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Assessing the efficacy of bentonite as a coagulant aid for raw water treatment

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ABSTRACT

This study aims to demonstrate the efficacy of both raw and pure bentonite as a coagulant/adjuvant in treating raw water from the Al Hoceima plant. The focus of this study lies in the evaluation of two distinct coagulant combinations with bentonite: aluminum sulfate/bentonite and chitosan/bentonite. Additionally, an assessment is made on the contrasting efficiencies of pure and raw bentonite in coagulation–flocculation processes. The potential link between Alzheimer's disease and aluminum has raised concerns due to the presence of aluminum residues after the treatment of raw water. By employing a natural organic coagulant, it becomes possible to mitigate environmental and human health risks. The experimentation involved various sections of jar tests. These tests encompassed the addition of sole coagulants (either aluminum sulfate or chitosan) as well as tests utilizing coagulant/adjuvant combinations (either aluminum sulfate or chitosan/bentonite) for raw water treatment. Key parameters under scrutiny included turbidity, pH, aluminum, and oxidizability. Results underscore that the inclusion of 30 mg/L of bentonite as an adjuvant alongside aluminum sulfate led to a 95.11% reduction in turbidity and a 56.75% decrease in oxidizable content. Similarly, the incorporation of 250 mg/L of bentonite with chitosan resulted in a 95.26% decrease in turbidity and a 57.39% reduction in oxidizable matter. Moreover, a comparative analysis between raw and pure bentonite in conjunction with coagulants was performed. Bentonite exhibited a discernible impact on the coagulation/flocculation process, contributing to larger floc formation, enhanced sedimentation rates, and influencing pH levels.

Keywords: Aluminum sulfate; Bentonite; Chitosan; Coagulation/flocculation; Oxidizability; Turbidity

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