Optimization of microwave pretreatment on wheat straw for ethanol production

An orthogonal design (L9(3^4)) was used to optimize the microwave pretreatment on wheat straw for ethanol production. The orthogonal analysis was done based on the results obtained from the nine pretreatments. The effect of four factors including the ratio of biomass to NaOH solution, pretreatment time, microwave power, and the concentration of NaOH solution with three different levels on the chemical composition, cellulose/hemicellulose recoveries and ethanol concentration was investigated. According to the orthogonal analysis, pretreatment with the ratio of biomass to liquid at 80 g kg\(^{-1}\), the NaOH concentration of 10 kg m\(^{-3}\), the microwave power of 1000 W for 15 min was confirmed to be the optimal condition. The ethanol yield was 148.93 g kg\(^{-1}\) wheat straw at this condition, much higher than that from the untreated material which was only 26.78 g kg\(^{-1}\).
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