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Production of a generic microbial feedstock for lignocellulose
biorefineries through sequential bioprocessing

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Abstract:

Lignocellulosic materials, mostly from agricultural and forestry residues, provide a potential renewable resource for sustainable biorefineries. Reducing sugars can be produced only after a pre-treatment stage, which normally involves chemicals but can be biological. In this case, two steps are usually necessary: solid-state cultivation of fungi for deconstruction, followed by enzymatic hydrolysis using cellulolytic enzymes. In this research, the utilisation of solid-state bioprocessing using the fungus *Trichoderma longibrachiatum* was implemented as a simultaneous microbial pretreatment and *in-situ* enzyme production method for fungal autolysis and further enzyme hydrolysis of fermented solids. Suspending the fermented solids in water at 50°C led to the highest hydrolysis yields of 226 mg/g reducing sugar and 7.7 mg/g free amino nitrogen (FAN). The resultant feedstock was shown to be suitable for the production of various products including ethanol.

Keywords: *Trichoderma longibrachiatum*, solid-state bioprocessing, sugarcane bagasse, soybean hull, *in-situ* enzyme hydrolysis, generic microbial feedstock

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