

Removal and Recovery of Phenol by Solvent Extraction from Industrial Wastewater †

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Abstract: Phenol is a highly toxic chemical to humans and aquatic biodiversity. The desirable limit [BIS] in drinking water is 0.001 mg/L. The sources of phenolic compounds in industrial effluents are petroleum refineries, plastic manufacturing plants, pharmaceutical industries, coal carbonization, and tar distillation units, wood charcoal production units, coke ovens, phenol-formaldehyde plants, bisphenol - A, and other synthetic resin manufacturing units. The study was carried out to remove and recover Phenol present in the wastewater by liquid-liquid extraction process – a novel technique. In this process, Toluene is used in the capacity of solvent to extract Phenol from wastewater. COD was determined before and after to check the efficiency of treatment. The laboratory experiments were carried out on a 5% aqueous solution of Phenol. COD was measured at different pH: 4,5,6,7 and varying % of Toluene: 20, 30, 40. After extraction with an organic solvent, two separate layers were formed; one of Toluene+Phenol (organic) and the other of water+some amount of Phenol (aqueous). The highest 60 % removal was obtained at 7 pH and by using 20 % Toluene. For Pharmaceutical wastewater, 68 % removal was obtained. Phenol was recovered by using a 20 % aqueous solution of NaOH and then by using H₂SO₄.

Keywords: liquid-liquid extraction; phenol; COD; % removal.

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Conflicts of Interest

The authors declare no conflict of interest.