Synthesis of acrylic-acid-modified shorea sawdust and application in adsorbing toxic organic materials

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\textbf{ABSTRACT}

Shorea sawdust grafted with poly(acrylic acid) (SD-g-PAA) is synthesized and characterized as an adsorbent of toxic organic compounds. SD-g-PAA copolymers are prepared using Fenton’s reagent (Fe\textsuperscript{2+}-H\textsubscript{2}O\textsubscript{2}) as the redox initiator. The graft copolymerization is examined to determine the effects of temperature, concentrations of Fe\textsubscript{2+} and H\textsubscript{2}O\textsubscript{2}, and AA/SD ratio. The obtained maximum grafting percentage of the grafted copolymer is 13.0 ± 0.2%. The grafted copolymer is characterized using Fourier transform infrared spectroscopy and solid-state \textsuperscript{13}C NMR. A representative SD-g-PAA copolymer is neutralized to a sodium salt (SD-g-PANa) and used in the adsorption of malachite green (MG), methyl violet (MV), and paraquat (PQ). The monolayer adsorption capacities of these substances are 233.7, 312.9, and 164.8 mg/g adsorbent, respectively. The high adsorption capacity of SD-g-PANa for toxic matter indicates its potential in the treatment of wastewater that contains MG, MV, or PQ.

\textbf{Keywords:} Acrylic acid; Shorea sawdust; Graft copolymerization; Adsorption; Toxic materials

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