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PHYSICOCHEMICAL AND RHEOLOGICAL CHARACTERIZATION OF COMPLEX COAGULANTS DERIVED FROM WEAK AND MEDIUM ANIONIC POLYMERS AND MEDIUM CATIONIC SURFACTANT

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Abstract

This paper presents the physicochemical and rheological properties of some complex coagulants derived from the weak and medium anionic polymers and medium cationic surfactant in order to evaluate the opportunity to use them in destabilizing and removing the colloidal systems from water and wastewater. In this respect, weak anionic and medium anionic copolymers of acrylamide and sodium acrylate with commercial names of Preastol 2515 and Preastol 2540, and a medium cationic surfactant derived from triethanolamine with commercial name of Tetranyl AT-7590 were used in order to obtain these complex coagulants. Complex coagulants formation was revealed based on changes in physical properties of the solutions such as superficial tension and apparent viscosity. The experimental results suggest the formation mechanism of the complex by grafting of surfactant micelles on the chain of the polymer, a process that occurs in the range of surfactant concentrations ranging between its critical aggregation concentration and critical micellar concentration. Loss of viscoelastic properties of complex solutions has a beneficial effect on the interaction between colloidal particles and complex coagulant and subsequently, on the entire coagulation – flocculation process. Although complex are formed by electrostatic attraction forces they have a good mechanical strength evidenced by maintaining of the rheological characteristic at high shear rate. Therefore, it is expected that these associations to withstand the intense mechanical conditions that occur during contact of colloidal solution with complex solution.

Key words: anionic polymer, cationic surfactant, coagulation – flocculation, complex coagulant

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