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Application of Methylene Blue Adsorption to Cotton Fiber Specific Surface Area Measurement: Part I. Methodology

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Adsorption of methylene blue or 3,7 bis (dimethylamino) phenothiazin-5-ium ion was used to measure the specific surface areas of six cotton fibers taken from the International Calibration Cotton Standards. A kinetic study of this dye's adsorption to the cotton fibers was first conducted to establish the adsorption isotherms. From this study, the adsorption isotherm was determined at 25°C for 24 hours with the concentration of methylene blue solution in the range 0.004 to $0.18 \times 10^{-3} \text{ kg L}^{-1}$. After 24 hours, the concentration of methylene blue at the adsorption equilibrium was analyzed by a spectrophotometer at a wavelength of 660 nm. The specific surface area was then calculated from this isotherm. The specific surface areas for these cottons, B-26, C-36, D-5, E-4, G-17, and I-26 were found to be 32.32, 32.42, 34.48, 52.72, 43.96, and $29.91 \times 10^{-3} \text{ km}^2 \text{ kg}^{-1}$, respectively. The reliability of this method seems very good.

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