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## **STRUVITE PRECIPITATION FROM SEWAGE SLUDGE ASH**

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### **Abstract**

The recovery of nutrients from sewage sludge ash, especial phosphorus, is one of the most important alternative in sewage sludge management. Phosphorus is an essential element for all living organisms and very important for agriculture and industry, as well as. Because the phosphorus is a non-regenerative resource, its recovery plays an important role for society. Phosphorus capitalization as struvite ( $\text{NH}_4\text{MgPO}_4 \cdot 6\text{H}_2\text{O}$ ) from sewage sludge has attracted considerable attention due to its potential to be re-used as fertilizer through phosphorus recovery.

The aim of this paper is the recovery of phosphorus as struvite from the ash resulted after the sewage sludge incineration. The optimal conditions chosen were: L:S=5:1 and 5% sulfuric acid solution, obtaining in this case a phosphorus extraction efficiency of 92% and having a phosphorus content in of 8.2 g/L. The precipitation process was studied for two values of the Mg:P ratio of 1.5 and 1.2 for pH ranging between 8.5 and 10. For struvite precipitation, magnesium sulfate heptahydrate ( $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ ) and ammonium chloride ( $\text{NH}_4\text{Cl}$ ) were used as the magnesium and nitrogen sources in alkaline media using 4M NaOH solution. The precipitates were characterized chemically and morpho-structurally. The optimum pH for the struvite formation is pH=9. The XRD pattern for the sample precipitated at pH of 9 shows the struvite as the only detectable crystalline phase with the highest intensity compared with other precipitates.

The proposed method for struvite obtaining represents a green and less expensive technology presenting advantages from both economic and environmental point of view.

**Key words:** phosphorus recovery; sewage sludge ash management; fertilizer

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