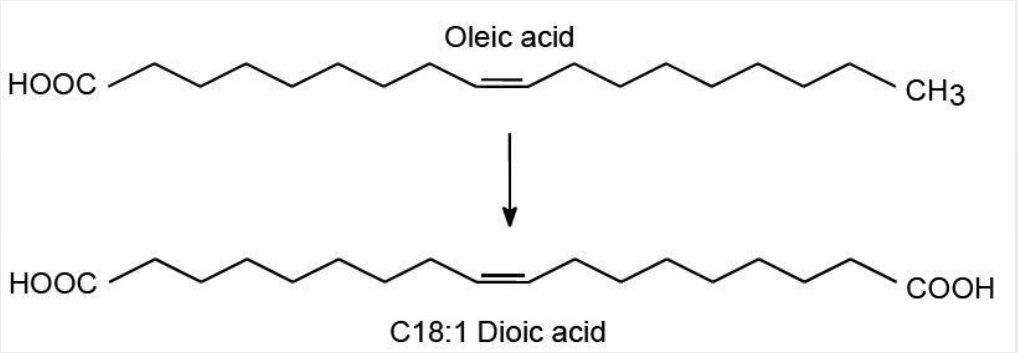
- Joint venture with Goodyear;
  The vision is for all Goodyear tyres to be manufactured from this bio-isoprene

- Manufacturing a conventional tyre requires seven gallons of petroleum feedstock per tyre. Using BioIsoprene will reduce that to close to zero

Active ingredient in cosmetic product

Croda

- C18:1 dioic acid
- Skin whitening agent
- Produced through biotransformation of oleic acid, a natural fatty acid
  - Inhibits biosynthesis of melanin
  - Significant market in Asia
- Effectively unachievable by chemical transformation



But these are all large companies

What is preventing faster take-up of industrial biotechnology and renewable feedstocks by other companies, especially SMEs ?

BIOCHEM

Objective:

To develop practical solutions which will lower the barriers to innovation in bio-based products

BIOCHEM: Objectives

- Develop a business support toolbox to help lower the barriers for SMEs to innovate in this market (toolbox developed and national innovation agencies trained in preparation for SME visits)
- Test the toolbox with SMEs through three interrelated activities
  - Support for existing businesses – assessment of the opportunities for at least 250 SMEs using the toolbox, and production of Individual Development Plans
  - Access to funding – funding needs and opportunities for each SME based on its Individual Development Plan
  - 4 Accelerator events (technology transfer, partnering and venture capital) including 2 business plan competitions (BPC)
- Dissemination of information on the bio-based market and the toolbox in order to increase awareness within the chemistry-using sectors
- Develop an exit strategy to ensure the benefits continue beyond the lifetime of the project

BIOCHEM Project Partners

Europe Unlimited

GATE 2 GROWTH

essenscia

feiQue

cpi ...the future inspired

PNO
Inspire Improve Impact

DECHEMA

Knowledge Transfer Network
Chemistry Innovation

Madrid Network
MADRID BIOCLUSTER

Sviluppo chimica spa

fast track

ASTER

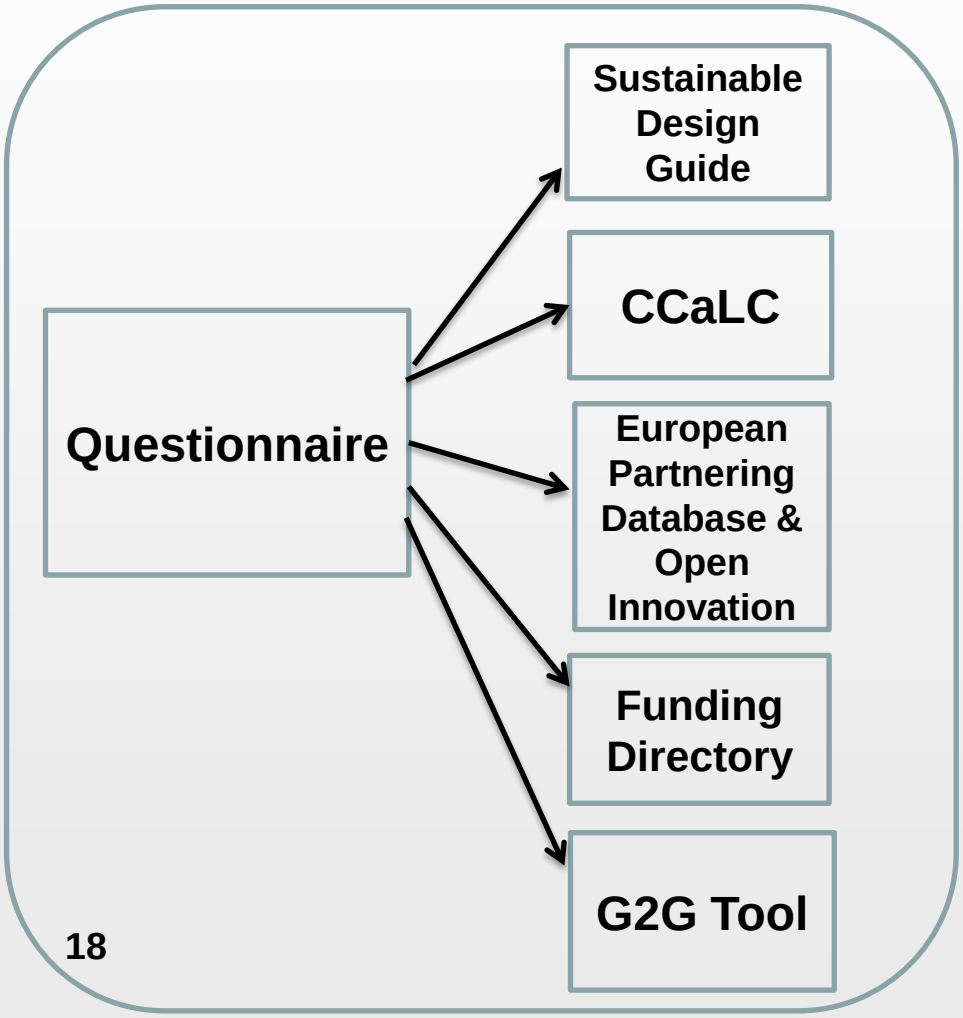
PÖYRY

cefic

MANCHESTER 1824
The University of Manchester

NWO
Netherlands Organisation for Scientific Research

The BIOCHEM Toolbox



Years 2 - 3

Testing of Toolbox

Co-ordinated BBP Investment Fund

Summary of Project Deliverables

- **Year One**
  - Develop toolbox
  - Develop delivery processes
  - Generate background information to support innovation
  - Engage with target SMEs
- **Year Two**
  - Test the toolbox with 100 SMEs
  - Develop and test crowd sourcing prototype
  - Entrepreneurial teaching classes and first major accelerator forum
  - Business Plan competitions
- **Year Three**
  - Refine toolbox and use with a further 150 SMEs
  - Analysis of project output and exit strategy
  - Development of BBP investment fund
- **Throughout project**
  - Communication, case studies,

Progress and achievements to date

- **Development of toolbox**
  - Opportunity assessment questionnaire
  - Business support tools, including on-line partnering, funding directory, LCA, Sustainable Design Guide
  - Innovation agencies trained in use of audit methodology and toolbox in March 2011
- **SME Visits**
  - 36 SME visits have been conducted to date versus Year 2 target of 100
- **Accelerator Events**
  - First event in Milan event, 5-7 October 2011

Success at the end of the project?

- A toolbox that is useful to, and used by, SMEs and larger organisations
- A community of SMEs and larger companies, together with national and regional innovation agencies, which can collaborate to lower the barriers to innovation in bio-based products
- A practical exit strategy to ensure that the legacy continues to live

Acknowledgements

- **DG Enterprise and Industry**
- **All the BIOCHEM partners**
  - And the regional organisations who are helping to find the right SMEs

Thank you for your attention !

- For further information on BIOCHEM see http://www.europe-innova.eu/biochem/
- From mid October the new BIOCHEM portal will be at http://www.biochem-project.eu