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Plant potential in the pipeline

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What have you done so far today; made a cup of tea, driven to work, sent an e-mail or text?

Each of those activities is dependent on oil, from fuel for transport to the plastic parts of your kettle, car, keyboard and mobile. Development of our high-impact consumer lifestyles is accelerating even as fossil fuel supplies are dwindling and the impact of their use on the environment becomes ever more apparent.

But plants, rather than fossil fuels can provide our future energy, fuel and everyday products and today an international group of scientists will reveal how. The EPOBIO project, led by CNAP, a research centre at the University of York, is releasing its first series of reports on the endless possibilities of plants.

The renewable revolution

EPOBIO Director Professor Dianna Bowles said "Two key threats to society are our dependence on finite fossil fuels and climate change. Plants have the potential to provide us with everything now made using petroleum. In this way, we can create a sustainable society for the future and address immediate concerns such as rising energy costs, security of supply and our impact on the environment."

Plants offer a sustainable tool to achieve the renewable revolution. They are 'green factories' using energy from sunlight to make biofuel, bioplastics and a range of other products cheaply and in large quantities. The EPOBIO reports present detailed analyses of how plant products and plants themselves can be used to replace products made using oil.

Key issues highlighted in the reports are:

The need for alternative sources of natural rubber:

- Natural rubber is a strategic commodity, irreplaceable by synthetic alternatives for many of its applications, e.g. heavy duty tyres for SUVs, trucks and aeroplanes.
- The incidence of allergic reactions to proteins in natural rubber (latex) is increasing. Natural rubber is used to make protective medical products, posing a potential risk to both patients and medical workers.
- The rubber tree, *Hevea brasiliensis*, is at risk from a fungal disease which has already decimated large-scale rubber production in South America.
- Future shortages in supply are predicted
- The rubber-producing shrub, guayule, can be grown in Europe as an alternative source of non-allergenic natural rubber.

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The potential of using plants as an energy supply:

- Biofuels, power, chemicals, materials and fibres can be all made from plants rather than oil in integrated processing systems called biorefineries.
- The use of plant material reduces greenhouse gas emissions while guaranteeing security of supply.
- 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.

The potential of producing lubricants from plants:

- Plant oils have similar structures and properties to oil derived from petroleum and can be used as replacements in many applications.
- Plant waxes 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 waxes from the non-food oil crop Crambe will provide a sustainable supply of lubricants to use in engine, transmission and hydraulic fluids.

The EPOBIO project involves a partnership between experts in plant science, environmental impact assessment, economic analysis and social expectations and combines these strengths to identify the plant-based products which offer greatest benefit to society within the next 10-15 years.

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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. 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.

5. For general enquires about EPOBIO, please contact Dr Louisa Wright on 01904 328802 or 07795 315036, e-mail: lw15@york.ac.uk. For general enquiries about the University of York, please contact David Garner on 01904 432153, University of York Communications Office.