



IENICA



Newsletter number 2

May 1998

The IENICA project is now underway and achieving its aims in terms of creating an industrial crops network and spreading awareness about the potential of industrial crops in the European Union.

The 14 countries in the project are at present writing reports on the current situation of industrial crop production in their individual countries and the future potential markets and its needs. The reports should be complete by October 1998 and will then be collated into an EU overview and summary.

A coordination meeting for the IENICA project was held during May, hosted by the UK Central Science Laboratory of the Ministry of Agriculture Fisheries and Food, in York, UK. One of the key issues on discussion was the organisation of seminars on industrial crops and crop uses, intended particularly for industry. Details will be confirmed in later editions of the IENICA newsletters and on the IENICA website: (<http://www.csl.gov.uk/ienica>).

Participants at the 2nd IENICA
Coordinators' Meeting,
11th-12th May 1998,
Central Science Laboratory, York, U.K.



Forthcoming Industrial Crops Events

6 - 7 July 1998

Biotechnology in Agriculture, London, UK.

Contact: Anja Knauer, IBC UK Conferences,

Tel: +44(0)171 453 5404

Fax: +44(0)171 631 3214

IBC on the Internet: <http://www.ibc-uk.com/>

3 - 4 Sept 1998

Fatty Acids and Lipids - Chemistry & Analysis

Invergowrie, Dundee, DD2 5DA, Scotland, UK.

Tel: + 44 (0)1382 568568

Fax: +44 (0) 1382 568501

email: jsnape@scri.sari.ac.uk

14 - 15 Sept 1998

International Oils and Fats Congress
Magdeburg, Germany.

Further details to be added.

20 - 25 Sept 1998

World Renewable Energy Congress V
Florence, Italy.

Contact: Università degli Studi di Firenze

Fax: + 39 55 4224467

E-mail : marco_sala@cesit1.unifi.it

Web site: <http://www.wrenuk.co.uk>

21 - 24 Sept 1998

12th International Symposium on Alcohol
Fuels

Beijing, China.

Tel: + 86 10 62 78 45 89

Fax: + 86 10 62 77 03 04

For comprehensive details of events see the IENICA
web site: www.csl.gov.uk/ienica

or contact Sarah Hugo at s.hugo@csl.gov.uk

IENICA on the Internet

Information about IENICA has been available on the Internet since summer 1997. This original format featured on the UK's Ministry of Agriculture Fisheries and Food (MAFF) Internet site on the pages of the Central Science Laboratory

Since February 1998 IENICA has had its own Internet site which is freely available with no registration necessary. The site is accessed directly using the address:

<http://www.csl.gov.uk/ienica>

The IENICA Internet site is divided into 5 main sections:

- Background details of the project;
- Details of all country coordinators;
- Diary of forthcoming events of relevance to industrial / non-food crops;
- Enquiries to IENICA;
- And the main body of the site is the INDUSTRIAL CROPS DATABASE.

The database provides information on a wide range of crops with novel applications in industry. It will be an invaluable tool to those in industry, producers of the crops and academia alike.

Each entry is described under the following headings:

- Botanical characteristics and taxonomy
- Details of quality characteristics
- Constraints on production in Europe
- Markets and market potential
- Crop production statistics (where available)
- Other information, in terms of agronomy, pests and diseases etc.
- Useful contacts.
- References.

Crops listed on the database are, for example, crops which yield alternatives to oils normally derived from the petrochemical industry for use as lubricants, fuels, plastics, detergents, paints etc.; plants which can be

used to provide energy when burned, crops which yield quality fibres which can substitute for carbon- or petrochemical- derived sources. Frequently there are environmental benefits accruing from the use of these bio-renewable products.

The IENICA database also contains information on a diverse range of crops which are sources of therapeutic chemicals; plants used for production of dyes; plants which provide novel sources of nutrition; carbohydrates, paper or pulp. The database also includes traditional food crops for which non-traditional uses have been developed.

Plants are listed by their common names (English, French, German) and Latin names. The database can be searched using an Alta Vista-style search engine.

We are currently adding a 'Useful Contacts' page - a more general directory of industrial, academic and practical contacts, specific contacts are listed on individual crop pages. This page will also have links with other useful Internet sites such as ACTIN and NF2000.

On the Enquiries page visitors to the site can leave questions for Melvyn Askew (coordinator), Sarah Hugo (technical) or Jane Megginson (administration). These will come directly to us via email and we will endeavour to answer all queries as quickly as possible.

We welcome all contributions to the Database, Forthcoming Events and Useful Contacts pages. We particularly invite contributions from European visitors to the site. Please email your information to Sarah Hugo at s.hugo@csl.gov.uk

Visit the IENICA database at: <http://www.csl.gov.uk/ienica>

Molecular Farming Workshop 26 February 1998, Copenhagen.

About 100 scientists from research institutions and private industries attended this workshop.

In the lecture 'Therapeutic and Health Care Proteins from Plants' Dr. C. P. E. van der Logt of Unilever Research stated that there are many potential commercial applications for functional proteins but they demand large quantities of active material at low cost. Already, there is interest in a variety of plant-produced proteins for this type of application, and reports in the literature include plant-produced xylanase (eg for paper making), phytase (feed additive), antibodies (eg for bioremediation or for dental hygiene), hirudin (for anticoagulant therapy), cytokines (for immunological disorders), antigens (for vaccines) and serum proteins (for plasma replacement). Within this group there are different demands and constraints, so it will always be important to fully understand the intended application as well as the plant production technology, itself. Matching the application with the process is crucial.

Despite the obvious potential, however, there is more to be done with the underlying science, for most plant production systems still yield levels of active protein that are too low for commercial application. There are many technical options to explore, and the prospects for success are good. Plants therefore constitute a highly attractive production system for therapeutic and health care proteins, and they are likely to open up entirely new commercial applications in the speciality chemicals, pharmaceutical and related industries, once we have mastered the technology.

Dr Kristian Dalsgaard presented under the lecture 'Vaccines', results from an EU/FAIR research project in which they have successfully expressed a protective peptide antigen from an animal virus in a plant virus. At his research laboratory they have studied the effect of saponins extracted from *Quillaja saponinaria* Molina. By combining these two components in a formulation they have produced the first plant derived vaccine which protects against a virus disease.

Mr Melvyn F. Askew gave an overview of secondary plant metabolites their opportunities, challenges, and constraints, and Dr. Barbara Ann Halkier presented a lecture on Metabolic engineering of secondary plant products.

Dr. Sten Stymne concluded in the presentation on 'Speciality Oils by Plant Engineering' that it is likely that there will be, in a relatively short future, transgenic oil crops yielding a great variety of oil qualities suitable for use in various industrial products such as paints, polymers and lubricants. Further he stated, it can be anticipated that these qualities will have a substantial market and also a premium price compared to conventional vegetable oil qualities and thus make agriculture a more profitable business as well as replacing mineral oil with renewable environmentally more benign resources. Perhaps the most important consequence of this will be an increased market for agricultural products and thus reduction of surplus production and increased world market prices which in its turn will mean less need for subsidies for the agricultural sector in the Western world.

Dr. Preben Bach Holm concluded in the presentation on 'Use of Malting Principles for Production Synthesis in Molecular Farming' that malting constitutes an ancient and well established industrial process designed to ensure the production and secretion of large amounts of hydrolytic enzymes from scutellum and aleurone of barley and wheat. Among the enzymes synthesised, α -amylases and (1,3-1,4)- β -glucanases have in particular been studied at the biochemical and molecular level. Also, cereal aleurone layers and isolated aleurone protoplasts are to be considered primary model systems for promoter analyses, studies of hormone mediated signal transduction, and enzyme secretion. The potential of malted cereal grains for molecular farming has not yet been explored in detail but available data suggest that the necessary technology is at hand for production of heterologous enzymes during germination.

The final report from the workshop will be available from:

The Non-food Secretariat
Toldbodgade 29
1253 Copenhagen K
Denmark

Finn Rexen, national coordinator for the IENICA project in Denmark

Renewable Feedstocks for the Speciality Chemical Industry

At a seminar in London last October representatives of industry and the research community met to discuss opportunities for the increased use of crop-derived, renewable raw materials by the Speciality Chemicals Industry. The event was organised by the LINK Competitive Industrial Materials from Non-Food Crops programme and the Ministry of Agriculture, Fisheries and Food, in association with ACTIN (Alternative Crops Technology Interaction Network) the Chemical Industries Association and the Royal Society of Chemistry, Speciality Chemicals Sector.

In his keynote paper, Dr Koon Chan of ICI Polyurethanes indicated that speciality chemicals held attractions for ICI as they were less affected by economic cycles, they tended to have higher added value and presented a research-based company such as ICI with opportunities for tailoring products to meet customers' needs.

Speciality chemical companies, like other chemical companies, are always trying to reduce costs and, encouragingly, for some applications crop-derived raw materials are indeed cheaper than conventional petroleum-based raw materials.

Supply Chain Issues

However, any change from traditional, mainly mineral oil-based feedstocks to crop-derived raw materials will require a re-evaluation of the manufacturing process. The options are either

- a) a direct replacement of the existing feed stock
- b) the introduction of an additional processing step to modify the renewable feedstock
- c) adapting the current manufacturing process
- d) developing a new manufacturing process.

Such changes in manufacturing process will require a re-evaluation of the existing links in the supply chain in order to find the most efficient route to market. If the raw materials are entirely novel, there will be no such supply chains to adapt and a more extensive evaluation of market opportunities and potential routes to market will be required.

The Importance of Networking

All of these changes will require the establishment of new contacts in order to bring about the desired end result - a novel and competitive product from a renewable feedstock. To make these contacts will require "networking".

It is possible for either industry or the research community to undertake such networking activities but, where emerging technologies are concerned, independent agencies such as ACTIN can help speed up and add value to the process.

Ian Bartle, national coordinator for the IENICA project in the UK.

Front page photograph.

(From left to right)

(back row) Ciaran Mangan, Birger Kerckow;

(3rd row) James Burke, Emmanuel Koukios, Gianpietro Venturi, Pedro Casquero, Ian Bartle;

(2nd row) Nico Stutterheim, Finn Rexen, Mia Sahramaa;

(front) Melvyn Askew, Frederic Francis, Sophie Labrousse, Sarah Hugo.



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