

Process relevant screening of cellulolytic organisms for consolidated bioprocessing.

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Abstract

Although the biocatalytic conversion of cellulosic biomass could replace fossil oil for the production of various compounds, it is often not economically viable due to the high costs of cellulolytic enzymes. One possibility to reduce costs is consolidated bioprocessing (CBP), integrating cellulase production, hydrolysis of cellulose, and the fermentation of the released sugars to the desired product into one process step. To establish such a process, the most suitable cellulase-producing organism has to be identified. Thereby, it is crucial to evaluate the candidates under target process conditions. In this work, the chosen model process was the conversion of cellulose to the platform chemical itaconic acid by a mixed culture of a cellulolytic fungus with *Aspergillus terreus* as itaconic acid producer. Various cellulase producers were analyzed by the introduced freeze assay that measures the initial carbon release rate, quantifying initial cellulase activity under target process conditions. Promising candidates were then characterized online by monitoring their respiration activity metabolizing cellulose to assess the growth and enzyme production dynamics.

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