

Fluoranthene Removal in Wastewater Using Biological and Physico-Chemical Methods

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Abstract : Polycyclic aromatic hydrocarbons (PAHs) are produced naturally (forest fires, volcanic eruptions) and human activity (burning fossil fuels). Concern for PAHs is due to their toxic, mutagenic and carcinogenic effects and so pose a potential risk to human health and ecology. Therefore these are considered the most toxic components of oil, they are highly hydrophobic, making them easily depositable on the floor, air and water. One method of removing PAHs of contaminated soil used surfactants such as Tween 80, which it has been reported as less toxic and also increases the solubility of the PAH compared to other surfactants, fluoranthene is a PAH with molecular formula C₁₆H₁₀, its name derives from the fluorescence which presents to UV light. In this paper, a study of the fluoranthene removal solubilized with Tween 80 in synthetic wastewater using a microbial community (isolated from soil of coffee plantations in the state of Veracruz, Mexico) and Fenton oxidation method was performed. The microbial community was able to use both tween 80 and fluoranthene as carbon sources for growth, when the biological treatment in batch culture was applied, 100% of fluoranthene was mineralized, this only occurred at an initial concentration of 100 ppm, but by increasing the initial concentration of fluoranthene the removal efficiencies decay and degradation time increases due to the accumulation of byproducts more toxic or less biodegradable, however when the Fenton oxidation was previously applied to the biological treatment, it was observed that removal of fluoranthene improved because it is consumed approximately 2.4 times faster.

Keywords : fluoranthene, polycyclic aromatic hydrocarbons, biological treatment, fenton oxidation

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