

ABSTRACT

Part I of this thesis consists of the literature review on lignin. Chapter one constitutes the review on the qualitative tests, the isolation of several types, classification, and the structure of lignin. Chapter two studies the various reactions of lignin including hydrolysis, halogenation, nitration, reduction and oxidation. Chapter three deals with the microbial degradation of lignin and cellulose using white rot and brown rot fungi. Special emphasis is given to *Phanerochaete chrysosporium*, *Trichoderma reesei* and *Cyathus stercoreus*.

In Part II Chapter Four an investigation of the action of *Phanerochaete chrysosporium*, *Trichoderma reesei* and *Cyathus stercoreus* on sawdust (*Pinus caribea*) and sugarcane bagasse (*Saccharum officinarum*) is reported. Growth of these microbes was poor but improved in the presence of growth medium, and after delignification of the substrates with ethanol.

The final chapter relates the isolation of Brauns lignin from both substrates followed by alkaline nitrobenzene and potassium permanganate oxidation. Oxidation of Brauns lignin from sawdust gives vanillin, vanillic acid, p-hydroxybenzaldehyde, syringic acid 3,5-dimethoxy-4-hydroxycinnamic acid, syringaldehyde,

veratraldehyde, veratric acid and anisic acid. Reactions on sugarcane bagasse yield vanillin, p-hydroxybenzaldehyde, syringaldehyde, veratraldehyde, veratric acid, anisic acid and trimethoxybenzoic acid. When nitrobenzene is the oxidant, trans-phenylazobenzene is also formed. These results provide information on some of the structural units present in lignin from both these sources.