

Kinetika Pembentukan Flok Pada Proses Pengolahan Air Limbah Menggunakan Metode Koagulasi-Flokulasi Berbasis Bahan Organik dan Anorganik = Floc Formation Kinetics In Wastewater Treatment Process Using Coagulation-Flocculation Method Based On Organic and Inorganic Materials

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Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh kinetika pembentukan flok pada pengolahan air limbah pewarna buatan menggunakan proses koagulasi-flokulasi. Tawas dan Anionik Polyacrylamide (APAM) digunakan sebagai koagulan dan flokulan. Analisis kinetika yang digunakan adalah persamaan kinetika Avrami menggunakan fraksi penghilangan kekeruhan dan warna pada suhu 303 K, 323 K, dan 343 K untuk mengetahui kinetika pembentukan flok. Hasil uji jar menunjukkan data optimum pada suhu 303 K dengan pH 6,5, dosis koagulan dan flokulan masing masing 30 ppm dan 1 ppm. Proses koagulasi-flokulasi selama 120 menit menunjukkan penghilangan parameter kekeruhan (NTU) dan parameter warna (Gardner scale) masing-masing 90,8% dan 85,2 %. Data proses koagulasi-flokulasi pada parameter kekeruhan dan parameter warna masing masing mengikuti kinetika persamaan Avrami:

$$Y(T,t)_{\text{kekeruhan}}=1-\exp\{[-0,21\exp(-598,80)/(T))t(0,85)]\}$$

$$Y(T,t)_{\text{warna}}=1-\exp\{[-174,84\exp(-2928,20)/T)t(0,90)]\}$$

.....The goal of this research is to better understand the kinetics of floc formation in artificial dye wastewater treatment utilizing the coagulation-flocculation method. Alum is used as a coagulant, while Anionic Polyacrylamide is used as a coagulant aid. To understand floc formation kinetics, the Avrami equation is utilized to examine turbidity and color removal at 303 K, 323 K, and 343 K. Jar test procedures were also performed in this study to identify the optimal turbidity and color removal. The best results were obtained at 303 K and a pH of 6,5. The optimal coagulant and flocculant dosages are 30 ppm and 1 ppm, respectively. At 120 minutes, turbidity removal (NTU) and color removal (Gardner Scale) were 90,8% and 85,2%, respectively. Data on turbidity and color parameters for coagulation-flocculation process respectively follow the kinetics of the Avrami equation:

$$Y(T,t)_{\text{turbidity}}=1-\exp\{[-0,21\exp(-598,80)/(T))t(0,85)]\}$$

$$Y(T,t)_{\text{color}}=1-\exp\{[-174,84\exp(-2928,20)/T)t(0,90)]\}$$