

## Effect of Acid-Basic Treatments of Lingocellulosic Material Forest Wastes Wild Carob on Ethyl Violet Dye Adsorption

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**Abstract :** The effect of acid -basic treatment of lingocellulosic material (forest wastes wild carob) on Ethyl violet adsorption was investigated. It was found that surface chemistry plays an important role in Ethyl violet (EV) adsorption. HCl treatment produces more active acidic surface groups such as carboxylic and lactone, resulting in an increase in the adsorption of EV dye. The adsorption efficiency was higher for treated of lingocellulosic material with HCl than for treated with KOH. Maximum biosorption capacity was 170 and 130 mg/g, for treated of lingocellulosic material with HCl than for treated with KOH at pH 6 respectively. It was also found that the time to reach equilibrium takes less than 25 min for both treated materials. The adsorption of basic dye (i.e., ethyl violet or basic violet 4) was carried out by varying some process parameters, such as initial concentration, pH and temperature. The adsorption process can be well described by means of a pseudo-second-order reaction model showing that boundary layer resistance was not the rate-limiting step, as confirmed by intraparticle diffusion since the linear plot of  $Q_t$  versus  $t^{0.5}$  did not pass through the origin. In addition, experimental data were accurately expressed by the Sips equation if compared with the Langmuir and Freundlich isotherms. The values of  $\Delta G^\circ$  and  $\Delta H^\circ$  confirmed that the adsorption of EV on acid-basic treated forest waste wild carob was spontaneous and endothermic in nature. The positive values of  $\Delta S^\circ$  suggested an irregular increase of the randomness at the treated lingocellulosic material -solution interface during the adsorption process.

**Keywords :** adsorption, isotherm models, thermodynamic parameters, wild carob

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