Study of the Fate of Lipophilic Wood Extractives During Acid Sulphite Pulping Process by Ultrasonic Solid-Liquid Extraction and Gas Chromatography Mass Spectrometry

Abstract

Lipophilic extractives in dissolving pulp are still a big concern for pulp industries due to their detrimental effect on the quality of pulp. Since lipophilic extractives remaining in pulp are trapped in low-accessible fiber structures, effective extraction methods need to be established for studying their fate in the process. A simple, ultrasonic, solid liquid extraction established in this study was found to be more effective in capturing extractive residues in all "elemental chlorine-free" bleaching stages. Its efficiency was dependent on the extraction temperature, time, and solvent composition. A linearly correlated removal pattern of sterols and unsaturated fatty acids by the bleaching sequence was observed. It was further found that the bleaching combination did not fully remove lipophilic extractives. This study suggests an opportunity to explore ultrasonication-based extraction as an effective extraction procedure prior to gas chromatography mass spectrometry analysis for monitoring extractives in pulp.

Keywords

Acid sulphite pulping,
gas chromatography mass spectrometry,
lipophilic extractives,
pulp,
ultrasonic solid liquid extraction