



**INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS**

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Thesis Title: Membrane Separation Technique for the Treatment of Humic Acids Solution, Paper and Tea Factory Wastes

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SHORT ABSTRACT

The work stated in this thesis is the treatment of Humic acids, paper industrial effluents, and tea factory liquid and solid waste materials using various separation processes, like, unstirred batch cell and spinning basket membrane module ultrafiltration, alum coagulation-ultrafiltration integrated process, solvent extraction techniques with fruitful outputs. Membrane processes are potentially better for the environmental science since the membrane approach requires the use of relatively simple and non-harmful materials. In chapter 1, a brief summary on the environmental pollution, sources of water pollution, the properties and treatment technologies of the Humic acids, different treatment methods of the paper and tea factory wastes has been presented. The complete experimentation, procedures, different chemicals, operating conditions, and the theoretical studies have been discussed in the chapter 2. The recovery of Humic acids synthetic solution is described using newly spinning basket membrane ultrafiltration in chapter 3. The permeate flux behavior, irreversible membrane pore clogging, the volume reduction factor (VRF), and the permeate quality are compared successfully with an unstirred batch cell ultrafiltration. The detailed explanations are reported for the treatment of paper (collected from M/s. Nagaon Paper Mill, Assam, India) and tea industrial effluents (collected from from M/s. Sindhu Tea Pvt. Ltd. Golaghat, Assam, India) using spinning basket membrane ultrafiltration in chapter 4. The specific use of spinning basket module membrane (SBMM) for the treatment of industrial effluents is novel, compact, energy-saving, and environment-friendly. The eco-friendly management of solid waste materials after fruitful extraction of polyphenols like value added products has been deliberated successfully in the chapter 5. The particular use of tea factory solid waste to extract the total polyphenols and to explore the different solvent extraction and diffusion of total polyphenols is a novel and innovative approach. The overall conclusions and perspective of future work are discussed in chapter 6.