Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2013, 5(2):305-307

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Biosorption of As(III) by dead cells of *Aspergillus niger* X_{300}

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ABSTRACT

Present study was conducted to examine the potency of non-treated fungal cells of Aspergillusniger X_{300} for biosorption of As(III) from aqueous solution.Biosorption by the dead fungal cells increased significantly (p,0.05) compared to the living one.

Key words: Non-treated, non-treated, *Aspergillus niger* $X_{300,}$ Biosorption, dead fungal cells

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INTRODUCTION

The removal of toxic metalloids (like arsenic) is of great importance from an environmental point of view. Biosorption of As (III) has some potential advantages over conventional chemical methods, like it has low operating cost, minimize the chemical sludge, high efficiency of such metalloid removal from dilute solutions, regeneration of biosorbents, scope of metalloid removal from the sorbents and it is environmental friendly[**1**].

Biosorption is basically a surface methodology which involves interactions between metals / metalloids and surface compounds such as polysaccharides , proteins or lipids containing several functional groups like amino acids ,carboxyl ,hydroxyl, sulphate etc. groups present on the surface of the biosorbents**[2-5]**. For last few years several trials have been adopted in the field of biosorption of heavy metals/ metalloids using dead cells microbial cells as it is easier and cost effective [**6-12**].

The aim of the present study was to examine the potential of the dead cells of As(III) resistant strain *Aspergillusniger* X_{300}toadsorb As(III) from aqueous solutions.

EXPERIMENTAL SECTION

Preparation of dead cells :87 gm (equivalent to 15.1 gm of dry cell weight) of live wet cells of *Aspergillus niger* X300 were autoclaved at 121^0C for 15 minutes at 15 psi and then dried at 60oCfor 12h**[13].**

Estimation of As (III) : The concentration of As(III) in the broth was estimated by the method as reported by Cernansky *et al*., 2007[**14]**.

Estimation of dry cell / spore weight: Fungal cells /spores were filtered using Whatmen No.1 filter paper and heated at 70^0C until it becomes dry and its weight was estimated by electronic weighing machine (ECELON MS- 2690)[**15]**.

Statistical analysis: All data were expressed as Mean± SEM. Data were analysed by one way ANOVA followed by Dunett's post hoc multiple comparison test considering p<0.01 as highly significant (using Prism 4.0).

Table 1: BIOSORPTION OF As(III) BY DEAD CELLS OFAspergillusniger X_{300}

Contact time(minutes)	**Initial concentration of As (III) [mg/L]**	**Final concentration of As (III) [mg/L]**
20	1500	**926.4±5.336
40	1500	**721.6±9.717
60	1500	**631.3±6.881
80	1500	**432.9±6.666
100	1500	**227.3±5.431
120	1500	**191.2±8.713
140	1500	**154.9±6.132
160	1500	**121.7±4.983
180	1500	**98.6±7.434
⋕200	1500	**58.6±8.362
220	1500	**58.6±7.313
0.0(control)	**1500**	1500

*(Values were expressed as mean ±SEM ,where n=6,**p< 0.01 when compared to control.⋕ stand for maximum biosorption)*

Biosorption was carried out at pH 4.5, above and below which potential for biosorption of As(III) by the dead cells decreased gradually.

Table 2: COMPARISON OF As(III) BIOSORPTION USING LIVING AND DEAD CELLS OF Aspergillus niger X_{300}

Cells	**Initial concentration of As (III) [mg/L]**	**Final concentration of As (III) [mg/L]**
Dead cells	1500	*58.6±8.362
Living cells(Control)	1500	89.3±6.136

*(Values were expressed as mean ±SEM ,where n=6,*p<0.05 when compared to control)*

My present study related to As(III) biosorption by dead cells (non-treated) As(III) resistant fungal strain *Aspergillusniger* X_{300} has been depicted in table 1.The biosorption was increased significantly (p,0.05) by dead cells compared to the living cells. This is probably due to exposure of more chemical groups compared to living one **[16].**

Acknowledgement
Sincere gratitude to be given to the department of Chemical Engineering , University of Calcutta, Bose Institute, Kolkata , Indian Institute of Chemical Biology, Kolkata, Department of Food technology and Biochemical Engineering , Jadavpur University for their kind cooperation without which I could not finish the work.

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