Optimization of Delignification Process from Red Meranti Wood Sawdust (RMWS) Pretreated with Acidified Sodium Chlorite

Abdul Rahman Siti Noredyani[1], Abdul Wahid Zularisam[1], Noormazlinah Ahmad[2] and Abdul Munaim Mimi Sakinah[1]

[1]Faculty of Engineering Technology, Universiti Malaysia Pahang, Gambang, Pahang, Malaysia
E-mail: mimi@ump.edu.my
[2]Faculty of Chemical & Natural Resources Engineering, Universiti Malaysia Pahang, Gambang, Pahang, Malaysia

ABSTRACT

Delignification is a process to remove the lignin content from lignocellulosic biomass to increase hydrolysis efficiency. In other word, the process ensures cellulose parts are more accessible. In the present research, there are two objectives; (i) to optimize the operating parameters of acidified sodium chlorite pretreatment for delignification of RMWS, and (ii) to characterize the RMWS used as feedstock. The two significant variables, reaction temperature and ratio of sodium chlorite to sawdust were optimized using response surface methodology and experiments were performed according to a central composite experimental design in order to enhance the delignification process aswell as holocellulose recovery. The experimental design was expressed based on preliminary work and screening process using the combined severity, which ranged from 0.76 to 1.64 for chlorite solution and temperature range from 65 to 85 °C. The experimental results showed the most optimal condition of acidified pretreatment of RMWS was 1.42 for the ratio of sodium chlorite to RMWS at an optimal temperature at 70 °C, resultedwith 97% of lignin removal. These results are important for further treatment to finally extract the cellulose.

KEYWORDS

Red Meranti wood sawdust (RMWS); acidified Sodium Chlorite; delignification; Respond Surface Methodology (RSM); lignin removal

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