

YXY FUELS

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YXY FUELS Partners

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BIOMASS BASED CHEMICALS

Progression - Industry
"out of the box technologies"

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YXY FUELS

Use of lignocellulosic and paper residues as feed stock for the production of YXY building blocks

YXY Technology Platform

Plant based Feedstock

Dehydration → **MMF** (5-methoxy methyl furfural) → Oxidation → **FDCA** → Polymerization → **PEF** → Bio-based products

Heat + Power

Dehydration → **Levulinics** → Hydrogenation, oxidations → **Bio-fuels Chemicals Materials**

Tunable process

YXY FUELS Objectives

- Proof of Process**
Develop and validate YXY process on industrial pilot scale with 2G feed stocks
- Integration**
Integrated biomass fractionation by organosolv and subsequent processes for processing and upgrading of fractions
- Proof of Products**
Industrial scale production of cellulose, YXY building blocks and lignin for application development key industrial markets
- Energy outlets**
Proof that the lignin / humins side stream can be used for energy generation (heat) as well as a component of (marine) fuels

YXY Fuels Flow Chart

Lignocellulosic biomass → **Fractionation (organosolv)**

Primary biorefinery outputs: Paper & cellulosic materials, Cellulose, Hemicellulose, Lignin, Filler, adhesives, ...

Secondary biorefinery processes:

- Cellulose → Hydrolysis OR Fursolv → Chemical conversion → Furans (EMF, ...)
- Hemicellulose → Chemical conversion → Furfural
- Lignin → Thermochemical depolymerization → Phenolics, Fuel additives, ...
- Lignin → CHP → Electricity, Heat

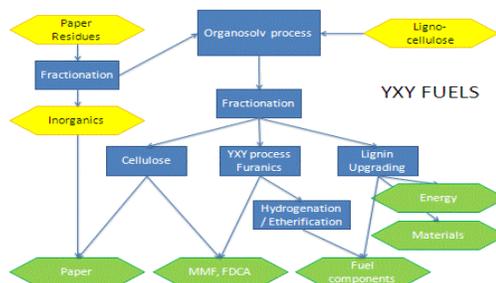
Research Lines



- WP 1 Feedstock selection, characterization and pretreatment residues
- WP 2 Continuous OrganoSolv reaction
- WP 3 Separation and post-processing of product streams
- WP 4 Upgrade of YXY building blocks
- WP 5 Upgrade of lignin fraction
- WP 6 Evaluation of biofuel components
- WP 7 Analysis of integrated system and chain evaluation

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Research Lines



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Highlights



- Organosolv process is working, however, up-scaling is challenging.
- (Side) streams from Organosolv (lignin) and YXY (humins, ML) process can be utilized as transport fuels with lower soot / NO_x emissions.
- (Fractionated) lignin can be used as fuel additive, however, catalytic conversion to valuable aromatics more profitable.
- YXY building blocks can be converted to MeTHF. Humins can be used as adhesive in sand casting.
- Inorganic and organic fractions can be separated. Paper production with organosolv pulp in progress.

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Conclusions



- 2G Biomass derived building blocks can be used in existing outlets.
- (Side) streams from Organosolv (lignin) and YXY (humins, ML) process can be utilized as transport fuels.
- Applications other than transport fuel are also feasible.
- Use of side streams in fuel outlets beneficial for reaching the 2020 CO₂ reduction targets.

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