

Project Proposal

For the Degree Program in Sustainability Studies

Material substitution vs. material reduction

Carrying out a comparative life cycle assessment (LCA) of the potential ecological impact of petrochemical polymer reduction and substitution with biopolymers

Duration: 5-6 Months (27,5 ECTS = 825 h)

Location: Home Office and partly Sigmaringen, Forschungsfabrik

Possibilities for a follow-up Master's Thesis: Yes (e.g. expansion to other packaging materials and other product groups)

Potential Cooperation Partners (if applicable): None

Supervisor / Contact: Elisa Uhlig, M.Sc.

Aim of the project: To provide a fact-based decision-making basis for different sustainability strategies (consistency vs. efficiency/sufficiency) in material selection and concept development (in the context of packaging). Therefore to answer the following scientific question: To what extent do the potential environmental impacts of the two approaches (material reduction of petrochemical polymers; material substitution of petrochemical polymers by biobased/biodegradable polymers) differ, assuming a comparable functionality in a selected example?

Project description: In recent years, there has been an increasing trend towards material reduction (saving) and substitution (replacement) in the packaging industry. Both approaches are intended to reduce the environmental impact. However, past efforts, such as the directive on single-use plastics, have not always led to real reductions in environmental impacts, but rather to shifts in environmental impacts. The question of whether one of the two approaches can generally be considered more environmentally sustainable, or to what extent both approaches need to be combined, remains unanswered. This is where the project comes in and aims to answer the scientific question by carrying out a comparative LCA using an example.

Suitable for / Requirements for the student: Can be carried out in German or English. The student should be interested in the topic, have an independent way of working and be willing to familiarize themselves with a sustainability assessment software.