



## Removal of Cd(II) Ions from Aqueous Solutions using adsorption By Bentonite Clay and Study the Adsorption Thermodynamics

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### ABSTRACT

cadmium usually enter the environment and water resources through wastewater, released by various industries, and may have adverse effects. The current study employs surface of bentonite clay available locally in order to remove cadmium In solutions contaminated with this type of ions, in order to research on a surface with a high ability to adsorption of cadmium (II) ions, study Some factors affect the adsorption process on bentonite clay, such as contact time, pH the solution, Adsorbent particle size, Initial concentration of solutions and temperature of the solution were examined in the a batch process mode. The amount of adsorbed Cd (II) increased with height temperature, the optimum adsorption pH was about 6.5. Under this condition, the percent removal was 95.17%. The adsorption isotherms were studied and the results of adsorption processes were more fitted with Freundlich model rather than Langmuir adsorption model. Thermodynamic study showed that,  $\Delta H$  was endothermic,  $\Delta G$  is found to be negative That is, the process is automatic and  $\Delta S$  was found to be positive. The current study also involves practical application using bentonite to get rid of Cd(II) ions to from wastewater of Hamdan's station of the Basra- Iraq, The results indicate high affinity (97.84%) removal of Cd(II) ions.

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## INTRODUCTION

The main objective for the Wastewater Pollution Treatment in all sectors of industry, reconnoitring, agriculture and waste treatment is the reduction of toxicity such as Organic compounds, Dyes and heavy metal. Many industrial Operations in the coating industry, heavy metals for metalworking and their wastewater must be treated before unloaded (Kurniawan *et al.*, 2006; Karami *et al.*, 2021; Orooji *et al.*, 2021). Some of these metals are recognized to be toxic such as cadmium, mercury, copper, chromium, lead, selenium and silver. When this metal reaches the environment, it will make up a threat to human health (Rao *et al.*, 2010). Heavy metals are considered dangerous and toxic environmental pollutants, as they are stable and do not decompose, and this leads to their accumulation in microorganisms, plants and aquatic organisms, which in turn are transmitted to humans through the food chain and thus lead to multiple health problems for humans (Briffa *et al.*, 2020). Cadmium is one of the most toxic elements and is not necessary for the life of living organisms. It is found in low concentrations in natural conditions, but human activities have led to an increase in its levels in all continents. Cadmium contamination

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