

Impact of Cations on the Sorption Capabilities of Kaolin Towards Biofilm-forming Bacteria

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Abstract

Biofilm-forming bacteria cause problems in many branches of industry, such as medical, food, and water treatment industries. Kaolin, a clay mineral, possesses good abrasive and sorption capabilities that can remove the microorganisms composing these biofilms. In this study, the impact of cations on the sorption efficacy of kaolin products towards biofilm-forming bacteria was investigated. In previous studies, kaolin products 83-1A and 83-2 were selected for their superior sorption performance, and pH 5 was established as the optimal value for sorption. Various Al^{3+} concentrations were evaluated and measured using an aluminon/acetate buffer and measuring the absorbance at 530 nm. Accordingly, an Al^{3+} concentration of 1500 μM was selected for the study. For the trials, selected bacteria was propagated, harvested and re-suspended in pH 5 buffer amended with Al^{3+} . The experimental group was treated with kaolin. Meanwhile, a negative control containing Al^{3+} and bacterium, and a positive control containing kaolin and bacterium was prepared. All three treatments were incubated for thirty minutes, and then plated. After 48 hours, the cell count was determined for each treatment. For the two kaolin products, *Escherichia coli* demonstrated 98-100% removal. The results support the hypothesis that cations improve the sorption capacities of kaolin. Further investigation with more cultures is to follow.