Introduction

Water is the most abundant liquid on this planet and is essential to the survival of every living thing. Everybody needs fresh water. Without water people, animals and plant cannot live. Although a few plants and animals can make do with saltwater, all humans need a constant supply of fresh water if they are to stay fit and healthy.

The demand on freshwater is increasing by approximately 5% every year. The International water Management Institule estimated that nearly 1.4 billion people or 25% of the world's current population live in regions that will experience severe water crisis. Growing and approaching an alarming level in some countries, most notability countries in Central and West Asia and North Africa (CWANA) where the average availability of water per capita is around or below 1.250 m^3/year, compared to 18,740 m^3/ year in North America and 23,100 m^3 / year in Latin America [1].

There are many causes for water pollution but two general categories exist : direct and indirect contaminant sources. Direct sources include effluent outfalls from factories, refineries, waste treatment plants etc.. that emit fluids of varying quality directly into urban water supplies . In many countries, these practices are regulated, although this doesn't mean that pollutants can't be found in these waters. Indirect sources include contaminants that enter the water supply from soils and groundwater systems and from the atmosphere via rain water. Soils and groundwater contain the residue of human agricultural practices (fertilizers, pesticides, etc..) and improperly disposed of industrial wastes [2].

The water-pollution control efforts in many countries have made available treated effluent that may be an economical augmentation to existing water supply when compared to increasingly expensive new water-

resource development. In world-wild scale the volume of wastewater reaches about 440km^3/year.consquently, we must make a spot of light on the wastewater treatment [3].

Water treatment can be defined as the manipulation of a water source to achieve a water quality that meets specified gools or standards set by the community through its regulatory agencies [4].

The wastewater treatment objective is the efficient removal pollutant loads from municipal and industrial wastewater. Wastewater contains a great variety of contaminants. The composition and volume of wastewater varies from place to place, and from time to time. Each wastewater plant shoud be designed according to local conditions peak loads. Among the wastewater contamintants was heavy metals, which toxicity is largely a function of the water chemistry [5].

Removal of heavy metals from industrial wastewater is of primary importance because they are not only causing contamination of water bodies and are also toxic to many life forms. Industrial processes generate wastewater containing heavy metal contaminants. Since most of heavy metals are non degradable into nontoxic end products, their concentrations must be reduced to acceptable levels before discharging them into environment [6].

There are several methods for removing those toxic heavy metal ions from aqueous solutions, which include chemical precipitation, ion exchange, membrane processes (reverse osmosis), solvent extraction, and adsorption [7].

However, there are some specific disadvantages using most of these methods including costly equipment and operation, production of sludge or other toxic wastes, energy and space requirements. There are also several potential disadvantages to these traditional techniques. For instance, in order to remove complex agents that might inhibit precipitation, prior treatment maybe required. In time of precipitation the minimum solubility of various metals in a mixed waste stream generally occurs at different pH values. Consequently, maximum removal of one metal maybe occurs at pH value where the solubility of another is unacceptably high. Moreover, given more and more stringent treatment and disposal regulations, a successful precipitation process may not be the optimal solution to wastewater treatment problems [8].

In the recent years the adsorption of heavy metals by a variety of substances has been the subject of many studies. Effort made to develop low-cost adsorbents (non-conventional adsorbents), for removal of metals from aqueous solutions including natural and industrial wastewater [9].

A perspective method for purification of wastewater is adsorption. Using this method the adsorbents have to achieve the number of requirements to be active, stable, accessible, cheap, easy to regenerate and most important is that the exchange ions should be harmless and should not provoke secondary water pollution.

Agricultural by-product could be heavy metal adsorbents, which could be selective for metal ions. The agricultural by-product metal ion adsorption may involve metal interactions or coordination to function groups present in natural proteins, lipids, and carbohydrates positioned on cell walls [10].

Ability of clay minerals has been thoroughly investigated by several researches.

Clay removes metals in a variety of ways:

- Cation exchange capacity, where metal ions present on the clay (e.g. Mg and Ca) are exchanged for other metals in the surrounding medium (e.g. Cu, Zn, etc)
- Clays have a high surface area due to their small particle size. These allow them to bind to a large number of metal ions.
- Clays often contain organic matter, which can form complexes with metals.

There are many factors that affect the adsorb ability of dissolved element including the chemical form of metal, solution pH, time of contact, metal concentration, the presence of competing adsorbents, the amount of sorbets, organic matter, temperatures, particle size and others [11].