

Optimization of enzymatic hydrolysis of biomass followed by planetary mill pretreatment

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We propose planetary mill based pretreatment process for environmentally friendly biomass pretreatment. Planetary milling reduced the crystallinity of rice straw from 48% to 11%. During the pretreatment process, only 0.293 g/l of soluble phenolic compounds was produced while chemical pretreatments, soaking aqueous ammonia or sodium hydroxide solutions led to the production of 0.694 and 1.922 g/l of freely soluble phenolic compounds, respectively. The optimum ratio of biomass to liquid based upon glucose production was found to be 4%(w/w). At this ratio, 82% glucose conversion was found. Furthermore, none of biomass was lost during the milling process. Finally, we investigated the effect of milling time, enzyme loading and incubation time on enzymatic saccharification using a response surface method according to Box-Behnken design to find the optimum conditions of pretreatment and saccharification processes.