



Phosphorus recovery through struvite precipitation from wastewater: effect of the competitive ions

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ABSTRACT

In wastewater treatment plants (WWTP), struvite precipitation occurs spontaneously under conditions which are influenced by factors such as: concentration of Mg^{2+} , NH_4^+ and PO_4^{3-} , pH, temperature, and competitive ions. These parameters are often difficult to control and, spontaneous precipitation of struvite creates operational problems in WWTP. Struvite is also a potentially marketable product as a fertilizer alternative. For these two reasons it is important to study the principles of struvite precipitation, and evaluate the parameters that control this process. In this study, the influence of the ions Ca^{2+} and Al^{3+} in struvite precipitation process was evaluated using three different molar ratios of $Mg^{2+}:Ca^{2+}$ and $Mg^{2+}:Al^{3+}$. The products were characterized by thermogravimetric analysis, X-ray diffraction, and scanning electron micrograph. The results showed that calcium interfered in struvite precipitation only when this is in equal or greater molar ratios to magnesium, while aluminum inhibited completely the production of struvite even at lower aluminum molar ratios to magnesium.

Keywords: Struvite; Wastewater; Phosphorus; Recovery; Precipitation

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