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IMPACT AND HEALTH RISKS OF PERSISTENT ORGANIC POLLUTANTS FROM PULP PAPER MILL SLUDGE

William Michelon[1*], Eraldo Antonio Bonfatti Júnior[2], Aline Viancelli[1]

[1]*University of Contestado (UNC), St. Victor Sopelsa, 3000, Salete, Concordia, SC, 89.711-330, Brazil*
[2]*Department of Forest Engineering and Technology (DETF), Federal University of Paraná (UFPR), Av. Pref. Lothário Meissner, 632, Jardim Botânico, Curitiba, PR, 80.210-170, Brazil*

Abstract

The pulp and paper industry is undergoing rapid global expansion, leading to a significant increase in the generation of wastewater and sludge contaminated with persistent organic pollutants (POPs). This review outlines the main stages of pulp and paper production, highlighting the generation of diverse waste streams at each stage. Special attention is given to the environmental hazards associated with effluents rich in POPs. The health implications of these pollutants are analyzed through a One Health perspective, which emphasizes the interconnectedness of environmental, animal, and human health. Various biological and physicochemical wastewater treatment strategies are examined, including enzymatic treatments, advanced oxidation processes, and membrane technologies. These approaches demonstrate significant potential for pollutant reduction and effluent detoxification. However, to ensure sustainable industrial practices, there remains a critical need for greener pulping alternatives, and integrated treatment systems.

Key words: bleaching, organochlorine compounds, pollution, toxicity, wood

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* Author to whom all correspondence should be addressed: e-mail: william@unc.br; Phone: + 55 (49) 3441-1000