## Effect of different UV and solar radiation wavelengths on the photocatalysis treatment of2,4,6-trichlorophenol contaminated wastewater: parametric and kinetic studies

## ABSTRACT

Remediation of 2,4,6-trichlorophenol (2,4,6-TCP) contaminated wastewater was carried out using photocatalysis treatment method in the presence of TiO2photocatalyst. Parametric and kinetic studies were investigated, in which, the effect of different UV and solar radiation wavelengths, initial concentrations of 2,4,6-TCP (10, 20, 30, 40 and 50 ppm), TiO2dosages (0.02, 0.04, 0.06 and 0.08 mg l-1) and initial pH (4,7, and 10) on the degradation of 2,4,6-TCP were investigated. According to the result obtained, the degradation efficiency of 2,4,6-TCP was directly proportional to the increase in the TiO2dosage and initial pH of the solution. However, the degradation efficiency decreased with the increase in the initial concentration of 2,4,6-TCP and irradiation wavelength of UV light or in the presence of solar radiation. UV-C, the shortest wavelength, exhibited the highest degradation percentage (88%) compared to UV-B (83%), UV-A (79%) and solar (30%). The highestTiO2dosage (0.08 mg/ml), gave the best degradation effect (97%). Alkaline solution condition, pH 10.0, gave the best degradation removal percentage (98%), followed by pH 7.0 (97%) and acidic condition, pH 4.0 (65%). Degradation of 2,4,6-TCP using TiO2achieved remarkable reduction in chemical oxygen demand (COD) about 82% removal efficiency but no change was observed with the biological oxygen demand (BOD) analysis. The photodegradation of 2,4,6-TCP followed the first order reaction kinetics