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Plant potential in the pipeline

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An international group of scientists will today release their first series of reports on the potential of plants to provide sustainable alternatives to fossil fuels.

The EPOBIO project provides the science to support policy decisions to realise the economic potential of sustainable resources from non-food crops. The project is funded by the European Commission and is led by CNAP, a research centre in the University of York's Department of Biology.

The project focuses on three 'flagship' areas - biopolymers, plant oils and the use of plant cell walls in biorefining. These areas have been identified as offering the greatest benefit to society which could be achieved in as little as 10-15 years time.

The renewable revolution

Plants offer a sustainable tool to achieve the renewable revolution. They provide a source of alternative feedstocks for industry while contributing to future targets on carbon emissions and biofuels. The EPOBIO reports, present detailed analyses of how plant products and plants themselves can be used to replace products made using oil.

EPOBIO Director Professor Dianna Bowles said, "Two key threats to society are our dependence on finite fossil fuels and climate change. A fundamental shift is required to respond to these. A bio-based economy creates a sustainable society for the future and addresses immediate concerns such as energy costs, security of supply and our impact on the environment."

Key issues highlighted in the reports are:

Biopolymers - the need for alternative sources of natural rubber:

- natural rubber is a strategic commodity, irreplaceable by synthetic alternatives for many of its applications.
- the rubber tree, *Hevea brasiliensis*, is at risk from a fungal disease, South American Leaf Blight, which has already decimated large-scale rubber production in South America.
- the incidence of allergic reactions to proteins in natural rubber (latex) is increasing. Future standards will require protein-free high performance latex for medical products.
- future shortages in supply are predicted due to the replacement of rubber trees with palm trees for biofuel production.
- potential of the Guayule shrub as an alternative rubber source

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Plant oils - the potential of producing lubricants from oilcrops:

- plant-derived oils are a sustainable means of providing essential products currently derived from petroleum.
- wax esters have excellent properties as lubricants but their use has previously been limited by the high cost of extraction from jojoba seeds.
- the low cost production of wax esters from the non-food oil crop Crambe (*Crambe abyssinica*) can be viable in Europe.

Plant cell walls - biorefining:

- the cost effective, efficient conversion of plant cell walls is key to realising the full potential of lignocellulose feedstock.
- the saccharification step is a major bottleneck in the use of lignocellulose material.
- plant material and processing methods need to be optimised so that material can be more easily extracted in order to increase yield and quality of the end products and reduce energy and chemical inputs.
- joint molecular and analytical tools are required to characterise the diverse range of biomass feedstocks, develop high-throughput assays for digestibility and optimise enzyme action.

EPOBIO involves an international partnership between experts in plant science, environmental impact assessment, economic analysis and social expectations. Through the production of these and future reports, EPOBIO will establish the evidence-base required for the successful development of bio-based, renewable products to benefit society.

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Editor Notes:

1. Full versions of the reports and executive summaries are available to download from www.epobio.net, along with further supporting information and images.
   Biopolymers flagship report - Alternative sources of natural rubber
   Plant Cell Walls flagship report - Cell wall saccharification
   Plant Oils flagship report - Production of wax esters in Crambe

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3. EPOBIO stands for "realising the Economic POtential of sustainable resources - BIOproducts from Non-Food Crops."
   EPOBIO is an international project to realise the economic potential of plant-derived raw materials and establish the priorities for bioscience research in order to deliver bio-based products for the market place in 10-15 years. The EPOBIO project involves a consortium of 12 European and US partners and is led by the Centre for Novel Agricultural Products at the University of York, UK. The project is funded as part of the European Commission's Sixth Framework Programme, receiving just under £1million, with co-operation from the United States Department of Agriculture.

4. EC-US Workshops of the Taskforce on Biotechnology Research during 2004 and 2005 prioritised key scientific themes (EPOBIO flagship themes) and technologies requiring the focus of international collaborations for delivery.

5. CNAP, the Centre for Novel Agricultural Products, is a research centre in the Department of Biology at the University of York and was established through a benefaction from the Garfield Weston Foundation and funding from UK Government. The University of York was awarded a Queen's Anniversary Prize for Higher and Further Education in 2006 for its work in CNAP. The aim of CNAP's research is to realise the potential of plant- and microbial-based renewable resources through gene discovery to make products needed by society. CNAP research in plant and microbial sciences is supported by the UK Research Councils, particularly the Biotechnology and Biological Sciences Research Council (BBSRC), as well as the DTI and DEFRA, and funding from European and US organisations.

6. For general enquires about EPOBIO, please contact Dr Louisa Wright on +44 (0)1904 328802 or +44 (0)7795 315036, e-mail: lw15@york.ac.uk. For general enquiries about the University of York, please contact David Garner on +44 (0)1904 432153, University of York Communications Office.