

ABSTRACT

Lack of management of textile production dye waste can cause water pollution. Silica gel is a material with a large surface area and nanometer pore sizes ranging from 2 to 50 nm and can be an adsorbent for dyes in wastewater. Silica gel can be synthesized via the sol gel method using chemicals such as tetraethyl orthosilicate (TEOS) but the price is relatively expensive, so it is necessary to look for other sources of silica that can replace TEOS, for example rice husks which have a high silica content. The aim of this research is to obtain sodium silicate from rice husks, determine the effect of calcination temperature on the characteristics and durability of the synthesized silica, and determine the adsorption ability of the synthesized silica on methylene blue. This research was divided into three stages, the extraction stage, namely the rice husks were extracted to obtain sodium silicate. The silica synthesis stage carried out varying calcination temperatures of 250°C, 450°C and 650°C. The synthesized silica was characterized using Fourier Transform Infrared Spectroscopy (FTIR) and Gas Sorption Analyzer (GSA). The application stage was carried out using a UV-Vis spectrophotometer to determine the adsorption ability of the synthesized silica on methylene blue. The results at the extraction stage showed that sodium silicate was 111.5 ppm. The results of Fourier Transform Infrared Spectroscopy (FTIR) characterization show that the four synthesized silicas have absorption peaks in the silica fingerprint area, namely at wavenumbers of 797.6 cm⁻¹, 954.1 cm⁻¹, 1058.5 cm⁻¹ and 1632.5 cm⁻¹. The Gas Sorption Analyzer (GSA) characterization results show that the surface area, pore volume and pore diameter decrease with increasing calcination temperature. The adsorption efficiency of methylene blue on silica without calcination and silica calcined at 650°C is 87.648 % and 87.323 %, the optimum contact time is 120 minutes.

KEYWORDS : Silica, Rice husk, Sol gel, Adsorption, Calcination.