

Organic Acid Based Pulping of Wheat Straw for Production of Paper Grade Pulp

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ABSTRACT

Due to limited availability of conventional forest based paper making raw materials like wood and bamboo, use of alternative raw materials mainly agro residues is increasing day by day. Wheat straw is a cheap substitute for wood raw material and can be used for manufacturing writing and printing paper with a required brightness level of above 80%. In the recent past, significant efforts have been made towards using organic solvents to produce chemical pulp from agro residues. The main aim of using these processes was to develop less polluting alternatives for the conventional pulping. Non-wood raw materials used in conventional pulping process causes many technical and environmental problems. Dissolution of silica into the alkaline cooking liquor and the separation of silicate have been difficult and uneconomical, which in turn has lead to high pollution load of these processes. In the present study a pulping process using formic acid, acetic acid and water to separate cellulose from wheat straw has been investigated. The process is suitable for agro-residues containing high silicon as the silicon compounds present in non-wood fibres are not removed from the pulp during cooking.

A series of pulping experiments were carried out to study the influence of, percentage of formic acid, acetic acid and water in the pulping liquor, pulping time, pulping temperature and liquor to dry matter ratio, on the delignification rate and other characteristics of the pulp.

The pulp obtained was subjected to short ECF bleaching sequence of oxygen delignification followed by various stages of bleaching with chlorine dioxide and peroxide. Results showed that wheat straw pulp cooked using formic acid, acetic acid and water could be bleached to a suitably high brightness ($\geq 85\%$ ISO) while retaining good mechanical strength properties required for writing and printing grade paper.