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Effect of humic acids on the kaolin coagulation performance of *Moringa oleifera* proteins

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Abstract

Cationic proteins from *Moringa oleifera* seeds are of interest as sustainable coagulants for drinking water treatment in regions with poor access to potable water. They have been shown to reduce turbidity in natural water sources as well as in various model freshwaters. Prior research on kaolin suspension coagulation by *M. oleifera* proteins demonstrated that coagulation occurs by adsorption and charge neutralization. Natural organic matter may interfere with this mechanism by complexing with proteins or adsorbing to kaolin particles. Electrophoretic mobility measurements of *M. oleifera* proteins added to mixtures of kaolin and humic acid confirmed that the coagulation mechanism remains neutralization induced by adsorption. Coagulation micro-assays were used to determine the coagulation activity of *M. oleifera* proteins in United States Environmental Protection Agency model freshwaters (ionic strengths ranging from 1.15 to 9.17 mM) as a function of humic acid concentration. Model freshwaters contained 0.5 g/L suspended kaolin and 2.5 to 10 ppm humic acid. Increasing humic acid concentrations

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