Use of the Continuous Flocculation Monitoring Technique for monitoring treatability parameters

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A continuous flocculation-monitoring equipment (CFME) was employed for better understanding coagulation–flocculation process during synthetic water treatment in jar testing under different coagulation mechanisms. By varying the initial turbidity and the coagulant dosage, different bench-scale tests were prepared, in which flocculation was dominated by adsorption-charge neutralization, sweeping or by both mechanisms combined. The flocculation index (FI) measured over time was able to identify the regions of floc growth, plateau and decay. FI was found to be an adequate parameter for optimizing flocculation pH and coagulant dosage. Optimum pH and dosage, obtained in jar tests, were related to variations in FI. The mean FI was found to be adequate for predicting optimum coagulant dosage in first three minutes, whereas the slope of the best-fit FI line was found to be suited for predicting flocculation kinetics. Plateau FI values, the mean and coefficient of variation of FI were computed for each bench-scale test. For the experiments with flocculation dominated by adsorption-charge neutralization, mean FI and coefficient of variation (CV) were equal to 26.6 and 0.3%, respectively. For experiments with flocculation dominated by sweeping, they were equal to 29.3 and 10.5%, and for experiments with both mechanisms combined, 28.5 and 137.0%. FI values obtained confirmed the increase in the average flocs size. The significant increase in CV reflects the increase in size distribution of flocs aggregates in the combined mechanism. The values of CV were found to be possibly useful for helping identify the dominating mechanism responsible for coagulation-flocculation processes.