

# The Adsorption Study of Orange Peel on Basic Dye

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## Abstract

The present study is concerned with the low cost orange peel which was prepared as adsorbent for the adsorption of dyes from aqueous solutions. In this study orange peel powder has been utilized as an adsorbent for the color removal of methylene blue dye. The prepared orange peel powder samples were characterized by conventional method as well as modern techniques, XRD, SEM and TG-DTA analysis. The physicochemical properties such as moisture contents, ash contents, pH, bulk density and specific surface area were also examined. The effectiveness of orange peel adsorption with aqueous dye solution has been studied for methylene blue basic dye as a function of adsorbent dose, initial dye concentration, agitation time and pH. The specific surface area of raw sample was found to be  $9.65 \text{ m}^2\text{g}^{-1}$ . The optimum adsorbent dose was found to be 0.06g. At normal temperature and original pH, a maximum percent removal of orange peel powder was obtained 60.53%. The adsorption capacity,  $X_m$  of orange peel powder was observed  $1.32 \text{ mgg}^{-1}$ . The equilibrium contact time was found to be 20 min for initial dye concentration  $10 \text{ mgL}^{-1}$  of methylene blue. The amount of maximum adsorption capability reaches at pH 4. By the isotherm analysis, a good fitting of dye sorption equilibrium data was obtained by Langmuir isotherm model.

**Keywords:** Orange-peel, dye removal, methylene blue, adsorption, Langmuir isotherm model

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