# Developing Fibre Extraction Pathways for Textile Applications from Paludiculture-Grown Typha latifolia

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**Abstract**

Plant fibres remain industrially relevant and offer considerable potential to partially substitute synthetic fibres. However, fibre plant cultivation largely disappeared from (Northern) Europe during the 20th century. In the context of climate change mitigation and sustainable land use, rewetted peatlands have regained attention as a means of reducing greenhouse gas emissions. This project, "Carbon-Positive-Fibres," investigates the development of textile fibres from peatland plants, with a focus on cattail (Typha latifolia) - the most abundant renewable raw material available through paludiculture (wetland agriculture). The aim is to maximise the value of Typha fibres within the textile sector, thereby linking climate protection, biodiversity conservation and value creation.
A holistic approach is applied, encompassing the identification of optimal growing conditions and harvest periods alongside the testing of established fibre extraction processes. First results confirm that Typha contains long cellulose fibres. Alkaline hydrolysis proved effective as a pretreatment, and mechanical extraction combining beating and combing was identified as an efficient processing route. Fibre quality differs markedly between leaf and stem material and depends strongly on growth stage and plant age at harvest.

Building on these findings, extraction and processing will be further optimised to obtain high-quality fibres, while options for utilising non-fibrous biomass and accompanying vegetation will be evaluated. The overall fibre production process will be assessed for ecological performance, scalability and integration into existing textile supply chains. Fibre characteristics and processability will be investigated further to identify suitable application fields, particularly in technical textiles, providing a basis for selecting processing routes for future optimisation and upscaling.
This work establishes a scientific and technological foundation for the systematic development of Typha-based fibres, linking fibre characteristics to extraction methods and supporting future paludiculture-based value chains.

**Keywords:** Natural fibres, Fibre extraction, Typha latifolia, Paludiculture, Moorland conservation, Sustainable renewable resources

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