

APPLICATION OF OZONATION PROCESS FOR TREATING ORGANIC MATTERS OF LANDFILL LEACHATE OF TAN CUONG, THAI NGUYEN CITY

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TÓM TẮT:

In this study, samples of landfill leachate were taken from Tan Cuong landfill site, Thai Nguyen city. The characteristics were: COD: 2180 – 2798 mg/l, SS: 760 – 1360 mg/l, color: 1512 – 2037 Pt/Co. Methods, using to treat landfill leachate, are to combine coagulation – flocculation and ozonation process to remove COD, SS and color and increase the biodegradability for further steps. Different coagulants were used to treat the landfill leachate, including poly-aluminum chloride (PAC), aluminum sulphate ($\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$) and ferrious chloride ($\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$) for selection of suitable one in the primary treatment. Results of these tests showed that PAC was the most suitable at pH value from 7 to 8, content of 1000 mg/l; efficiencies of COD, SS and color removal were 31%, 29% and 58% respectively. However, COD, SS and color values remaining after coagulation process were still high, thus, it need to treat in the next step. Ozone, one of strong oxidizing agents, was applied to oxidize coagulated landfill leachate. Purposes of tests are to determine color and COD efficiencies due to effects of reaction of time and volume of leachate and the amount of consumed ozone to decrease pollutants. Reaction time was changed from 20 to 120 minutes, COD load of leachate was between 3,000 and 12,000 mg COD (equivalent between 3-9 liters of the leachate). The amount of ozone was provided to reactions from 8 to 48 mg. After the test of the effect of reaction time, COD and color efficiencies were obviously from 40 to 80 minutes (COD: 42-51%, color: 84-93%, SS: 21-36%); the amount of reacted ozone was very low (14.402 – 30.722 mg). After the test of the COD load of leachate effects and remaining the amount of ozone was constant at 17.28 mg and 60 minutes for reaction showed that the efficiencies was gone down when the load was increased. Maximum efficiencies occurred at 3,000 mg COD, equivalent at 3litres at a time (COD removal: 52%, color removal: 86% and SS removal: 42%); and the amount of consumed ozone: 16.8 mg. Therefore, combination of coagulation and ozone process for treatment of landfill leachate was carried the high efficiency at the low amount of ozone and creating advantageous for further bio-treatment steps.