Biofuels RD&D in BIOENERGY 2020+

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Hot topics in biofuels

- Are biofuels sustainable?
- Food versus fuel
- Colonisation for energy?
- Decarbonisation of transport – a global challenge
Sustainability – the BioGrace tool

- RED and FQD define sustainability criteria for biofuels, including GHG emissions reductions
  
  BioGrace I project:
  - Transparent calculation of GHG emissions
  - Harmonization of GHG calculations across EU
  - Excel tool available: www.biograce.net

- EC recommendation on sustainability criteria for electricity, heat and cooling from solid and gaseous biomass (bio-el&h&c)
  
  BioGrace II project:
  - Transparent calculation of GHG emissions
  - Dialogue with policy makers and companies
  - Support the introduction of sustain. criteria for bio-el&h&c
Feedstock alternatives: lignocellulosics – gasification of wood chips

CH4 synthesis (currently idle)

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Gasifier

Mixed alcohols synthesis

Reformer

Drying (glycol-scrubber)

Compressor (5-7 km³/h, 90-300 bar)

Reactor

FT synthesis

Fischer-Tropsch Skid

Gas Conditioning Skid

Feed (wood chips) and FT Product

Slide 4
Feedstock alternatives: lignocellulosics – hydrogen from gasification

Project BioH₂-4Refineries:
Economic evaluation of production of Bio-hydrogen for a refinery

- 50 MW fuel plant to replace fossil hydrogen
- Evaluation of the biomass resources available for such a plant
- Basic - engineering of the gasifier as well as of all other sub units, including pipelines, utility systems, logistic needs
- Optimal use of by-products
- Economic evaluation

All components „Ready to market“
Feedstock alternatives: lignocellulosics – fermentation pretreatment technologies

- TherChem: **Thermochemical pre-treatment of brewers’ spent grains**

- Hymab: **Pre-acidification of substrates:** increasing CH$_4$ concentration, degradation rate and amount of gras silage, reducing viscosity
Feedstock alternatives: waste material – slaughterhouse waste to biogas

Project “Desmur”

Targets

■ Increasing degradation rate of slaughterhouse residues to biogas

Methods

■ Strengthen the anaerobic community by nutrients
■ Variation of process parameters for adaptation of microbiology
■ From lab to technical scale
Feedstock alternatives: algae – additive for biogas production

- **Objective:** Evaluate the utilization of microalgal biomass as additive to anaerobic biogas fermentation

- **Tasks:**
  - Screening for suitable algae strains
  - Fermentation experiments with algae addition at laboratory scale
  - Variation of process parameters in pilot plant (~1m³)

- **Status:** ongoing
Feedstock alternatives: algae – Perspectives for the Austrian Energy System

■ Scope:
  ■ Description of production and conversion pathways
  ■ Technical, economic and environmental assessment
  ■ Scenarios for Austria

■ Results:
  ■ R&D needs identified along the entire value chain
  ■ Promising raw material for industry and energy
  ■ Currently, no economic production of biofuels
  ■ Austria as technology developer and know-how exporter
Feedstock alternatives: algae – synergies with waste water treatment

Objectives:

- scientific basis of combined waste water treatment, nutrients retention, and microalgae cultivation
- identify suitable waste water streams
- develop production concepts
- define the R&D needs

Highlight: Algae Turf Scrubber
Colonisation for energy? – Jatropha oil in Africa

- BIA project: opportunities and risks of biofuels, focused on *Jatropha curcas*

- Conclusions:
  - Productivity is low and highly variable, Jatropha is not (yet?) profitable
  - Small-scale technologies for rural development (electrification, lighting, and cooking)
  - Jatropha oil suitable for biodiesel production, but quality management is a must
  - Jatropha may increase food insecurity

Read more: [www.bioenergyinafrica.net/home.html](http://www.bioenergyinafrica.net/home.html)
International collaboration – Biofuels Sector Monitoring

- EBTP (European Biofuels Technology Platform) aims for
  - cost-competitive world-class biofuels value chains
  - healthy biofuels industry
  - sustainable deployment of biofuels in the EU
- Industry-driven, support from EC

Tasks:
- **Biofuels sector monitoring**
- Strategic Research Agenda (update and implementation)
- Stakeholder Involvement
International collaboration – IEA Advanced Motor Fuels

- International platform to promote cleaner and more energy efficient fuels and vehicle technologies
- IEA Implementing Agreement, 12 active Annexes/Tasks
- Topics:
  - Application of alcohol fuels
  - Application of alternative diesel fuels
  - Use of biomethane in engines
  - Comparison of technology options
  - Value chain assessments
  - Toxicity of exhaust gases

www.iea-amf.org
Task 39: Commercializing Conventional & Advanced Liquid Biofuels from Biomass

Objective: promote transportation biofuels

Recent publications:

- Advanced Biofuels – GHG Emissions and Energy Balances
- Status of Advanced Biofuels Demonstration Facilities in 2012
- Biodiesel GHG Emissions: Past, Present and Future
- Technology Roadmap: Biofuels for Transport
- Current Status and Potential of Algal Biofuels

www.task39.org
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ideas with a future