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## Cultivation of industrial hemp using solid and liquid residues from municipal composting

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Industrial hemp as a renewable raw material for fiber extraction like for construction material or as biomass for energy generation is a potential agricultural product for low productive soils in temperate climates. Soil and climate conditions in Lower Lusatia, South Brandenburg, generally qualify this region suitable for growing industrial hemp. But due to the nutrient requirements of the plants, fertilization is necessary for optimal growth. Fertilization on sandy soils is, however, often problematic, since the groundwater risk is increased by the entry of nitrogen and phosphorus from the fertilizer supply. In addition, the costs of fertilizers make resource-efficient and sustainable use of the locations problematic. The liquid phase obtained in the course of municipal composting would be a suitable fertilizer in terms of nutrient concentrations, but due to the potential risk to groundwater, the use of the liquid phase from composting is currently not feasible. The aim of the project is the development of a closed cultivation system for industrial hemp using hydroponics, whereby sand and pelleted soil additives from composting are used as a supporting substrate. Nutrients from the liquid phase from the municipal composting will be used as fertilizer. The cultivation will take place under controlled conditions (light, temperature, watering water and leachate) in a glasshouse experiment. A mixture of sand and pelleted soil additives is to be tested as a plant substrate in various additional amounts. The sandy substrate is representative for the soils in Lower Lusatia. The use of pelleted soil additives in combination with the liquid phase from municipal composting is an innovative process and on the one hand contributes to the development of a new sales market and on the other hand promotes the local and resource-saving use of recyclables in the sense of the circular economy. The use of hydroponics is a promising process that can be used regardless of the climate and without endangering soil and groundwater.