



# IENICA



## Interactive European Network for Industrial Crops and their Applications

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### GreenTech 2002



The joint event of the 3<sup>rd</sup> International Congress and Trade Show GreenTech, together with the 5<sup>th</sup> European Symposium on Industrial Crops and Products took place in the Netherlands during April. GreenTech was the 2<sup>nd</sup> conference to be sponsored by the IENICA project and was held at the Floriade, World Horticultural Exhibition, near Amsterdam. The Floriade, the biggest horticultural show in the world, is held every 10 years and covers 65ha, with pavilions from over 25 countries.

This venue was a perfect setting to welcome the conference delegates – 150 from over 20 countries, from as far a field as the USA and Costa Rica. GreenTech was a truly international event. Taking place over two and a half days, the conference covered a huge range of topics, with over 40 speakers and more than 45 posters presented.

The first plenary session, with opening addresses from E. de Jong, Editor in Chief of Industrial Crops and Products, and Melvyn Askew, co-ordinator of the IENICA project, covered Policy and Regulations. Ian Bartle, from the European Renewable Resources and Materials Association (ERRMA) suggested that the main market sectors currently involved in the use of RRM's are oleo-chemicals, lubricants, polymers, pharmaceutical and healthcare products, and biofibres, particularly for the automotive industry. M. Karus, of the Nova Institute in Germany, gave an enlightening overview of the use of natural fibres in the automotive industry. He also stressed that the EU end-of-life vehicle directive will not have unfavourable implications for this, as the quota for material recovery fixed in this directive does not focus on a single vehicle



any longer, but is related to the 'average vehicle weight of all end-of-life vehicles abandoned per year'.

The afternoon of the first day was split into two sessions, covering Biotechnology and Eco-design. M. Toonen, of Plant Research International in the Netherlands, opened the Biotechnology session with his discussion of the HARMONIA project, which aims to develop novel biotechnological tools to improve fibre quality in flax and hemp. The information obtained will be used to develop tailor-made flax and hemp varieties for specific applications – each application requiring its own defined fibre quality. D. Kodali, of Cargill Industrial Oils and Lubricants in the USA, gave an overview of Cargill's work into modifying conventional plant oils, through genetics and plant breeding, to produce new fatty acid compositions that are more suited to various industrial applications. For example, high monounsaturated canola oils, with oleic acid content of up to 85%, have been produced for lubrication applications.

In the Eco-design session E. Ganglberger, from the Austrian Institute for Applied Ecology, gave an overview of natural dyes for the textile industry. Research has shown that Austrian textile companies are interested in using natural dyes, as they believe that they will offer new marketing opportunities. R. Wimmer, from Vienna University of Technology, provided an insight into the 'S-House' which, through the use of a demonstration building, shows innovative uses of renewable resources in construction and design.

The morning of the second day was again split into two sessions – Agriculture and Biocascading and New Materials and Technology. A. Hulst, of Avebe in the Netherlands, gave a fascinating presentation on the biorefinery of grass. Harry Gilbertson discusses this work further on page 2. Finn Rexen, of the Bioraf Denmark Foundation, discussed this topic further, and

**IENICA is a workstream in the INFORM-IENICA project**

suggested that biorefinery (“an optimal utilisation of all components in a given crop”) can be one way to improve the economics of renewable resources.

The parallel session on New Materials and Technology included a paper from D. Magyar and C. Rupp-Dahlem, from Roquette and DuPont in France on Isosorbide, a monomer derived from corn. This material, used to produce Polyethylene Isosorbide Terephthalate (“PEIT”), can enhance a material’s performance (in particular its thermal stability) where conventional polyester cannot do the job i.e. rigid containers for hot-fill applications.

Delegates convened in the afternoon to attend the second plenary session, on Market and Economy. Presentations included an overview (from H. Káb of IBAW in Germany) of the Kassel Project in Germany, which is the world’s largest test market for compostable plastics packaging made from renewable resources, such as maize starch. R. Jongboom, of Rodenburg Biopolymers in the Netherlands, presented ‘Solanyl®’. This innovative product is based on potato peels, and is biodegradable, sustainable, compostable and is based on renewable resources. Rodenburg Biopolymers has the largest production facilities for a bioplastic based on renewable resources in Europe (about 50,000 metric tonnes per year) and was awarded the GreenTech Award for ‘the most innovative development or product’.

The final day of the conference covered Quality and Performance: Customer Requirements. R. Willemse from TNO Eindhoven in the Netherlands discussed the use of starch-clay nanocomposites, which offer both a competitive price and improved performance. Exfoliated clay particles are incorporated into the starch matrix and improve the mechanical and flow properties of the material, and the sensitivity upon moisture.



The IENICA project would like to thank all those who had a part in making the conference so successful, particularly Europoint for their organisation; Teresa Lopes for arranging the programme, and all of the speakers and delegates. Copies of the proceedings, and some posters, are available from Europoint or the IENICA website.

Caroline Holmes  
IENICA assistant co-ordinator  
c.holmes@csf.gov.uk +44 (0)1904 462379

## The Cow of the Future? - A Grass Bio-refinery

Public concern within the EU about the environment, our landscape and rural development is growing daily. A Dutch syndicate, the subject of one of the INFORM-IENICA project Case Studies, has developed a novel technology that could change the way grassland all over Europe is managed. An exciting new range of natural products is also being developed to ensure the enterprise is economically viable. Initial work commissioned by the group at the Dutch research station, AB-DLO, investigated whether the industrial processing of grass might yield new and more efficient ways of utilising grass than traditional grazing of animals and then deriving products and by-products from the animals.

First AB-DLO took a very broad look at potential new sources of grass raw material. Not just the traditional cultivated grass provided by farmers for hay and silage but also novel sources such as verge trimming carried out by Local Authorities on roadsides for safety and maintenance. Another source would be ‘amenity grass’ where areas of coarse grassland are set aside and managed by Trusts; Parks; Tourist Boards or, again, Local Authorities for the benefit of the general public to provide ‘Green Spaces’ within urban and rural settings. Normally these sources would be considered to be lacking in nutrition, contaminated with litter, weeds or otherwise unsuitable for management by grazing.

The new system can cope with both natural (e.g. weeds, branches and stones) and man-made (e.g. plastic, metal and glass) contamination. In fact the starting point is a ‘harvesting’ system which cuts and collects all above ground matter from the area - leaving it clean for future amenity use as well as discouraging weeds and encouraging fresh grass growth. This minimises the need for herbicides on open public areas to control weeds. Bio-refining therefore offers a solution to the problems of managing roadside verges and amenity areas. These areas are increasing each year and the maintenance of them is currently an overhead cost for whoever is responsible.

**Visit the IENICA website at: [www.csf.gov.uk/ienica](http://www.csf.gov.uk/ienica)**

The grass is cut, collected and transported back to the factory, or baled and stored for later use, so the factory can run throughout the year. The lead company on the factory processing side is AVEBE bv. This firm is one of the Netherlands biggest potato starch producers. Their starch extraction, refining procedures and grower-infrastructure can easily be applied to grass processing. Another partner, Nedalco, is searching for new raw materials as an alternative for beet molasses in ethanol production.

Industrial processing of grass demands the design of whole new production chains. These must guarantee stable supplies of raw material, efficient processing and stable markets for the resultant range of products and co-products.

The bio-refining separates off extraneous materials first; then refines and separates the grass into two primary fractions - high-protein juice and dried grass-fibre. In the short term the fibre can be used as a CO<sub>2</sub> neutral 'green' fuel to provide process heat within the factory. In the mid-term highly consistent composts can be made particularly suited to mushroom growing. In the long-term inclusion of the fibre in industrial products such as paper, composites, insulation boards and packaging materials have all been proven to be feasible at lab-scale. The juice can be used as animal feed protein mix or refined further into a range of higher-value second-generation products such as inulin, rubisco, pigments, organic acids and potassium salts.

This project has brought out the need not only for inter-disciplinary work between scientists and engineers, but also for co-operation and lateral thinking within and across Government Departments. The need for systems innovation in agriculture and the sustainable management of the countryside for public benefit surely makes such joint efforts worthwhile.

Harry Gilbertson

## Return to the Roots

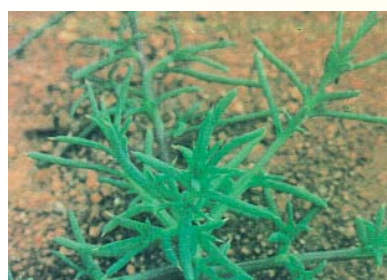
Herbs have always been man's best and loyal friends. Observation and research have shown the positive effects of many herbs and plants on the human organism, where they are used either for treatment or prevention. Man has gone through various stages in his relationship with herbs, but in recent years a triumphant return to them is being observed. Until the

16<sup>th</sup> century, man's relationship with herbs had been harmonious, and they were an integral part of man's remedial needs. With the advent of civilisation herbs were somehow neglected or rejected as medicinal agents, largely due to the development of synthetic chemistry and the production of synthetic drugs. However, the side effects of chemical drugs were soon noted and caused considerable concern. Concurrently, the news from the new developments of herb related technology was very encouraging. Tens of thousands of biologically active components in plants provided the possibility for innumerable combinations for the production of new drugs based on herbs.

### *Herbs in Cyprus*

*"It was found that there is a big and high mountain in Cyprus, higher than all its mountains, called Troodos, where many and different plants grow, which are useful in medicine. If I try to describe them separately, time will not be enough for me to narrate"(Aristotle).*

Cyprus, like all Mediterranean countries, is characterised by a rich and diverse flora, containing an important number of pharmaceutical plants, many of which are cultivated systematically. The first botanical gardens, containing herbal plants, were founded in monasteries on the island, where monks used the herbs as therapeutics. Cypriots have a tradition in knowledge, evaluation and usage of these plants, which is very often mixed with beliefs and superstitions. However, the action of these preparations from plants is proved and scientifically documented.



*Salsola spp.*

A number of therapeutic qualities can be found in bulbs or roots, flowers, seeds, branches, leaves or even in their peel. Sage (*Salvia*) is very common throughout the island. It contains camphore tannin and other aromatic compounds. It is generally used as a tonic, as well as a medicine for a lot of diseases. The juice of the fresh plant of *Salsola* spp. (*Kali* and *Soda*, above) is said to be an excellent diuretic, the twisted seed-vessels having the same virtue and being given in infusion.

Clearly, from the examples shown, there is considerable potential to exploit natural products from plants in

Cyprus and we look forward to developing this industry over the next few years.

Theodora Chr. Kyprianou and Dr. Kyriaki Zanettou  
State General Laboratory, Cyprus

## HGCA Enterprise Awards ~ What's the Alternative?



Are you a business with pioneering ideas for using cereals and oilseeds in alternative ways? If so up to £50,000 could be yours with an HGCA Enterprise Award. Established in 1995, the HGCA Enterprise Awards are designed to develop and promote new markets for British cereals and have so far helped over 100 companies. Past award winning projects range from pastel coloured free-range eggs, organic flours, breakfast cereals and beer, to biodegradable packaging, heated wheat packs for soothing aches and pains and a grain based product used in oil exploration.

The 2003 scheme opens on September 9 and this year there is a new Enterprise Award category to stand alongside the main awards. This will focus on the industrial use of cereals, for example in cosmetics, packaging, plastic alternatives, fuels and lubricants. This is building on the success of several industrial projects recognised within the scheme in previous years and in reflection of the clear need for British agriculture to innovate to expand the market for cereals.

Previous non-food award winners include Heygates and Mill Feed Anglia. Heygates won an award for £30,000 in 2000 for a new concept using wheat flour. Working with Greenlight Products a 100% biodegradable and viable alternative to polystyrene loosefill has been produced. A £15,000 helped Mill Feed Anglia diversify from animal feeds into worldwide oil exploration. Today they are the market leaders of high performance, eco-friendly grain-based sealants used during bore drilling.

Companies of any size and using cereals (wheat, oats, barley or rye) or oilseeds directly or indirectly are eligible to apply. Worth between £5,000 and £50,000 the awards can be used to finance most aspects of developing products and markets from process and supply chain development through to packaging design and promotional campaigns.

Initial applications must be submitted by December 31,

2002. They can be made online by visiting the HGCA website [www.hgca.com/enterprise](http://www.hgca.com/enterprise) or by contacting Charlotte Smethurst at HGCA Enterprise Awards, HGCA, Caledonia House, 223 Pentonville Road, London N19HY, telephone 020 7520 3927 or email [charlotte.Smethurst@hgca.com](mailto:charlotte.Smethurst@hgca.com)

## Bulgaria

We are delighted to announce that Bulgaria is now a full member of the INFORRM-IENICA Project. Our partner in Bulgaria is Alexandra Balabanova, Head of the Flax Research Group at the Agrobiointitute in Kostinbrod (Tel: +35 9 721 2552; Email: [a\\_balabanova@agrobiointitut.org](mailto:a_balabanova@agrobiointitut.org)).

## FORTHCOMING INDUSTRIAL CROPS EVENTS

10-11 September 2002

### Production, Processing and Utilisation of Natural Fibres

Potsdam, Germany

Tel: +49 (0)331-5699311

Email: [cbronowski@atb-potsdam.de](mailto:cbronowski@atb-potsdam.de)

5-7 November 2002

### BioProducts from Plants and Microbes

Rothamsted, UK

+44 (0)1582 763133

Email: [biomarket@bbsrc.ac.uk](mailto:biomarket@bbsrc.ac.uk)

Website: [biomarket@bbsrc.ac.uk](http://biomarket@bbsrc.ac.uk)

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### Contact:

Melvyn F. Askew

Central Science Laboratory

Sand Hutton

York

YO41 1LZ

Tel: +44 (0) 1904 462309

Fax: +44 (0) 1904 462029

E-mail: [ienica@csl.gov.uk](mailto:ienica@csl.gov.uk)