



## **Effect of Precursor Ions on the Removal of Phosphate from Low Strength Wastewater by Precipitation**

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**Abstract:** Phosphate removal from wastewater by precipitation is becoming alternative method to prevent eutrophication in the receiving water bodies and thus recover phosphorus sources. This study aims to understand the effect of precursor ions on phosphate removal from the actual domestic wastewater as well as the characteristic of the precipitated product. The precipitation of phosphate was observed on actual and synthetic wastewater, and evaluated based on initial pH variation, mixing duration, and the use of quartz sand as seed material. All experiments were conducted in a batch system, at room temperature, and initial pH value ranging from 7.0 to 9.0. It is found that phosphate removal efficiency and its precipitation process were significantly influenced by pH and precursor ions. At the initial pH value of 7.0 to 8.5, phosphate removal was increased during process and reached its removal peak after 150 minutes of reaction on actual and synthetic wastewater, i.e., ranging from 31% to 53% and 28% to 89%, respectively. Meanwhile, at initial pH of 9.0, fast precipitation was achieved after 10 minutes with around 77% and 84% of phosphate removal, then increased slowly to 78% and 92% on actual and synthetic wastewater, respectively, at the end of reaction. An X-ray Diffraction (XRD) analysis indicates that the precipitates were full of amorphous matter. However, Energy-Dispersive X-ray (EDX) test confirms that the dominant species of precipitates were in the form of calcium phosphate.

**Keywords:** Chemical Precipitation; Mixing; pH; Phosphate removal; Precursor ions.

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