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RESEARCH ARTICLE

Kinetic and Thermodynamic Study of Adsorption Methylene Blue by Nitrated Biomass of Prunus Cerasus

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ABSTRACT:
Adsorption of methylene blue biomass of Prunus cerasus is conducted in batch mode. The effect of various factors such as contact time, adsorbent dosage, initial dye concentration, temperature and pH of dye solution was investigated. The maximum removal of methylene blue dye was attained at 8.0 pH. The adsorption equilibrium was represented with Langmuir, Freundlich and Temkin isotherm models. Langmuir and Tempkin equations were found to have the correlation coefficient value in good agreement. Adsorption of MB onto prunus cerasus followed pseudo second order kinetics. The calculated values of ΔH°, ΔS° and ΔG° were found to be -31.177kJ/mol, 0.1099 KJ/mol and -63.9722 KJ/mol, respectively. The equilibrium data were also fitted to the Freundlich equation. It was observed that the sorption process is spontaneous and exothermic in nature.

KEYWORDS: Nitrated biomass of Prunus cerasus Adsorption Isotherm, Methylene Blue (MB), Langmuir, Freundlich and Temkin isotherm.

1. INTRODUCTION:

Dyes may also be problematic if theyare broken down unaerobically in the sediments, as toxic amines are often produced due to incomplete degradation by bacteria[1]. Synthetic dyes have a complex aromatic structure which provides them physiochemical, thermal, biological, and optical stability[2]. Literature also reports the removal of dyes such as malachite green[3] crystal violet, methyl red, eriochrome black T, deorlene, saffranine red[4]. acidorange-7, acid red-88, acid blue 113, and methyl violet by different available adsorbents, such as silica and alumina[5].

A large number of dyes are commercially available. These are released from Industrial Effluents of dyes and other related industries. It is estimated that approximately 21% of the dye stuffs are lost in industrial effluents during manufacturing and processing operations. M. Auta, B.H. Hameed, reported the Preparation of waste tea Nitrated biomass[6]. Using potassium acetate as an activating agent for adsorption of Acid Blue 25 dye. The O. Tunc, H. Tanacı, Z. Aksu has been studied the Potential use of cotton plant wastes for the removal of black B reactive dye[7]. V.K.Gupta, D.Pathania, S.Agarwal, P.Singh, reported the Adsorptional photo catalytic degradation of methylene blue onto pectin-Cu -Sn a nanocomposite[8]. under solar light. Various physical, chemical and biological methods, including adsorption, biosorption, coagulation/flocculation, advanced oxidation, ozonation, membrane filtration and liquid–liquid extraction have been widely used for the treatment of dye-bearing wastewater. The A.A. Kale has been reported study sieved agro waste of Cicer Arientinum[9]. The B.H. Hameed, M.A.M. Salleh, D.K. Mahmoud, W.A. Karim, A. Idris, worked on Preparation, characterization and evaluation of adsorptive properties of orange peel based Nitrated biomass[10]. Via microwave induced K2CO3 activation. The advantages and disadvantages of every

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