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DEGRADATION OF PHENOL IN WATER BY OZONE - BASED ADVANCED OXIDATION PROCESSES: EFFECTS OF PH LEVEL ON THE EFFICIENCY OF THE METHODS

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ABSTRACT: Advanced Oxidation Processes (AOP) involving ozone, otherwise known as "Ozone-based AOP" have been acknowledged as a promising technology for the removal of organic pollutants as well as a powerful disinfectant for drinking and wastewater. One of the limitations of these treatment methods however, is their high energy consumption. This study investigated the efficiency of different Ozone-based AOP methods at different pH levels in the treatment of a simulated water using phenol (50 ppm) as a target contaminant. The study was aimed at identifying the shortest degradation time effective for AOP method of treating the added phenol regardless of the pH of such water. Batch experiments were conducted in a NORMAG tabular photoreactor with forced liquid circulation equipped with a glass diffuser to sparge ozone from an ozone generator (C-Lasky C-L1010 ozone generator) in tiny bubbles through the phenol-simulated water. 15 W and 150 W UV lamps were used as the sources of UV irradiation in the photoreactor. The Ozone-based methods investigated included: Ozone only (Batch Ozonation at 10 ppm ozone and Continuous Ozonation at the rate of 1 liter per minute), Ozone/UV (15 W and 150 W UV lamps), and Ozone/UV (15 W and 150 W lamps).

The results showed that Continuous Ozonation at the rate of 1 liter per minute was the fastest (in less than 5 minutes), the most effective and most economical ozone-based AOP technique for complete degradation of phenol in water at different pH levels were investigated

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