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Phenol removal from industrial wastewaters: a short review

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ABSTRACT

The toxicity of phenol even at low concentrations in industrial effluents is high enough to meet its needs for separation. In this paper, a review will be carried out on the traditional techniques and recent advances in the separation of phenol from its contaminated streams. The most commonly used methods classified based on the phenol concentrations (high, medium, and low), and also, their advantages and disadvantages that should be considered in the design of industrial wastewater treatment systems will be discussed. Finally, the best methods will be suggested for each concentration range at the influent and, of course, that is allowable in the final effluent. The survey results recommended that biodegradation, chemical, electrochemical, and photocatalytic oxidation, solid phase extraction, ozonation, reverse osmosis/nanofiltration, and wet air oxidation are useful methods in low phenol concentrations, whereas liquid–liquid extraction, pervaporation, membrane-based solvent extraction, adsorption, and distillation are suggested for high phenol concentrations.

Keywords: Phenol; Wastewater treatment; Persistence organic pollutants; Membrane technologies; Emulsion liquid membrane; Adsorption; Extraction; Distillation; Ozonation; Photocatalytic oxidation; Photocatalytic membrane reactor; Concentration

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