

Application of Zeolitised Coal Fly Ashes to the Depuration of Liquid Wastes

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ABSTRACT

In this work the application of some zeolitised fly ashes and synthetic zeolites to the decontamination of municipal waste landfill leachates and liquid farm wastes has been studied. Thus, the reduction of organic matter (BOD and COD), ammonium and total nitrogen, phosphorus, suspended solids and metals contents, after a zeolite treatment alone or after a physical-chemical treatment combined with the zeolite treatment, were evaluated. Two ways of contact between the zeolitic material and the liquid waste have been tested: a batch mixed tank and a column. In addition, other variables determined were the zeolite dose and the residence time.

Several synthetic zeolites were tested: a commercial zeolite and other zeolitised ashes obtained after a coal fly ash alkaline hydrothermal process. The treatment was applied to the leachate produced in a municipal solid waste (MSW) treatment plant and to the liquid waste coming from a pig-farm, but it could be used for the treatment of other organic liquid wastes with a high nutrient (N and P) content that prevents a biological treatment. The leachate comes from a collection pool of the liquid waste produced by the organic fines fraction in a storing unit, before it is submitted to composting. The results showed that the physical-chemical treatment yielded an important reduction in the leachate COD, not improved by the zeolite treatment. Nevertheless, zeolites, especially zeolitised fly ash, clearly produced a strong reduction in the leachate nitrogen and phosphorus content. In addition, although the leachate metal concentrations are not very high, the zeolite addition also improved the metal removing.