Removal of Nitrogen and Phosphate from Fertilizer Industry Wastewater by Magnesium Ammonium Phosphate Formation and Electrochemical Treatment

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A pilot-scale MAP (magnesium ammonium phosphate) precipitation system was applied for the removal of high-strength nitrogen compounds from fertilizer industry wastewater. The system was composed of a biological pre-treatment process for nitrate removal and a physico-chemical MAP precipitation process for ammonia removal. Although influent nitrogen loading was severely fluctuated, the stable nitrogen removal could be achieved. For the recovery of magnesium and phosphate from crystallized MAP, ammonia stripping was also conducted. The MAP precipitants could be transformed to MHP (magnesium hydrogen phosphate), and the magnesium and phosphate used for MAP formation was recovered to above 90%. Also, most phosphate increasing by the supplement of phosphate and magnesium for the formation of MAP precipitants could be eliminated rapidly within 3 minutes by electrocoagulation during the electrolysis procedure.

Keywords: Fertilizer industry wastewater, Nitrogen and phosphate removal, MAP, MHP, electrolysis

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