

Jinchutar Srijohn 2009: Volatile Organic Compounds Removal By Biofilter Made from Wastewater Sludge. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Mr. Suchart Leungprasert, Ph.D. 123 pages.

This study is to determine the efficiency of biofilter in which it was made from wastewater sludge mixed with shredded peanut shells, for toluene removal from air contamination. The ratios of the sludge to the peanut shells varied as 0 : 100, 30 : 70, 50 : 50, 70:30 and 100: 0 by volume. The mixture was added to a 2-L glass-tube with 10 centimeters diameter. Contaminated air contained toluene concentration of 42 – 420 ppmV flowed through the reactor with the air flow rate of 0.015 l/s. The residence time of 133 seconds were used in this study. The first periods of experiments were conducted for 2 weeks to acclimatize microorganisms and then the second period was continued for a month with the actual loading.

The toluene removal efficiency by the biofilter depends up on the volume of the wastewater sludge added in the reactors. It was found that in the reactor contained 30% 50% 70% and 100% of wastewater the concentration of toluene were removed about 57, 79, 94 and 96 %, respectively. When compare the elimination capacity of these reactors, the average elimination capacity of each reactor in the steady state, day 35 – day 45, was 22.52, 30.35, 36.51 and 37.19 g/m³h respectively. There were 2 mechanisms founded in the biofilter. First was adsorption on peanut shell and second was biodegradation by microbial activities which indicated by CO₂ stripping. The biodegradation play important role in the biofilter because at the steady state the adsorption on peanut shell was already breakthrough.

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