

1. INTRODUCTION

The presence of heavy metals in water is of great concern because of their toxicity to life forms, even in small concentration. Chromium is important toxic element, especially found in effluents of steel and textile industries. The chromium is considered to be carcinogen because of its mutagenic and carcinogenic properties, which leads to skin rashes, respiratory problems, hemolysis, acute renal failure, weakened immune systems, kidney and liver damage, alteration of genetic material, lung cancer, pulmonary fibrosis etc. Various processes are available to remove heavy metals, such as precipitation, electro coagulation, electro precipitation, separation by membrane and cementing, ion exchange and solvent extraction. But these processes are not economical enough for wastewater treatment. The public environmental concerns and the strict environmental protection legislation led the global search for low cost and novel techniques for the removal of heavy metals from industrial wastewater. Hence the recent research has directed for developing cost effective technologies for the removal of metal ions from its aqueous solutions.

Adsorption is considered to be quiet attractive while dealing with its efficiency of removal heavy metals from dilute solutions. In many applications the materials like activated carbon, chitosan, zeolite, and clay are used as adsorbents. Still research is being continued to find relatively efficient, easily available and low cost adsorbents for the adsorption of heavy metals. This study has been carried out to find the potential of red mud to adsorb chromium from aqueous solution.

Red mud is generated as a byproduct during the production of aluminum hydroxide from bauxite ore. Red mud is composed of oxides of aluminum, calcium, iron, silicon and titanium. In most countries red mud is currently dumped into the sea or in holding ponds. As the red mud had high alkalinity and salinity, red mud is toxic and pollutes the water resources. The red mud composition is strongly dependent on the characteristics of precursor bauxite ore, as well as on applied technological process, and consequently fluctuates strongly between samples generated in different parts of the world.

1.1 Objectives

Objectives of this project work are:

- To determine the effectiveness of metal ions by using activated red mud and optimize the parameters such as
 - Adsorbent dosage
 - Initial concentration of metal ions
 - Rate of Agitation
 - Contact time
 - pH of the solution
- To carry out the adsorption kinetics and isotherms studies for removal of metal ions using activated red mud.

1.2 Scope

Optimized parameters of adsorption process using red mud will be an instrumental key in removing heavy metals from industrial effluents.

1.3 Problem Statement

Currently many industries commonly use different adsorbents for the removal of metal ions. The cost of these adsorbents and problem associated with regeneration of adsorbents had led research to find alternate low cost adsorbent. Nowadays, there are numerous commercially available adsorbents which have been used for metal ion removal. Moreover, as the adsorption capacities of various adsorbents are not very large, new modified adsorbents which are more economically available and highly effective are needed for which extensive work is being conducted. **The added advantage of using red mud is to obtain a cost effective and efficient adsorbent.**