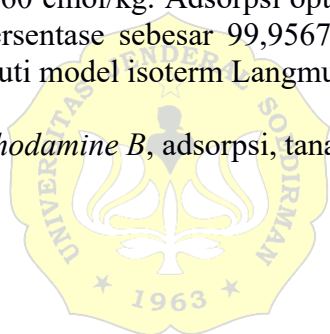


ABSTRAK

Industri tekstil merupakan sektor unggulan manufaktur nasional yang berkembang pesat karena permintaan produksinya selalu meningkat setiap tahun. Kondisi tersebut menyebabkan tingginya volume limbah cair yang dihasilkan, terutama zat warna sintetik seperti *rhodamine B* yang bersifat toksik, sulit terurai, dan berpotensi mencemari lingkungan, terutama tanah. Hal ini disebabkan adanya senyawa organik dalam tanah seperti asam humat dengan gugus fungsi yang dapat berinteraksi dengan *rhodamine B*. Penelitian ini bertujuan untuk menganalisis interaksi adsorpsi *rhodamine B* pada asam humat hasil isolasi dari tanah gambut Rawa Pening, Kabupaten Semarang. Asam humat diisolasi melalui ekstraksi alkali dan dikarakterisasi menggunakan FTIR, UV-Vis, SEM, serta analisis kadar air, abu, dan gugus fungsi kuantitatif. Proses adsorpsi diuji berdasarkan variasi waktu kontak, pH, dan konsentrasi *rhodamine B*, serta dianalisis menggunakan model isoterm dan kinetika. Hasil karakterisasi FTIR menunjukkan keberadaan gugus –OH dan –C=O karboksil khas asam humat. Rasio E_4/E_6 sebesar 2,889, morfologinya berbentuk padatan amorf yang tidak beraturan. Kadar air dan abu masing-masing 9,26% dan 5,63%, serta kandungan keasaman total, –COOH, dan –OH sebesar 630, 160, dan 460 cmol/kg. Adsorpsi optimal tercapai pada pH 3 dan waktu 30 menit dengan persentase sebesar 99,9567%. Interaksi terjadi melalui ikatan hidrogen dan mengikuti model isoterm Langmuir.

Kata kunci: asam humat, *rhodamine B*, adsorpsi, tanah gambut, Rawa Pening



ABSTRACT

The textile industry is a leading national manufacturing sector that has grown rapidly due to increasing production demand each year. This growth leads to a high volume of liquid waste generation, especially synthetic dyes such as rhodamine B which are toxic, difficult to degrade, and potentially pollute the environment, especially soil. This is due to the presence of organic compounds in the soil such as humic acids with functional groups that can interact with rhodamine B. This study aims to analyze the adsorption interaction of rhodamine B on humic acid isolated from peat soil of Rawa Pening, Semarang Regency. Humic acid was extracted using an alkaline extraction method and characterized through FTIR, UV-Vis spectroscopy, SEM imaging, and quantitative analysis of moisture, ash content, and functional groups. The adsorption process was evaluated by varying contact time, pH, and rhodamine B concentration, and analyzed using adsorption isotherm and kinetic models. FTIR characterisation results showed the presence of -OH and -C=O carboxyl groups typical of humic acids. E_4/E_6 ratio of 2.889, the morphology is irregular amorphous solid. The moisture and ash contents were 9.26% and 5.63% respectively, and the total acidity, -COOH, and -OH contents were 630, 160, and 460 cmol/kg. Optimal adsorption was achieved at pH 3 and 30 minutes with a percentage of 99.9567%. The interaction occurs through hydrogen bonding and follows the Langmuir isotherm model.

Keywords: *humic acid, rhodamine B, adsorption, peat soil, Rawa Pening*

