Removal of Selected Metals in Textile Wastewater Using Plant Parts of *Pinus caribaea, Manihot esculenta* and *Gliricidia sepium*

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Textile industry is one of the major contributions of every nation's economy. Metals and their compounds are indispensable to the industrial and technological development and causes a major environmental threat when released to the environment. Therefore, developing effective economical removal methods of toxic metals from industrial wastewater is important, as a replacement for costly adsorption methods of removing metal ion from textile wastewater. This research attempts to assess and compare the efficiency of low cost adsorbent materials prepared from plant parts such as roots, trunk, pith and leaves of the *Pinus caribaea, Manihot escluenta* and *Gliricidia sepium.* The removal of metal ions was carried out using synthetic textile wastewater where the effect of contact time and particle size were investigated. Textile dye contained water was added to the plant parts for three different particle sizes (<150µm, 150-500 µm and 500 µm) and remaining concentrations were measured using Atomic Adsorption Spectrophotometer after 1,3,5 and 7-day time interval. The experiment showed that the quantity of metal ions adsorbed varied with contact time, particle size and part of the plant. The order of removal of metal ions by bio sorbent is $Fe^{2+} > Mn^{2+} > Cu^{2+} > Cd^{2+} > Mg^{2+}$. Furthermore, in comparison of the three plant species *Gliricidia sepium* pith shows the highest removal percentage for metal ions of 73.06% and plant leaves of all three shows the lowest removal percentage of 45.14% for all the metal ions used. This confirmed that the plant parts that has high content of cellulosic materials had a unique role on high adsorption of metals. The results convince the high potential of *Gliricidia sepium* pith as an alternative substrate behaving as an adsorbent, for removal of toxic metal ions being an economical remediation for wastewater treatment.

Keywords: Adsorption, Metal ions, Textile wastewater, Plant species