

Effects of ultrasonic irradiation on concentration of chemical oxygen demand in Landfill Leachate.

ABSTRACT

Landfilling for the disposal of municipal solid wastes continues to be widely accepted and used due to its economic advantages, but it could be a potential source of surface and ground water contamination. Therefore, the study was conducted to investigate the efficiency of ultrasonic irradiation for reducing the Chemical Oxygen Demand (COD) from one of the landfill sites in Malaysia. Several operating conditions, such as power density (24 to 188 W/L), pH (2 to 11), dilution factor (1:9, 1:1 and 9:1) and addition of different amount of Ferrous sulfate (FeSO_4) (1.0 to 5.0 mmol/L) were tested concerning their effect on COD reduction. Results indicated that the best irradiation conditions were enhanced at increased power density of 188 W/L, pH 7.4, initial concentration and without addition of catalysts with a percentage reduction of 95.55%. This suggested that the removal of COD in landfill leachate was mainly contributed by higher concentration of hydroxyl radical which leads to higher reduction of organic matters.

Keyword: Landfill leachate; Ultrasonic irradiation; Chemical oxygen demand; Hydroxyl radical.