

Project no.: **038994 – (SES6)**

Project acronym: **Biosynergy**

Project title:

**BIOmass for the market competitive and environmentally friendly SYNthesis  
of bio-products together with the production of secondary enERGY carriers  
through the biorefinery approach.**

Instrument: Integrated Project

Thematic Priority: SUSTDEV 1.2.5 (Biomass)

### **D 8.1.4 B Three national workshops organised**

#### **Proceedings of the BIOSYNERGY Workshop on Biorefineries 2 July 2009, European Biomass Conference and exhibition, Hamburg, Germany**

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<b>Dissemination level</b>		
<b>PU</b>	Public	<b>X</b>
<b>PP</b>	Restricted to other programme participants (including the Commission Services)	
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	



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## 1. Introduction

The Deliverable D 8.1.4: 'Three national workshops organised' is split in three parts reporting the proceedings of the three workshops.

The first workshop was the BIOSYNERGY Enlargement and Integration Workshop that was held on 17-18 April 2008, at the Institute for Energy of the EC Joint Research Centre, in Petten, the Netherlands. The proceeding of this event have been reported as deliverable D 8.1.4 entitled: Advanced Biorefinery Concepts: A Feasibility and Reality Check. This document is available on the BIOSYNERGY public website.

Deliverable report D 8.1.4.A reports the second of the national workshops, held in Ghent on the 12 of June 2009 to present the first version of a Training course on Biorefineries developed in the BIOSYNERGY project in cooperation with IEA Task 42 Biorefineries. The proceedings of this workshop are available on the Biosynergy website.

The proceedings of the second National Workshop, that, like the first one also had a pronounced international flavour, are presented in this report D 8.1.4B.

In order to maximize the impact of the third workshop, it had been postponed to the middle of 2009. In this way it was possible to organize it as a side event of the 17th European Biomass Conference & Exhibition at the CCH - Congress Centre Hamburg on the 02 July 2009.

The title of the workshop was 'Biosynergy workshop on Advanced Biorefinery Concepts and Technologies'. The goal of the Workshop was to present and discuss the project results achieved so far with stakeholders from the public sector, industry and R&D organizations.

## 2. Programme

### Workshop Programme, 02 July 2009

<i>13:30-14:00</i>	<i>Arrival of participants, registration,</i>
<b>14:00-14:15</b>	<b>Welcome and Project overview - J.H. Reith (ECN, NL), BIOSYNERGY Project Coordinator</b>
<b>14:15-14:45</b>	<b>Advances in physical and chemical fractionation of biomass – Rob Bakker (A&amp;F, NL)</b>
<b>14:45-15:15</b>	<b>Innovative thermochemical conversion of biomass – Paul de Wild (ECN, NL)</b>
<b>15:15-15:45</b>	<b>Advanced biochemical conversion of biomass (ABE fermentation) – Frédéric Monot (IFP, FR)</b>
<i>15:45-16:00</i>	<i>Coffee Break</i>
<b>16:00-16:30</b>	<b>Innovative chemical conversion and synthesis – Zoi Nikolaidou ( CHIMAR, GR)</b>
<b>16:30-17:00</b>	<b>The generation and evaluation of integrated bioenergy chains for second generation biofuels - Katie Chong and Tony Bridgwater (Aston University)</b>
<b>17:00-17:15</b>	<b>Discussion and closing - J.H. Reith (ECN, NL), BIOSYNERGY Project Coordinator</b>

### 3. Workshop summary

The economics and ecological benefits of biomass processing can be improved via the biorefinery approach i.e. the sustainable processing of biomass into multiple products, fuels and energy. The goal of this BIOSYNERGY Workshop was to present and discuss the project results achieved so far with a wider public of stakeholders from public sector, industry and academia. The workshop was well attended by more than 50 scientists and other interested persons. The workshop ‘Advanced Biorefinery Concepts and Technologies’ was organized as a side event of the 17th European Biomass Conference & Exhibition ‘From Research to Industry and Markets’ that was held in the Congress Centre Hamburg on 2nd July 2009.

The overall goal of the European Integrated Project (IP) BIOSYNERGY (2007-2010) is to develop sound techno-economic processes (from lab-scale to demonstration at pilot-scale) for integrated production of fuels, chemicals, power and heat from lignocellulosic biomass. This includes the development of integrated, synergetic biorefinery concepts, using advanced fractionation and conversion processes, and combining biochemical and thermochemical pathways. Furthermore the project will identify the most promising biorefinery chains for Europe based on energy efficiency, environmental performance, socio-economic aspects and costs. The BIOSYNERGY IP places particular emphasis on valorisation of residues from cellulosic ethanol production. The assessed feedstocks include wheat straw and soft and hard wood as representatives of major European biomass streams.

During the workshop R&D highlights and challenges were presented and discussed by researchers actively involved in the project. Project Coordinator Hans Reith, who chaired the workshop, summarized the BIOSYNERGY results and conclusions to date. The presentations in the workshop highlighted the objectives, the partnership, an outline of the R&D and the preliminary results of the IP BIOSYNERGY that had just completed 2.5 years of its 4-year life.

At the current stage of the project the following preliminary conclusions could be drawn.

- The Research and Technological Development in the IP BIOSYNERGY shows good progress and provides a basis for large-scale valorization of C5 sugars and lignin. In the final project phase scale-up is planned for several conversion routes.
- Development of integrated lignocellulose biorefinery technology combining bioprocesses, chemical processes + Combined Heat and Power production offers good perspectives to fully exploit the potential of lignocellulose feedstocks.
- Pretreatment and enzymatic hydrolysis are critical process steps for fractionation and important cost drivers in the biorefinery and therefore for the quality of the end products and overall techno-economic feasibility.
- Pretreatment technologies need to be optimised toward a particular goal.
- Enzymes are a major processing tool in the lignocellulose biorefinery. Further development and cost reduction are needed.
- Integrated development of the pathway, feedstock-pretreatment-hydrolysis-fermentation, is required.

- Lignin valorization (at least in part) to chemicals is an important component of the process with a significant impact on economic profitability and for reduction of the carbon footprint of a lignocellulose biorefinery. Within the IP BIOSYNERGY project the direct application of (organosolv) lignin and enzymatic conversion show promising results for lignin valorization.
- Separation technology development is vital for both biochemical and thermochemical processing technologies
- Development of integrated biorefinery processes including chain optimisation forms a major success factor and is also one of the major challenges. This includes technical process integration but also the integration of environmental and socio-economic aspects.

## 4. Proceedings

The workshop presentations are available in the Biosynergy public website ([www.biosynergy.eu](http://www.biosynergy.eu))

- Introduction, conclusions-JH Reith-BIOSYNERGY Workshop\_Hamburg, 2 July 2009
- WP1\_Advanced physical-chemical fractionation R[1]. Bakker-BIOSYNERGY Workshop\_Hamburg\_2 July 2009
- WP2-Innovative thermo-chemical conversion-P de Wild-BIOSYNERGY Workshop Hamburg, 2 July 2009
- WP3-Advanced Biochemical conversion-F Monot-BIOSYNERGY Workshop\_Hamburg\_2 July 2009
- WP4-Innovative chemical conversion- Z[1].Nikolaidou-BIOSYNERGY Workshop\_Hamburg, 2 July 2009
- WP6-Process Chain design- K.Chong-BIOSYNERGY Workshop\_Hamburg, 2 July 2009

## 5. List of participants

<b>FIRST NAME</b>	<b>FAMILY NAME</b>	<b>COMPANY / INSTITUTE</b>
Matthias	Meier	Independent
Ondrej	Masek	University of Edinburgh
G. Wytze	Meindersma	TU Eindhoven
David	Guenadou	CEA
Dr. H. N.	Pandey	NTPCLTD (NETRA - SSD)
Caecilia	Vitasari	TU Eindhoven
Jean Jves	Escabasse	Papierteknische Stiftung
Aussi	Kalli	VTT
Christian	Lindfords	VTT
Tan Lien	Chion	Ezno Pte ltd
Tuula	Makinen	VTT
Lars	Andersen	EC JRC IE Petten
Romano	Giglioli	Univ. Pisa
Craig	Jamieson	AEA
Jonas	Dahl	Danish Technological Institute
Dietrich	Meier	VTI
Philipp	Hashley	Emerald Tech. Ventures
David	Baxter	EC JRC IE Petten
Esther	Sulmon	Tver St. Tech Un-ly
Vera	Myasoedova	EC Grantek
Amaya	Arteche	Inasmet - Tecnalía
Toshikazu	Yano	Miyagi University
Neeta	Sharma	ENEA
Tim	Sze	CBD New Energy
Myrsini	Christou	CRES
Maryori	Diaz	CIRCE
Philippe	Evon	LCA-ENVIACET
Zoi	Nicolaidou	Chimar HELLAS
Bryan	Jenkins	UC Davis

Tonia	Tommasi	Politecnico di Torino
Eva	Lopez	Fundacion CIRCE
Mahender	Pal	NTPC india
Walter	Prins	Univ. Gent
Taobias	Richards	Chalmers Univ of Tech
Victoria	Junquera	Consultant
Krzysztof	Swiechowicz	OBR Pro Ecoinvest
Michael	Windt	VTI / HTB-C
Arnold	van der Post	Hanze Consult
Sonia	Quintili	ENEL Trade
Helena	Wessman	VTT
Eibhilin	Manning	Eubia