

ABSTRACT

THE EFFECT OF ADSORBATE CONCENTRATION ON THE ADSORPTION CAPACITY OF METHYLENE ORANGE USING BANANA PEEL (*Musa paradisiaca* Linn.) AS ADSORBENT

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Rapid population growth and high market demand for fashion have resulted in increased demand for dyes. Dye waste that is discharged into the environment in high concentrations causes environmental pollution and affects human health. Therefore, dyes must be removed from the waste water before it entered to human body. One of the most widely used is methylene orange. The adsorption method is widely used remove methylene orange from water because of its simplicity, efficiency, and resistance to toxic pollutants.

The adsorbent used in this study was banana peel. The adsorbent was activated by 0.15 M HCl. The adsorbent that has been activated is then immersed in a methyl orange solution with a certain concentration (1, 3, 5, 10, and 15 ppm), pH was adjusted to 3 and then stirred using a magnetic stirrer for 120 minutes. After that it was filtered to obtain the filtrate. The filtrate obtained was then analyzed using a UV-Vis spectrophotometer at a wavelength of 465 nm. The adsorption capacity was calculated based on the amount of methylene orange adsorbed on the adsorbent.

Based on the results obtained, raja nangka banana peel can be used as an adsorbent for methylene orange adsorption with variations in the optimal adsorbate concentration of 15 ppm, the highest adsorption capacity is 8,466 mg/g. Meanwhile, the variation of adsorbate concentration of 1 ppm obtained the lowest adsorption capacity of 0.028 mg/g. Adsorbate concentration affects the adsorption capacity.

Keywords: Raja nangka banana peel, adsorption, methylene orange