

PRELIMINARY ANALYSIS ON THE PULPING OF CORN STOVER USING AQUEOUS
ETHANOL AND SUPERCRITICAL CARBON DIOXIDE

by

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ABSTRACT

Currently, the two main chemical processes used to produce pulp - the Kraft and the Sulfite method - emit large amount of environmental pollutants. The organosolv pulping method, which uses organic solvents at high temperatures to delignify biomass for the production of pulp, was developed as a more environmentally friendly alternative. Corn stover was chosen as feedstock because it is one of the most abundant waste generated in the world yet remains underused. Ethanol was chosen because it is one of the most promising solvent used in the organosolv process. Supercritical carbon dioxide has proven to be effective in removing lignin. A 2^3 factorial experiment was performed to study the impact of reaction time, cooking temperature and ScCO_2 presence. The reaction times used were 50 and 80 minutes, and the temperatures used were 150 and 170 °C. The response studied were yield and the extent of delignification (measured as kappa number). An analysis on areas for future research is also included. Results show that ScCO_2 may be used to shorten the cooking times to obtain the same amount of delignification as those of longer cooking times without ScCO_2 . The condition that produced the best compromise between yield and delignification is 170 °C, 50 minutes of reaction time, and with ScCO_2 .