TUHH

Climate Informed Engineering

TECHNICAL BIOCATALYSIS TUHH

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Project B2: Climate-informed multiphase solvent-free biotransformations of renewable raw materials

Renewable raw materials are seeing the spotlight recently, and starting to see integration in industrial processes and bio-processing for its sustainability. These carbohydrates, oils, and biomass are then turned into biofuel and chemicals. However in bioprocessing, 'process tolerance' of a material is important especially for transitioning out of traditional processes. In synthetic materials, their structural and physiochemical composition do not vary much due to the rigid and controlled production pipeline. Biomaterials produced or grown in a non-controlled environment can and have been affected by the variability of said environment.

Climate variability, such as temperature, humidity, and carbon dioxide levels is one such factor that have an effect on the composition of lignin, and so it is not a stretch to assume that climate change has a direct impact as well. With variabilities in composition, the efficiency and selectivity of the raw materials change, cascading to the biocatalytic processes that lignin is used in. There is a need to better understand how climate variations affect different biomaterials, to both predict composition and improve selectivity in processes.

The impact of climate variability on the quality of lignin will be investigated in conjunction with project B1, B3, and B4, and with this project's focus on how climate-influenced lignin impact enzyme immobilization and biotransformation process efficiency.

This is a project affiliated with the United Nations University Hub (UNU-INWEH) in engineering to face climate change.

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