CHAPTER ONE

1.1 INTRODUCTION

Excessive release of heavy metals into the environment due to urbanization and industrialization husk posed a great problem worldwide. Unlike organic pollutants, the majority of which are susceptible to biological degradation, heavy metal ions do not degrade into harmless end products. The presence of heavy metal ions is a major concern for the many life forms due to their toxicity. Heavy metal pollution exists in aqueous wastes of many industries, such as metal plating, mining operations, chloralkali, tanneries, radiator manufacturing, alloy industries, smelting and storage batteries industries, etc. Lead is a naturally occurring basic element and a metal lead Pollution is the introduction of lead into the atmosphere in a matter that it affects the environment. It husk many source such as comes from lead smelters, metal processing plants, incinerators and from the cars which used gas with lead. The humans and animals be affected by lead through polluted air, accidental ingestion of pieces of lead paint, water contaminated with lead and contaminated soil. Lead poisoning in humans causes several damage to the kidney, nervous system, liver, reproductive disorders and/or osteoporosis, and brain, and can lead to sickness and enough lead in the body will be fatal.

There are some technologies which applied for the removal of heavy metals from wastewaters include chemical (precipitation/neutralization) or physical (ion exchange, membrane separation, electro dialysis and activated carbon adsorption) methods (Beszedits, 1983; Atkinson et al, 1998). In chemical precipitation, chemicals such as ferrous sulfide, lime, caustic and carbonate are sodium commonly used. These processes generally show high efficiency in removing the bulk of metals from solutions at high or moderate

concentrations. After treatment, total dissolved solids in wastewater may not be still acceptable (Metcalf and Eddy, 1991). When applied to dilute metal waste or lower concentrations of metals, especially less than 100 mg/L, these processes are either ineffective or not cost effective (Matheickal et al., 1996; Huang and Huang, 1996). Apart from the expense, membranes are vulnerable to the attack of microorganisms. An ion exchange process faces the problems of cost at smaller treatment capacity and oxidation of resins by chemicals (Kuyucak, 1997). Some processes can not produce an effluent of lower concentrations of metals. Therefore, other methods are needed to further treat or "polish" the effluent of low to medium concentrations of heavy metals to meet stringent requirements. Activated carbon adsorption is an effective process in removing organics and heavy metals, but high treatment cost is a concern in many cases. Adsorption technique also husk been found to be superior as compare to other technique in terms of flexibility and simplicity of design, ease of operation, insensitivity to toxic pollutant (Crini et al., 2008) and does not result in the formation of harmful substance (Crini et al., 2006).

In this context, a search for newer eco-friendly method is essential. Natural materials which are available in certain waste or large quantities from agricultural operations may have potential to be used as low cost adsorbents, as they represent unused resources, widely available and are environmentally friendly (Deans,1992). Some previous investigations on the removal of heavy metal ions with many agricultural byproducts have been reported (Ansari, et al., 1999; Mohan, 2002 and Yoshihiro, et al., 2005). In general, chemically modified plant wastes exhibit higher adsorption capacities than unmodified form.

In adsorption process, besides activated carbon, other adsorbent materials studied, include low-cost and cheaper such as carbonaceous material, agricultural products and by-

products such as peat, saw dust, palm fiber, rice husk, peanut hull, coir husk, banana pith, tree fern, and leaves.

In present study, an attempt was made to investigate the use of modified Jatropha seed husk as a low-cost and cheaper adsorbent for the removal of toxic lead from aqueous solutions. In addition, there is no need for a complicated regeneration process when using agricultural by products for wastewater treatment (Abia and Igwe, 2005). The aim of the study was to investigate the kinetics and behavior of pb(II) ions adsorption onto Jatropha seed husk.

1.2 Objective of study:

1. To modified the Jatropha seed husk as an adsorbent for Pb(II) adsorption.
2. To investigate the adsorption behavior of Pb(II) ions onto modified Jatropha seed husk in aqueous solution.
3. To investigate the kinetics of Pb(II) ions adsorption onto Jatropha seed husk.