

Dephosphorization of Wastewater by Fly Ash from Phuket Incineration Plant

Cheerawit Rattanapan^{1*}, Surapon Arrykul²
and Panalee Chevakidagarn³

¹Department of Industrial Biotechnology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai 50100, Thailand

²Department of Mining and Materials Engineering, Faculty of Engineering, Chiang Mai University, Chiang Mai 50100, Thailand

³Faculty of Environmental Management, Prince of Songkla University, Hadyai, Songkhla 90112, Thailand

*Corresponding author. E-mail: cheerawit@hotmail.com

ABSTRACT

Dephosphorization of wastewater was carried out by using fly ash from Phuket Incineration Plant which contained a high amount of water-soluble calcium ion (54.26% of its dry weight). The highest capacity in removing orthophosphate was when calcium concentration level was 331.40 grams per gram of orthophosphate for non-turbid wastewater, and 165.70 grams per gram for wastewater with a turbidity of 80 NTU, a pH of 10 and a contact time of 30 minutes. The turbidity of the synthetic wastewater resulted in better removal of orthophosphate.

The absorption capacity of phosphorus by fly ash from Phuket Incineration Plant, calculated with Freundlich's equation, was 158.63 mg of orthophosphate per gram of fly ash.

The experiment on raw wastewater from frozen seafood industry revealed that less orthophosphate was removed from wastewater from the production process and the total industry wastewater than from synthetic wastewater. Because raw wastewater contained more chemical substances than synthetic wastewater, calcium concentrations varied from 1,657-16,570 mg/l. It was also found that the amount of orthophosphate removed from raw wastewater was not the same as that from synthetic wastewater. However, in the production process, sulfate was added. As a result, less orthophosphate was removed from wastewater from the production process.

Key words: Dephosphorization, Fly ash, Phuket Incineration Plant, Frozen seafood industry