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Evaluation on Flocculating Activity in Kaolin Using Bioflocculant GTC01314 Produced by *Citrobacter* Strain

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**ABSTRACT**

Wastewater treatment industries were constantly seeking for feasible solutions to address secondary environmental pollutions and health hazards caused by extensive use of synthetic organic flocculants, especially in sludge dewatering. In recent years, flocculating properties of bioflocculants had attracted enormous attentions by researchers due to their biodegradability and environmental-friendly natures. The findings on flocculating activity of GTC01314 in kaolin can yield their potential as an alternative solution to wastewater treatment applications. The objectives of this research was to characterize the chitosan-like bioflocculant GTC01314 produced by *Citrobacter* strain, to investigate the flocculating activity of the bioflocculant in kaolin and propose its flocculation mechanism. Besides that, this research aimed to determine the effect of process parameters on the flocculating activity, namely dosage, pH, temperature, cations addition and shelf-life. After flocculation experiment, 1ml of upper part of supernatant in the flocculating system was carefully extracted to avoid taking precipitates. The absorbance was measured at 550 nm and flocculating activity was calculated. 'Flocculating titre' was evaluated by two-fold serial dilution of GTC01314, which defined by its fold-dilution corresponding to 50% flocculating activity. The polysaccharide and protein contents of GTC01314 were 0.45 mg/ml and 0.23 mg/ml respectively. Over 90% of flocculating activity was observed at pH range from 2 to 6 and dosage range from dilution 3 to 6. GTC01314 showed high thermal stability up to 100 °C for 30 minutes, which proved that it was polysaccharide-based instead of glycoprotein. The weakened synergistic effects of flocculating activity mediated by higher valence cations showed that GTC01314 is cation-independent. The 'flocculating titre' dropped from 2048 to 1260 in 12 weeks. From the results of this research, it was concluded that the chitosan-like nature of GTC01314 was verified by its polysaccharide-based, effective flocculation in acidic flocculating system, cation-independent, high thermal stability, low dosage (3:100) and high shelf-life characteristics.

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