

Effect of acid pretreatment on enzymatic hydrolysis in bioethanol production from rice straw

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Abstrak

Clean, safe and sustainable energy sources must be found to minimize all side-effects of fossil fuel consumption. Second generation bioethanol possesses a great potential as an alternative energy source especially in the transportation sector. In this study, rice straw was selected to be studied as a conversion of potential lignocellulosic biomass into bioethanol. Firstly, rice straw was processed with mechanical pretreatment using a home blender, followed by acid pretreatment using 2.0 M sulphuric acid (H₂SO₄) at 90oC for 60 minutes. The glucose yield was found to be 9.71 g/L. Then, rice straw pretreated with acid was hydrolyzed using 24 mg of cellulase from *Tichoderma Ressei* ATCC 26921 over a 72-hour duration, which yielded a total glucose count of 11.466 g/L. After fermentation with *Saccharomyces cerevisiae*, it was found that by combining enzymatic hydrolysis with acid pretreatment yielded a higher ethanol content after fermentation (0.1503% or 52.75% of theoretical value) compared to acidic pretreatment alone (0.013% or 11.26% of theoretical value).