



## Evaluation of Lead Removal Using Prrenjas Montmorillonite Clay

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**Abstract:** Heavy metal ions such as cadmium, zinc, copper, lead and nickel are hazardous to both human life and the environment. In the present work study on the feasibility of the Prrenjas montmorillonite clay for the removal of  $Pb^{2+}$  in aqueous medium through the process of adsorption under a set of variables (concentration of metal ion, amount of clay, pH, time and temperature of interaction) was carried out. Increasing pH favors the removal of  $Pb^{2+}$  till they are precipitated as the insoluble hydroxides. The uptake is rapid with maximum adsorption being observed within 90 min for  $Pb^{2+}$ . The Lagergen pseudo first-order and second-order kinetics model, are utilized to evaluate the kinetics and the mechanism of the immobilization interactions. It is determined that adsorption of  $Pb^{2+}$  is well-fitted by the second order reaction kinetic. Langmuir and Freundlich isotherms are applied in order to determine the efficiency of natural clay used as an adsorbent. Results show that all isotherms are linear. The Langmuir model fitted better with the experimental data rather than the Freundlich model. Prrenjas montmorillonite have considerable Langmuir monolayer capacity for  $Pb^{2+}$  18.87 mg/g. The thermodynamics of the immobilization process indicates to be endothermic. The interaction with  $Pb^{2+}$  is accompanied by an increase in entropy and an appreciable decrease in Gibbs energy. The results have established good potentiality for Prrenjas montmorillonite to remove  $Pb^{2+}$  from aqueous medium through adsorption-mediated immobilization.

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