



Study of the efficiency of bio-filter and activated sludge (BF/AS) combined process in phenol removal from aqueous solution: determination of removing model according to response surface methodology (RSM)

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ABSTRACT

Since most industrial wastewaters contain phenol compounds, achieving eco-friendly and economic processes for filtration of such wastewaters is one of the concerns of environmental researchers. Thus, present study aims to determine the efficiency of bio-filter and activated sludge (BF/AS) combined process in phenol removal from aqueous solution. In this experimental study, BF/AS reactor in a pilot scale with continuous flow and useful volume of 24 L, made of Plexiglas was utilized. Effect of dissolved oxygen concentration, hydraulic residence time, mixed liquor suspended solids (MLSS) and glucose concentration on phenol removing efficiency were evaluated. In order to determine the phenol removal model and optimum removal conditions using central composite design in response surface methodology environment, the reactor was studied in separate runs according to software design. Accuracy of results was evaluated in MLSS concentrations of 2,250 mg/L, glucose of 250 mg/L and dissolved oxygen of 3 mg/L and quadratic model ($R^2 = 0.99$) well fitted to the results. With regard to high yield of BF/AS biological system in decreasing phenol content from wastewater, the system under study could be used widely in refining the toxic wastewaters of industries given the appropriate operation conditions.

Keywords: BF/AS; Biodegradation; Phenol; RSM; Wastewater

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