



## Research News

### Valorisation of Plant production supply chains

#### Introduction

*The global concern for climate change and green house gas emissions combined with the dwindling availability of petrochemical resources on longer terms and the increasing needs for fuel and feedstock for chemical industries have led to policies for stimulation of sustainable developments and transition to a **biobased economy**. In this framework fits the promotion of renewable resources as a feedstock for chemical industries.*

Valorisation of plant production chains offers possibilities to reduce the need for fossil fuels. Alternative resources derived from plant production systems or residues from the agro-food production chain should become available. The search is for feasible processes for production of 'green chemicals' and products that can compete with the current petrochemical products. As a sustainable substitute for synthetic products a number of criteria need to be met.

*The primary questions that arise for production from renewable resources are concerning the scale of performing economically feasible plant conversion processing as biorefinery, fermentation, and extraction. What processes are the most efficient for production of chemical components and fuels from biomass? What are the limitations and what are the opportunities?*

**Biomass** is a very heterogeneous resource, consisting for a large part of water and soluble components (sugars, proteins, salts). Specific components may accumulate in certain plant parts or be excreted. Those are produced and stocked because of their functional properties

such as structural (cellulose, hemicellulose, lignin, pectin), reserve (protein, starch, oil), or protection against damage (tannin, lignin, toxins). Others play a role to attract or repel animals (odour, flavour, colour) that take care of fertilisation or spreading of seeds.

Utilisation of biomass to save petrochemical resources especially will be feasible for those chemicals that require high energy input for its synthesis and high investments in heat exchangers or pressure vessels or that have low conversion efficiency because of losses and undesired side products.

#### R&D fields

- Selection of 'green chemicals' that can be produced in plants
- Maximum concentration in plant production systems
- Required technologies for extraction of components (biorefinery, biocascading)
- Whole crop utilisation
- By-products from agro-industrial food production providing a suitable resource for extraction or conversion
- Conversion technologies

(thermic, chemical, or biotechnological, fermentation or enzyme technology) to produce valuable components

#### Disciplines

Considering the overlap and synergy with many different disciplines and the required multidisciplinary approach of those questions research topics can be defined in many areas of scientific expertise:

- Agronomy, Breeding and Plant physiology,
- Biotechnology, Biochemistry and Organic chemistry
- Processing technology , Agrotechnology
- Agrolistics, Economy
- Ecology

#### Information

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