

Bioremediation of lead and cadmium by tea waste.

Sreedevi P¹, Parameswari CS².

¹ Department of Biochemistry, Annai violet arts & Science College, Chennai, India.

² Department of Biochemistry, Bharathi Women's college, Chennai, India.

Corresponding author email: pdvdsa@yahoo.com

From International Conference on Biosciences- Trends in Molecular Medicine.

Post Graduate Department of Biochemistry, Dwaraka Doss Goverdhan Doss Vaishnav College, Arumbakkam, Chennai 600 106, India. 7-8 February 2012.

American J of Bio-pharm Biochem and Life Sci 2012 March, Vol. 1 (Suppl 1): A09

ABSTRACT

Heavy metals released by a number of industrial processes are major pollutants in marine, ground, industrial and even treated waste waters. Conventional techniques have limitations and often are neither effective nor economical especially for the removal of heavy metals at low concentration. Therefore, there is need for the development of a low cost process to remove heavy metals economically. Biosorption is a process that utilizes biological materials as adsorbents and several researchers have studied this method as an alternative technique to conventional methods for heavy metal removal from wastewaters. In this study, the efficiency of tea waste has been determined in the process of heavy metal removing from single metal ion solutions and mixed metal ion solutions. Metals of interest are lead and cadmium. They were chosen based on their industrial applications and potential pollution impact on the environment. The research is a bench scale experiment type and analyses have performed by using fixed amount of adsorbent in solution with four different concentrations (5 mg/L, 10 mg/L, 15 mg/L and 30 mg /L) of each metal and also in a mixed combination. Since the pH plays a major role in adsorption, it should be maintained at 4.5 throughout the experiment. Result indicates the removal efficiency is highest for lead than for cadmium. The adsorption data fit well with the Langmuir isotherm model. The maximum adsorption capacity calculated from the Langmuir isotherm for 28.51 mg/L and for cadmium is 24.1 mg/L individually whereas in combination for lead is 28.37 mg/L and for cadmium is 27.27 mg/L. Though tea waste could adsorb 80 ± 2 % cadmium in single metal ion solution, but its adsorption of cadmium get increased to 90 ± 2 % in mixed metal ion solution. This indicates that lead act as the stimulator for cadmium adsorption. Comprehensive parameters indicate tea waste to be excellent parameters for biosorption of lead and cadmium to treat wastewaters containing low concentration of metals.