

Influence of leachate matrix on oxidation performance of ozonation and aops

Abstract

Landfill leachate is a critical environmental issue that should be adequately treated to prevent it from spreading to the environment. This study explored the influence of raw leachate matrix and treated leachate matrix on O₃, O₃/H₂O₂, and O₃/PS performance. O₃ and AOPs were conducted in a laboratory-scale batch reactor. The findings showed the degradation of p-cresol, COD, and humic substances was much slower in treated leachate matrix than in raw leachate matrix. However, color was found easier to remove in treated leachate. The results revealed a synergic effect between molecular O₃ and dissolved organic matter in the raw leachate as the O₃ performance was enhanced in the presence of raw leachate matrix, except for color removal. The highest degradation of more than 90% was achieved in O₃ /H₂ O₂ to remove COD, p-cresol, and humic substances, although it is the most affected by the leachate matrix. This study provides vital insight into the notable performance of O₃ /PS in color removal regardless of the influence of leachate matrix, suggesting that the sulfate radical-induced oxidation outperformed O₃ and O₃ /H₂ O₂ in reducing nitrogen-containing compounds.

Keywords

Hydroxyl radical; Leachate; Ozonation; P-cresol; Sulfate radical