

Pondnaps Vongsansukcharoen 2015: Treatment of Acetaldehyde in Synthetic Wastewater by Ozonation Process. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Mongkol Damrongsri, Dr.Ing. 121 pages.

The objective of this research is to study treatment of acetaldehyde in synthetic wastewater by ozonation process. Optimum condition and removal percentage of acetaldehyde in ozonation process were investigated. Ozonation of synthetic wastewater were conducted in batch and continuous tests using an ozone generator with a production rate of 204.67 mg/hr, air flow 3.5 L/min, Ozone dose/air 0.97 mg/L and the saturated ozone concentration of 0.304 mg/L.

The results showed that treatment of acetaldehyde in synthetic wastewater by ozonation process was conducted in batch test. The chosen initial acetaldehyde concentration in the experiments were 10, 25 and 50 mg/L. The volume of synthetic wastewater used was 1 L, varying dissolved ozone concentration from 0 to 0.3 mg/L and contact time from 0 to 2.92 hr. The results showed that ozonation was able to remove acetaldehyde and organic compounds in synthetic wastewater. Acetaldehyde removal was highest at dissolved ozone concentration of 0.3 mg/L and a contact time of 2.92 hr. At initial acetaldehyde concentration of 10 mg/L, the removal efficiency for acetaldehyde and COD were 79.64% and 57.76%, respectively. According to BOD₅/COD ratio of wastewater, it was found that ozone treated wastewater employed higher BOD₅/COD ratio than the initial, from 0.1278 to 0.4685, indicating higher biodegradability of organic compounds. Then ozonation process was investigated in continuous test, varying contact time 0.58, 0.97, 1.95 and 2.92 hr. The results showed that the removal efficiency for acetaldehyde were 38%, 50.98%, 65.54% and 74.44%, respectively, and COD were 17.49%, 34.27%, 44.43% and 57.14%, respectively. A higher BOD₅/COD ratio than the initial 35.84%, 53.99%, 60.29% and 75%, respectively. And then the results showed that ozonation changed acetaldehyde into other forms of organic compounds. This was confirmed by HPLC analysis which found formic acid in treated wastewater.

Student's signature

Thesis Advisor's signature