



Building WUR-WU Database on new biobased materials to facilitate LCA analysis

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A: Design Flagship Methodological Innovation

What are you exploring? With what objective?

- To establish a common, structured approach on how data should be collected and reported for new biobased processes and biobased materials to be used in LCA studies, as well as techno-economic assessments. Including consideration of data quality, handling and reporting of confidential data.
- To start building a database that contains information on relevant biobased materials which are not available in standard databases
- To set a collaboration between WFBR and WU-ORL to create integrated knowledge for the study-analysis of biobased products (with focus on textiles and building materials) to support the environmental assessment in the transition to a circular bioeconomy.

LCA is method allows the analysis of environment aspect and impacts of product systems.¹ LCA studies are divided in four steps:

- 1.Goal and Scope
- 2.Life cycle inventory analysis
- 3.Life cycle impact assessment
- 4.Interpretation

This project is focused on step 2, which provides the energy and raw material requirements and emissions associated with biobased product systems. These resulting, so-called life cycle inventory data, are the backbone of every LCA study.

How is this relevant to the materials transition?

Although novel biobased materials have become available on the market in recent years, such as biofibres from various biomass sources for textiles and insulation materials, they are not widely applied in practice. One of the main reasons is that their environmental benefits are claimed but quantitative proof is not available. Also, many of novel biobased building materials are not registered in databases, hindering their selection and use in building projects. This project will support the data collection for performing the required environmental assessments for wider implementation of these biobased materials in the respective markets.



Figure 1. Potential Case Studies

Why is this interesting scientifically?

Life cycle assessment (LCA) is a standardised methodology¹ for assessing the environmental impacts of product systems along the life cycle. One of the main challenges for performing LCA studies on biobased products and associated processing steps is to gather reliable inventory data, representing industrial production practices. For these novel biobased products this data is most of the time very limited or not available at all in life cycle analysis software (e.g. Simapro) and its databases (e.g. Ecoinvent).

Prospective LCA, performed for novel and emerging products allows to make informed decisions on potential environmental impacts and show hotspots where further attention can be given in improvement of the technology or product. In this respect, guidance is needed on the methodological approaches used such as on what data needs to be collected, which upscaling method to be used, guidance for background data to be used and what to do when these data are missing in databases.

What are the key activities or steps?

Main activities are shown in Figure 2. A crucial activity is the active participation and constructive discussion of the involved researchers to develop the methodology for data collection and case study identification.



Figure 2. Project main activities.

The deliverables will include:

- 1.Short accessible document that describes the methodological innovation project and its rationale;
- 2.Presentation at a community meeting of the investment theme;
- 3.Report of the results of the learning journey key lessons learned.
- 4.Excel template for data collection with guidelines for setting up life cycle inventory;
- 5.Database (filled excel template) for the 3-5 selected novel biobased materials

One what issues would you like to get input from others?

Inventory of past projects on biobased product LCA + names of people involved.

1. ISO14040/14044