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## Enzymatic biomass deconstruction: An attempt towards selective lignin degradation for improved reducing sugar release

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) iological processes are becoming more competitive and gaining increased attention worldwide due to sustainability and eco-friendly Brature. Biocatalyst, such as enzymes produced from microorganisms act as an effective green catalyst for biomass deconstruction. The selective degradation of lignin without altering the structure of other carbohydrates is currently a major biotechnological challenge facing by physical, chemical and physic-chemical biomass deconstruction modes during second generation bioethanol production process. Laccase (oxidoreductase, EC 1.10.3.2) is a multicopper phenol oxidase enzyme that oxidizes electron-rich phenolic and non-phenolic substrates. Lignocellulosics such as Saccharum spontaneum (Kans grass), contains huge amount of carbohydrates in its cell wall and to make this enormous amount more accessible for hydrolysis and to be used further in fermentation, degradation of lignin through appropriate pretreatment process is an essential prerequisite of the complete biofuel production process. In the present work, laccase obtained from Lentinus sp. has been used for biomass deconstruction. The process was optimized through Response Surface Methodology (RSM) based on Central Composite Design (CCD) to investigate the effects of the different process parameters on biomass pretreatment. The maximum delignification obtained was 81.67% at 6 h of incubation time upon monitoring the initial lignin content of 17.46% similar to the ultrasound-laccase mediated treatment of Napier grass. Highest reducing sugar yield from enzyme-pretreated Kans grass was 500.30 mg g-1 substrate after 5.30 h of incubation time at a low cellulase loading. SEM analysis indicated changes in the surface characteristics, whereas FT-IR shows that the pretreatment condition does not pose any major changes in the chemical nature of cellulose and hemicelluloses. This work contributes towards the emergence of greener biomass pretreatment and utilization strategy.



## **Biography**

Rajiv Chandra Rajak is currently pursuing his PhD under the guidance of Prof. Rintu Banerjee from Indian Institute of Technology, Kharagpur, India. He is working in the area of Biomass Deconstruction using biological catalsyt and its role in reducing sugar production.

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