



COST Action FP0901

Analytical Techniques for Biorefineries

2009 | 2013

Objectives

To develop new and evaluate existing analytical methods for forest-based and agroindustrial Biorefineries that eventually will be applied within novel and existing sustainable Biorefining processes and for products, as well as in state-of-the-art academic research and innovations

Main Achievements

- Established good interaction with other Actions, EU projects/networks, and conferences
- FP0901 has successfully finished 21 (7+6+8) Short Term Scientific Missions
- Several round robin activities on analytical methods are in progress and the first results have been presented at our meetings

Working Group 1

Biorefinery feed material sampling and characterization. The feed material covers a wide range from forest to agroindustry and from fresh plants to industrial waste or recycled fibres. Necessary pretreatments will be evaluated and a comparison of isolation methods and sample representativeness are important. The isolation and analysis of specific compounds, including intact polymers, are critical steps to understand the process chemistry. Plant polysaccharides or lignin are starting materials for advanced biomaterials or a potential source for sustainable bioenergy production. The molar mass, polymer structure, physico-chemical properties, and the molecular building blocks are critical factors offering analytical challenges. Analysis of inorganic compounds may be a problem especially in Biorefineries using feed material from the agroindustry. Extractives represent an interesting source of bioactive compounds, specialty chemicals, and biofuels, where the analytical methods also are extremely challenging.

Working Group 2

Characterization of processed biochemicals and biomaterials. The representativeness of the analytical samples, as well as the pretreatments, sample storage methods, and a proper calibration of each method are in focus also for the processes and products. The sampling methods and pretreatments used in the process and for the products may differ significantly from those used for the feed material. An increasing amount of analysis data is needed directly from the processes. Therefore, one emphasis of FP0901 is on the development of analytical on-line applications, hyphenated techniques (i.e. combination of several techniques) and statistical multicomponent analyses to sort out the relevant data from the main data stream.

Working Group 3

Characterization and fate of process residues. The ultimate aim of a Biorefinery is to utilize 100% of the feed material. However, this is yet difficult to achieve and there is a varying amount of process residues from process chemicals, inorganic compounds, or high-molar-mass natural polymers that have undergone chemical reactions during the processing, which have rendered them unsuitable for further processing. The sampling, pretreatment, characterization, and fate of these process residues will be challenging but necessary to achieve the ultimate goal of total utilisation of the feed material. The use of the residues for bioenergy places high demands on a thorough characterization and deep understanding of the material to be able to avoid problems of corrosion, fouling, and low performance.

Forests, their Products and Services (FPS)

Participating countries

AT, BE, BG, CH, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LV, NL, NO, PL, PT, RO, RS, SK, SI, SE, TR, UK (BR, NZ, US, ZA)

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Biorefinery of straw



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