

Decision Support for Small-Scale Flexi-Feed Biorefineries

May 2018 – May 2021

Partners:

- INRA, Nantes (coordinator)
- École Supérieur de Bois, Nantes
- Institute of Technology Hamburg
- University of Hamburg
- University of Helsinki
- KU Leuven

Lead at TUHH:

PD Dr.-Ing. habil. Ina Körner
i.koerner@tuhh.de

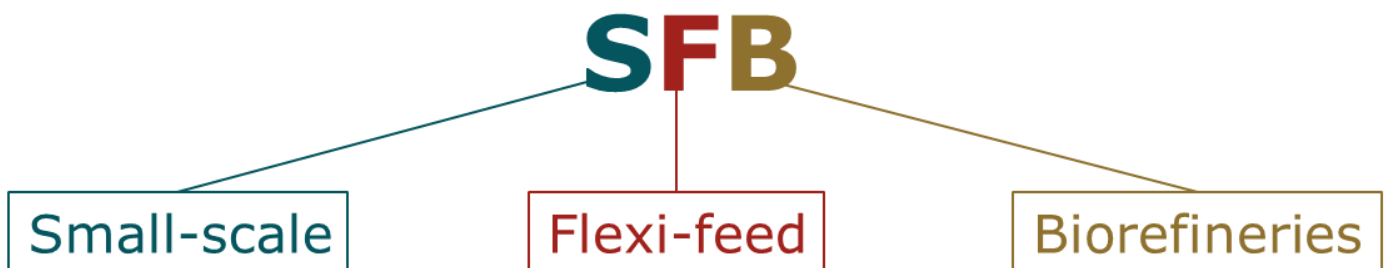
Researchers at TUHH:

Phillipp Lüsenhop
phillipp.luessenhop@tuhh.de
 Steffen Walk
steffen.walk@tuhh.de



Project description:

Using integrated experimental and modelling approaches, FLEXIBi studies the potential of residues from agri- and horticulture, gardening and landscaping, as well as from post-consumer wood from peri-urban and urban areas as feedstocks for Small-Scale Flexi-Feed Biorefineries (SFB). FLEXIBi evaluates the potential of these biogenic residues and their mixtures for production of bio-based materials and local energy generation via different biorefinery processes. The use of biomass from different feedstocks will allow the use of local and all-year available feedstocks to limit transportation and logistics issues while promoting local production of high value compounds, soil improvers and energy. FLEXIBi aims at designing a decision support tool assessing the different pathway for the establishment of SFBs by evaluating all parameters accounting to find sustainable solutions. Quantitative process modelling and knowledge engineering approaches are used to set-up the tool and value-creation oriented schemes for under-valorised residue-based bioresources. These will be used to support the SFB design on regional/local level .



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The Challenge:

FLEXIBI will face two main challenges :

- As technical challenge, FLEXIBI will build a model able to evaluate pathways for processing of locally available bioresources with variable composition in time during the year to provide suggestions for a sustainable and efficient bioresource use.
- As organisational challenge, FLEXIBI aims at providing a decision support tool describing interactions between biorefinery stakeholders, e.g. biomass producers, bioproduct end-users, local policy makers, user association, etc.



Source: TUHH

Gardening and landscaping residues



Source: TUHH

Post-consumer wood

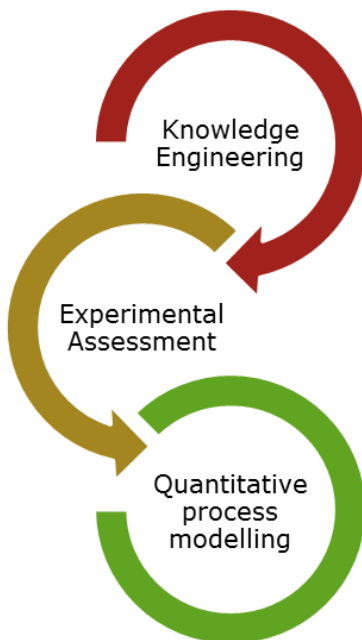


Source: INRA

Horticulture and agriculture residues

The approach:

FLEXIBI will follow an integrated and multidisciplinary approach including experimental and modelling works as well as actions to connect with stakeholders from production, transformation and policy sector.



Knowledge engineering: The relation between players relevant for implementation of SFBs will be represented and modelled based on knowledge from a multitude of stakeholder groups (i.e. commercial stakeholders, public authorities, organisations, scientists).

Experimental assessment: Three representative “model feedstocks” from the three different urban and peri-urban waste categories and their mixtures will be investigated using selected biorefinery pathways for the transformation into different product categories variable in value and demand in order to gain systematic data sets for modelling.

Quantitative process modelling: Modelling of material and energy balances of different types of residues using various biorefinery pathways.

The combination of the three approaches will result in a global decision support tool.

Publications and further resources:

List of publications and further results will follow as the project progresses