OMICS Group Conferences
Accelerating Scientific Discovery

3rd World Congress on
Biotechnology

September 13-15, 2012 Hyderabad International Convention Centre, Hyderabad, India

Application of response surface methodology for optimization of removal of lead (II) from simulated waste water using alginate immobilized papain

Soumasree Chatterjee[1], Srabanti Basu[2] and Susmita Dutta[1]
[1]Department of Chemical Engineering, National Institute of Technology- Durgapur, India
[2]Department of Biotechnology, Heritage Institute of Technology, India

Lead (II) ranks second among the top twenty hazardous substances as listed by ATSDR. It is discharged through waste water coming from different industries viz. leather, paint, battery, ceramic, pottery etc. Due to its non-biodegradable and re-circulating nature, lead (II) accumulates in the environment causing a serious threat to human health and ecological systems. Thus, it is mandatory to reduce the concentration of lead (II) in waste water below permissible limit. Papain (E.C. 3.4.22.2), a cysteine protease, has the characteristics of metal binding due to presence of four sulfhydryl groups at its active site. Though several works have been done to analyze the performance of papain in different fields like medicinal, food etc., no work has been made to explore its metal binding property for abatement of lead (II) from waste water. In the present work, the efficacy of immobilized papain in removing lead (II) from simulated solution has been investigated. Papain is immobilized in calcium alginate bead by ionotropic gelation method and termed as Alginate Immobilized Papain (AIP). Lead acetate was used to prepare simulated solution of lead (II). The removal of lead (II) using AIP has been optimized by Response Surface Methodology (RSM) using Design Expert Software 8.0.5 considering initial concentration of lead (II), weight of AIP and pH as input factors and percentage removal of lead (II) as response. The optimum condition for removal as designated by software is as follows: initial concentration of lead (II): 31 mg/L; volume of solution: 30 ml; weight of AIP: 6 g, pH: 7; temperature: 30^0C. Theoretical prediction (99.37%) matches very well with experimental value (99.29%). Maximum 99.37% removal has been obtained at optimum condition. Lead (II) is recovered by stirring AIP-Pb complex in distilled water at different pH condition. Almost 35% metal recovery is achieved at pH 4 from 3 g of AIP-Pb complex at room temperature. SEM and EDS study confirm the binding of lead (II) with AIP.

Keywords: Immobilization, Adsorption, Papain, Lead removal, Lead recovery, Response Surface Methodology

Biography

Soumasree Chatterjee, Senior Research Fellow sponsored by CSIR (Council of Scientific & Industrial Research), Govt. of India, is pursuing her Ph.D at National Institute of Technology, Durgapur India. She has published 2 papers in reputed international journals and 7 proceedings in different national and international conferences. She is also the first author of a book chapter. Her research areas are Biochemical Reaction Engineering and Environmental Engineering.

soumasree.chatterjee@gmail.com

Biochemical analysis of epicardial and subcutaneous adipose tissue- A clinical correlation with cardiovascular risk factors

V. Saravanakumar and R. Kadarkarai Raj
Sri Venkateswara College of Engineering, India

Epicardial adipose tissue is the visceral fat around the heart which has special properties that distinguish it from the other adipose tissue. The role of epicardial adipose tissue related with the heart diseases found to be unclear. Hence, this study is to analyse the oxidant, antioxidant and lipid profiles of Epicardial adipose tissue and subcutaneous adipose tissue and clinical correlation with the cardiovascular risk factors. The oxidant, antioxidant and lipid profiles were done using standard methods. The proteins was extracted and run in SDS PAGE electrophoresis. Lipoproteins were separated using agarose gel electrophoresis from the both adipose tissue. Lipid profile and oxidant found to be more in the subcutaneous adipose tissue, while the antioxidant, HDL and phospholipids were more in the Epicardial adipose tissue. Vitamin C, HDL, phospholipids, triglyceride, ceruloplamin and total cholesterol ($p< 0.04$) were found to be more significantly associated with the comparison studies. The antioxidant found to be high in the diabetic patients affected with acute myocardial infarction. Lipoproteins were separated in both tissues and found to be high in subcutaneous adipose tissue. In conclusion, the Epicardial adipose tissue possesses protective mechanism and seems to be beneficiticial to the cardiovascular system.

psaravana.77@gmail.com