Crystal Violet Adsorption by Bacterial Cellulose Powder: Effects of Various Experimental Conditions

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Abstract

This study focuses on the utilisation of bacterial cellulose (BC) as a biosorbent for wastewater treatment. BC produced from the fermentation of Acetobacter xylinum has been recognised as a versatile natural biopolymer due to its numerous applications in various fields such as food, medical, cosmetics and environment. In this study, the adsorption of crystal violet (CV) from aqueous solution by BC powder as biosorbent was investigated under various experimental conditions. The factors studied are initial CV concentration (10, 20, 30 and 40 mg/L), biosorbent size (<50, 106-199, 200-249 and >250 μm) and BC load (50, 100, 150 and 250 mg). Two major outcomes were the percentage of CV adsorption and equilibrium time. The results showed that the initial CV concentration and biosorbent size gave significant effects towards the percentage of CV adsorption which ranged from 26.7% to 69.7% and 15.0% to 73.5% respectively. Meanwhile, different BC loads did not show greater impact as the percentage of CV adsorption for each BC load was in the range of 73.5% to 82.1%. Additionally, the equilibrium time achieved at all experimental conditions was recorded between 100 and 120 min which proved their independent behaviour from all factors involved in this study.