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COMPARISON OF COAGULATION-FLOCCULATION, OZONATION AND FENTON PROCESSES FOR A MUNICIPAL SANITARY LANDFILL LEACHATE TREATMENT

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Abstract

This experimental study was conducted to investigate the effect of coagulation-flocculation (CF), ozonation (O), coagulation-flocculation after ozonation (O/CF), ozonation after coagulation-flocculation (CF/O) and Fenton processes on the Tekirdağ Province Municipal Sanitary Landfill leachate treatment in the city of Tekirdağ. Also, the effects of Al₂(SO₄)₃ and FeCl₃ dosages on coagulation-flocculation process, oxidation time on ozonation process and H₂O₂ and FeSO₄ dosages on Fenton process in the removal of chemical oxygen demand (COD) were studied. The following parameters were analyzed for characterization study: pH, conductivity, COD, dissolved COD, total suspended solids (TSS), NH₄-N and alkalinity. The study shows that in CF, FeCl₃ was effective for all three samples in terms of COD removal and the removal efficiencies for Sample 1, 2 and 3 were 40.5%, 46.8% and 55.2%, respectively. The amount of ozone applied in ozonation process was 1 g O₃ per hour and after 120 minutes ozonation the COD removal efficiencies were insufficient and 14.5%, 24.4% and 31.8%, respectively. In all treatment methods the best removal efficiencies were obtained as 80.2%, 79.6% and 78.8%, respectively by Fenton process. The COD values for Samples 1, 2 and 3 after the Fenton process were found to be 509, 456 and 397 mg/L, respectively. It was also determined that the removal efficiencies of coagulation-flocculation process which applied after ozonation were 70.4%, 74.4% and 67.7%, respectively and close to the Fenton process.

Keywords: coagulation-flocculation, Fenton, landfill leachate, ozonation

Received: September, 2020; Revised final: January, 2021; Accepted: March, 2021

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