Biosorption of Zn(II) ions by low-cost adsorbents which containing tannins and thermal properties of adsorbents

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A new low-cost, locally available sorbent sumac (Rhus coriaria L.) leaves (SL) and resins prepared from tannic acid/ gelatin (TG) and tannin from sumac leaves/ gelatin (STG) were tested for its ability to remove Zn(II) ions from aqueous solutions. The biosorption studies carried out with single metal solutions. The removal of Zn(II) from aqueous solution increased with pH and sharply decreased when pH of solution was decreased. Batch isotherm of biosorption zinc ions was investigated. The Freundlich, Langmuir and Tempkin models can describe the adsorption equilibrium of Zn(II) on SL, TG resin and STG resin. The biosorption constants were found from the Freundlich, Langmuir and Tempkin isotherms at room temperature. It is found that the biosorption data of zinc on SL, TG resin and STG resin fitted the Freundlich, Langmuir and Tempkin adsorption models. This study investigated also thermal analysis of TG and STG resins. The TGA-DTG curves of all the resins were similar and showed three steps in a similar way to a phenolic resin. This means that each resin is well cross-linked.

**Keywords:** Zn(II) ions; Adsorption isotherm; thermal properties; tannin-gelatin resin; tannin from sumac leaves-gelatin resin

![Fig. The effect of pH on the adsorption of zinc(II) (adsorbent dosage: 0.2g/100ml, 10mg/L of Zn(II), 120 min)](image)