



# IENICA



## Interactive European Network for Industrial Crops and their Application

Newsletter number 3

June 1998

On June 9 - 10 IENICA was represented at Chemical Specialities Europe '98 - the major annual event for the speciality chemicals industry. Staged at the RAI in Amsterdam, ChemSpec attracted 2,800 visitors, making it the best attended show outside the UK for this event. Attendees came from a wide industrial base, which included producers and suppliers of chemical intermediates (13.8%), agrochemicals (5.9%), general chemicals (6.9%), custom synthesis (4.9%), pharmaceuticals (7.7%) and pharmaceutical intermediates (10.8%), as well as adhesives (2.8%), contract and toll manufacture (4.1%), cosmetics and toiletries (3.7%), dyestuffs (4.4%), paints (3.2%) and polymers.

Visitors to the IENICA stand, one of 250 exhibitors, came from throughout Europe and beyond including a Chinese Trade Delegation and a visitor from the Canadian High Commission. Thanks to the good offices of ACTIN, the complimentary IENICA and ACTIN databases were on 'live' demonstration. There were also smaller exhibits from ACTIN and the BIORAF whole crop biorefinery project, also posters about the use of plant-derived indigo from woad (*Isatis tinctoria*) for use in inkjet printers and a collaborative EC-funded project on essential oils. Business was worthwhile and a number of enquiries were made about plant products, research areas and industrial opportunities for plant products.

The IENICA project is organising a series of three seminars to take place in 1999. These seminars will be aimed at industry and research and will feature key speakers from relevant sectors of industry. Exact dates are yet to be finalised but the programme is scheduled as follows:

- Natural Fibres Performance Forum - Needs, Challenges, Opportunities.

April 1999, Copenhagen, Denmark.

- Vegetable Oils - Meeting the Needs of Industry

June 1999, Rotterdam, Netherlands.

- Speciality Chemicals for the 21st Century

September 1999, Nice, France.

Each seminar will feature presentations from a maximum of eight speakers and all will follow the same theme of 'meeting the needs of industry'. There will be an attendance fee to cover the cost of the lunch and venue hire. The seminars will accommodate approximately 100 people and

proceedings will be available as a publication after the event. The language of the seminars will be English.

Confirmation of dates and venue will be given in future newsletters and will of course be available on the IENICA database: <http://www.csl.gov.uk/ienica>

### Forthcoming Industrial Crops Events

10 - 12 August 1998  
NORDFLAX I  
Tampere, Finland.  
Tel: + 358 3 3664400  
Fax: + 358 3 2226440  
Email: [conference@vip.fi](mailto:conference@vip.fi)

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  
Contact : Jonathan Snape at MRS.  
email: [jsnape@scri.sari.ac.uk](mailto:jsnape@scri.sari.ac.uk)

14 - 15 Sept 1998  
International Oils and Fats Congress  
Magdeburg, Germany.

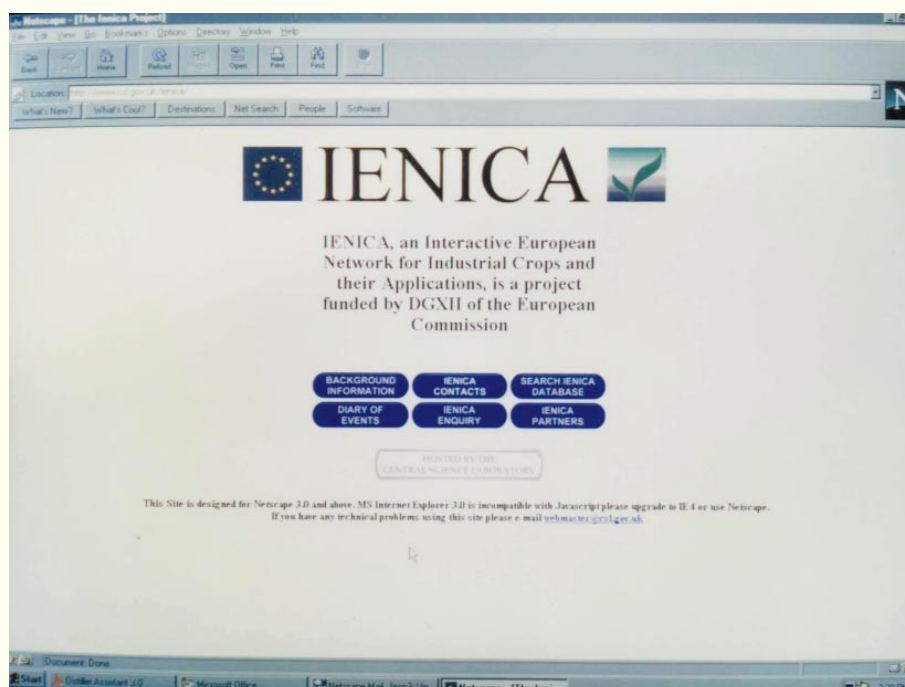
20 - 25 Sept 1998  
World Renewable Energy Congress V  
Renewable Energy : Energy and the Environment  
Florence, Italy.  
Contact: Università degli Studi di Firenze  
Tel: + 39 55 4376300  
Fax: + 39 55 4224467  
E-mail : [marco\\_sala@cesit1.unifi.it](mailto:marco_sala@cesit1.unifi.it)  
Web site: <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

7-9 Oct 1998  
Crops for a Green Industry  
Gmunden, Austria  
Contact: Ms Sonja Mayer/Ms Irene Baumann  
CFI, Congress and Fair International  
Wasagasse 6/12, A-1090 Vienna, Austria  
Tel: 43 1 310 20 07  
Fax: 43 1 310 20 09  
E-mail: [cfi@eunet.at](mailto:cfi@eunet.at)  
Internet: <http://cfi.austrian.org>

# IENICA on the Internet

For those readers who have not yet visited the IENICA site - the front page is shown below:



The IENICA database is still being extended but we are pleased to report that 65 crops have now been added:

AMARANTH; ARTEMISIA; BOG-MYRTLE; BORAGE;  
BROWN MUSTARD; BUGLOSS; CANARY GRASS;  
CARAWAY; CAPER SPURGE; CASTOR;  
CHAMOMILE; CHICORY; CLARY SAGE; COMFREY;  
CORIANDER; CRAMBE; CUPHEA; DILL; EDIBLE  
LINSEED (LINOLA); ELDER; ELEPHANT GRASS;  
ETHIOPIAN MUSTARD; EVENING PRIMROSE;  
FEVERFEW; FENNEL; FENUGREEK; FIELD  
SCABIOUS; FOXGLOVE; GIANT REED; GOLD OF  
PLEASURE; HEMP; HONESTY; JERUSALEM  
ARTICHOKE; JOJOBA; KENAF; LAVENDER;  
LESQUERELLA; LINSEED; LUPINS (GRAIN);  
MADDER; MARSH GRASSES; MEADOWFOAM;  
MUGWORT; MYRTLE; NETTLE (COMMON);  
OILSEED RAPE; PEPPERMINT; POPPY (OPIUM);  
POT MARIGOLD; QUINOA; RAMIE; REED CANARY  
GRASS; SAFFLOWER; SESBANIA; SISAL; SOYA;  
ST. JOHN'S WORT; SUNFLOWER; THYME; TURNIP  
RAPE; VALERIAN; VIPERS BUGLOSS / PURPLE  
VIPERS BUGLOSS; WELD; WOAD; YARROW;  
YEW;

We estimate that data entry will be completed for early August of this year. The process will then begin again as all entries will be continually updated.

This month we have added a new page to the database called "IENICA Contacts". This page has links with other useful industrial crops databases and has information on general contacts in the fibres, oils, carbohydrates, speciality chemicals and energy sectors with links to databases where available. This section is also still under construction and we welcome all contributions to the site, in particular this new page. If you wish to contribute to the database please email Sarah Hugo at [s.hugo@csll.gov.uk](mailto:s.hugo@csll.gov.uk).

The IENICA website is designed for Netscape 3.0 and above. Visitors to the site using MS Internet Explorer 3.0 will find that they cannot fully search the site, for example the navigation windows may not work properly. To overcome this please upgrade to IE 4 or use Netscape. On the front page of the web site users will find a direct link to the Webmaster who will be able to help you.

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

## Industrial Crop Refineries: An Option For Europe?

Can one really think today of the fossil hydrocarbons-based industry without refineries? Nevertheless, after a couple of decades of systematic R&D on the industrial utilisation of a much more complex type of feedstock, i.e. bioresources, the concept of biomass refinery/agro-refinery/biorefinery remains rather underdeveloped. A biomass refinery can be defined as an integrated system of industrial processes that separate the major components of bioresources and convert them to food, feed, fibre, fuel, fertiliser, fine and bulk chemicals, biopolymers and other biomaterials<sup>1</sup>. We can further classify biomass refineries, or biorefineries, according to the type of bioresource or the major separation task concerned; e.g. for plant-biomass feedstocks,

- Lignocellulosics biorefinery: lignin/cellulose/hemicellulose fractionation;
- Oil seeds biorefinery: lipids/proteins fractionation;
- Green leaves-tops biorefinery: protein/fibre fractionation;
- Carbohydrate crops-tubers biorefinery: sugar or starch/protein/fibre fractionation.

A number of recent European R&D projects have contributed to the investigation of several critical aspects for the feasibility and sustainability of biorefineries in this part of the world. Prominent among them, the "Whole crop biorefinery" project, co-ordinated by the Bioraf Foundation (Denmark), and co-funded by EC's ECLAIR Programme (AGRE-CT90-0082, 1991-1994). Within this project, biomass samples of a number of starch, oil, protein and fibre crops of interest to European agriculture were refined at a pilot-scale biorefinery that was established on the island of Bornholm, DK, and the fractions were tested and evaluated by the project partners (DK, D, GR, IRL, UK). The results of these pioneering efforts indicate that, under certain conditions, there could be significant scope for European agriculture and industry to establish biorefineries as a vital interface to speed up industrial utilisation of plant biomass.

To mention only the major findings of the fibre evaluation task performed by the group of this author,

significant technical, economic and environmental advantages for the fibre processing industries can be obtained by fractionation of the feedstock (fibre crop or residue) in a "chip" (fibre-rich) and a "meal" (nutrient-rich) fraction<sup>2</sup>. Whereas the meal fraction could be utilised locally, as animal feed or for soil improvement, the chip fraction appears to be an upgraded feedstock for technical fibre-producing industries, such as pulp-and-paper, packaging, and composites/biomaterials; upgrading in this case means higher product yield and quality, lower process inputs required (chemicals, energy, etc.), and less wastes generated compared to the use of the initial crop material. Within another, recently completed European research project on "Fixed-bed gasification of agricultural residues," supported by EC's JOULE Programme (JOR3-CT95-0021, 1996-1997), the same R&D group had the opportunity to apply the concept of biorefining in order to upgrade low-quality but high availability European bioresources as gasification feedstocks, with equally promising findings: the refined solid biofuels contain much less ash, which has a higher melting temperature range, and overall exhibit an acceptable thermochemical behaviour<sup>3</sup>.

<sup>1</sup> Koukios, E.G., "Biomass refining: A non-waste approach," in: D.O. Hall et al. (eds.), *Economics of Ecosystem Management*, 233-244, Dr. W. Junk Publishers, Dordrecht, 1985.

<sup>2</sup> Paphothofanous, M.G. et al., "Biorefining of agricultural crops and residues," *Biomass and Bioenergy*, 8, 419-426 (1995).

<sup>3</sup> Arvelakis, S. et al., "Upgrading agricultural residues as feedstocks of electricity generation by gasification," *Proceedings 10th European Bioenergy Conference*, Wuerzburg, 1998.

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## Symposium Renewable Resources - From Research To The Market

On 25 and 26 May 1998, the Fachagentur Nachwachsende Rohstoffe e.V. (FNR) organised a symposium in Güstrow about the economic potential of renewable resources in Germany. Representatives of major German industrial companies - such as BASF, Henkel and Daimler-Benz - presented success stories and difficulties of products based on renewable resources. More than 100 participants, mainly from industry, attended the symposium.

The presentations covered many different applications for renewable raw materials, both in industrial and consumer products: Surfactants, fibre reinforced composites, lubricants and hydraulic fluids, linseed oil based paints and coatings, loose-fill materials, flax based textiles, biodegradable packaging materials and pharmaceuticals based on vegetable ingredients.

Although the technical and marketing challenges differ from product to product, some aspects are relevant for all sectors. For industry, the key factors to use a renewable feedstock are price, long term availability and existing processing technology. In product marketing, ecological benefits and society demand may add on criteria such as competitive price and technological performance, but they cannot be used as a sole sale argument. For certain sectors, the legal framework is decisive for the market success. Examples are the packaging sector and biodegradable lubricants.

In conclusion, the symposium showed the success of renewable bioproducts in different market segments and the interest of industry in this field. So future developments can be seen with optimism.

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Email: F.N.R.@t-online.de

Proceedings of the symposium will be available in German. Anyone wishing to obtain a copy should contact F.N.R.@t-online.de

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