*Environmental Engineering and Management Journal*

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# PRODUCTION AND CHARACTERIZATION OF A NOVEL BIOFLOCCULANT FROM *PHOTORHABDUS LUMINESCENS* AND ITS APPLICATION IN HEAVY METALS REMOVAL

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## Abstract

In this study, a novel bioflocculant produced by *Photorhabdus luminescens* was used to flocculate kaolin clay suspension, and the flocculation activity was measured. Fermentation conditions were optimized by varying carbon source and nitrogen source. pH, mixing speed, cationic inducer and bioflocculant concentration as the independent variable, and flocculation rate as the dependent variable, single-factor experiments were performed. It was found that 10 g/L peptone and 5 g/L beef extract was the optimal medium, yielding 4.53 g/L of purified bioflocculant, which contained 85.5% polysaccharide and 4.7% protein. Under the optimized flocculation conditions of pH 7.0, 200 mg/L bioflocculant, 50 mg/L $FeCl_3$ and 240 rpm, the flocculation activity of kaolin reached 92.5%. Scanning electron microscopy (SEM) revealed an irregular fibrous network structure, while Fourier-transform infrared (FTIR) and ultraviolet (UV) analyzes confirmed the presence of hydroxyl, carboxyl, and amide functional groups. The efficacy of the bioflocculant was further tested in heavy metal adsorption experiments. It removed 61.32% Cr, 60.22% Pb, 85.90% Ni, 78.18% Cu and 80.71% Cd from aqueous solutions.

*Key words:* bioflocculant, flocculation activity, heavy metals, optimization, *Photorhabdus luminescens*

*Received: December, 2024; Revised final: August, 2025; Accepted: November, 2025*

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