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REMOVAL OF CADMIUM IONS FROM AQUEOUS SOLUTIONS BY POLYANILINE COATED ON SAWDUST

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The presence of cadmium, a heavy metal in aqueous solutions has been a sanitary and ecological problem. Cadmium is highly toxic even at very low concentrations and it can pollute drinking water streams. Therefore the effective removal of cadmium ions (Cd^{2+}) from industrial waste water is necessary. Use of polymers for toxic metal ion removal would be of great importance in environmental applications due to their selectivity and cost effectiveness. The objective of this study was to investigate the possibility of removal of $Cd^{2+}$from aqueous solutions, using polyaniline coated on sawdust.

Polyaniline was synthesized chemically and coated on sawdust via the cast method in the form of emeraldine base using formic acid as the solvent. The ability of polyaniline coated sawdust as a synthetic adsorbent was investigated for removal of Cd^{2+} ions from aqueous solutions by batch operation. The effect of various physicochemical parameters such as pH, initial metal ion concentration, adsorbent dosage level, temperature and equilibrium contact time on adsorption were studied.

It was found that polyaniline coated sawdust can be used as an effective adsorbent for removal of Cd^{2+} ions from aqueous solutions. The adsorption of Cd^{2+} ions increased with increase in pH. The optimum solution pH was around 5-6 and the maximum adsorption ability was achieved around 20 ^{o}C-30 ^{o}C. Adsorption was rapid and occurred within 10 minutes. The kinetic process of Cd^{2+} adsorption onto polyaniline coated sawdust was found to fit the pseudo-second order rate equation. The equilibrium adsorption data for Cd^{2+} fitted to the Langmuir adsorption isotherm model which is an exothermic process.