EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

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COST Action no. CM0903

Utilisation of Biomass for Sustainable Fuels &Chemicals (UBIOCHEM)

2009 | 2013

Objectives

- Foster synergism in the development of innovative technologies for the utilisation of biomass for sustainable fuels & chemicals through cooperation between scientists from different member states and disciplines, thus increasing competitiveness.
- Shape a unified view and metrics for comparing different processes to sustainable fuels and platform chemicals from biomass.
- Create novel materials with a reduced environmental footprint.

Main Achievements

- ***Training of ESRs and promotion of STSMs***:
- Participation of 28 ESRs in 3 different training schools dealing with chemometrics, ordered porous materials and biorefineries.
- 34 STSMs completed or approved until now.
- ***Publications***: Special issues of Catalysis Today devoted to each workshop (UBIOCHEM-II as part of the Conference on Materials and Technologies for a Green Chemistry).
- ***Collaborations:***
- Bridges built with some other Actions (FP0901, D36, D40, CM0701 and TD1203).
- More than 20 persons from 8 different countries working together to reach a consensus on a comparative study of green metrics for different selected molecules from biomass or petrochemical route. Main results will be published in a special issue of Catalysis Today.

Chemistry and Molecular Sciences and Technologies (CMST)

Participating countries

AT, BE, BG, DK, EE, FI, FR, DE, GR, HU, IE, IT, LV, LT, NL, NO, PL, PT, RO, ES, SE, SE, CH, TR, UK, IE, CS

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Cover of the special issue of Catalysis Today devoted to UBIOCHEM-I

COST is supported by the EU RTD Framework Programme

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Working Group activities

WG 1: Primary conversion of lignocellulosic feedstocks

- Evaluation of the chemical composition of various biomass rich in lignocellulosic materials ex: biomass of energy plants (i.e. mugwort (*Artemisia vulgaris* L.), silvergrass (Miscanthus giganteus), weeds (*Polygonacea*), sida ciliaris (*Malvaceae*), cup plant (*Silphium perfoliatum* L.).
- Hydrolysis of renewable lignocellulosic biomass.
- Investigation of the effect of the compositions of various enzyme preparations (i.e. hemicellulases, cellulases, amylases, glucoamylases) on cellulosic biomass saccharification efficiency.
- Genetic engineering (in particular for *Trichoderma* strains) to improve/alter their native hydrolase production.
- Investigation of new heterogeneous catalysts preparation for primary conversion of (ligno)cellulose.
- Pyrolysis of biomass (including pilot plant experiments).
- Supercritical conditions to convert recalcitrance renewable in presence of acid catalysis.
- Thermochemical conversion of lignocellulosic biomass.

WG 2: Biomass to energy

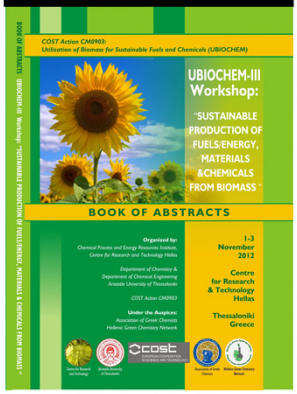
- Biofuel through gasification of biomass.
- Biofuel through pyrolysis and biooil.
- Biofuel through fermentation of biomass.
- Biofuel by direct synthesis from carbohydrate biomass.
- Biofuel by direct synthesis from lipid biomass.

WG 3: Biomass to novel materials

- Transformation of biomass to polymers via formation of monomers. Monomers can be prepared by fermentation or chemical transformations (diacids (succinic acid, furan dicarboxylic acid FDCA); α-hydroxy acid (lactic acid); diol (isosorbid, butanediol…); polyols. Potential actions on the different steps include: technical improvement (microwaves); green reactant (catalytic oxidation with air); LCA. Risk assessment analysis (REACH regulation).

WG 4: Biomass to platform chemicals

- Platform molecule *identification:* Definition of metrics to allow comparison; Development of new value-chains, secondary products and applications.
- Platform molecule *production:* Chemocatalytic production (i.e. homogeneous/heterogeneous/photocatalytic conversion); Biotechnological production (i.e. fermentative/enzymatic conversion).
- Platform molecule *valorization*: Chemocatalytic valorization (i.e. homogeneous/heterogeneous/photocatalytic conversion).
- *Biotechnological valorization* (i.e. fermentative/enzymatic).



Worshops of the Action were held in Spain, Estonia and Greece

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