

*Daphnia pulex* heart rate, highly sensitive to toxins, serves as a quantifiable indicator of chemical toxicity, offering a non-specific screening method for assessing systemic effects beyond aquatic ecosystems. Exposure to chemicals extracted from thermal bill paper caused a dose-dependent decrease in *Daphnia* heart rate, with complete cardiac arrest (0 bpm) observed at 5 mg/L after 24 hours. This cardiotoxicity, increasing with concentration and exposure time, highlights the potential human health risks, mirroring the cardiovascular effects of Bisphenol S (BPS) found in thermal paper. Analysis identified BPS and Diphenyl Sulfone (DPS) in the paper extract. In-silico analysis using SwissADME predicted high bioavailability for both, with DPS potentially crossing the blood-brain barrier. The acute toxicity of these compounds, confirmed by *Daphnia* tests, emphasizes the need for safer alternatives in thermal bill paper production due to potential adverse health and environmental impacts. The study utilized FTIR, HR-MS, and in-silico tools for a robust safety assessment.