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ENZYMATIC AND CHEMICAL DELIGNIFICATION OF KRAFT WOOD PULP: OPTIMIZATION AND SEQUENTIAL STUDIES

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Abstract

The delignification of wood pulp using hydrogen peroxide and xylanase enzyme in an ultrasonicator was studied at different process conditions. The factors influencing the chemical delignification were studied simultaneously using the Box-Behnken design of experiments. The mathematical model for Kappa reduction as functions of consistency of the pulp, concentration of peroxide and the temperature of delignification was developed. The response optimization studies for minimizing the Kappa number using chemical delignification provides the optimal conditions of 11% consistency of pulp, 3% concentration of peroxide and 50°C temperature with Kappa reduction to 15 as optimum value for the range of variables studied. The sequential delignification using enzyme followed by peroxide treatment was found effective with maximum reduction in Kappa number was achieved.

Keywords: Box-Behnken design, chemical delignification, enzymatic delignification, Kappa number, ultrasonication

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