Biolife
AN INTERNATIONAL QUARTERLY JOURNAL OF BIOLOGY & LIFE
4(2):300-302
ISSN (online): 2320-4257
www.biolifejournals.com
BIOLIFE RESEARCH ARTICLE

Effect of Lead on Growth and Total Proteins Produced In the Culture Filtrate of Different Fungi

Prasannarani Tanneru

Department of Botany, Lal Bahadur Shastri Mahavidyalaya Dharmabad Dist Nanded Maharashtra (India)

*Email: t.prasannarani@rediffmail.com

ABSTRACT

Five test fungi *Aspergillus flavus, Aspergillus niger, Cladosporium herbarum, Curvularia lunata* and *Trichoderma viridae* were subjected to growth in lead containing basal medium and level of tolerance was determined at 10, 20, 30, 40 and 50ppm Pb concentrations. The growth parameters adopted to study toxicity and physiological responses is the dry weight of fungi and total protein content in their culture filtrate. It was observed that Pb is highly toxic to the fungi it causes inhibition of growth. Maximum reduction in growth was observed in *Cladosporium herbarum* and *Curvularia lunata* whereas *Trichoderma viridae* and *Aspergillus niger* was found to be resistant as compared to other fungi. Sporulation was decreased in presence of lead. The total protein content at different concentrations was studied. Maximum decrease in protein content of culture filtrate of all test fungi was observed at 40ppm concentration of Pb.

Key words: Lead, Total Proteins, Fungi, Aspergillus, Pb.

INTRODUCTION

The contamination of agricultural lands caused by heavy metals in and around industrial areas is a serious problem. Such Contamination is due to largely injudicious anthropogenic activities such as indiscriminate use of pesticides containing heavy metals in agriculture, discharge of untreated industrial wastes and effluents, faulty waste disposal,, high rate of burning of fossil fuels, mining etc. [1,2,3,4]. Mercury persists in the environment by its rapid uptake and accumulation, by food chain organisms and contribute potential environmental hazard. In the present investigation an attempt has been made to observe the effect of different concentrations of mercury on growth and total protein content in the culture filtrate of different fungi to evaluate the efficacy of organisms for accumulation of pollutants.

MATERIALS AND METHODS

Estimation of Proteins The protein content of extract was estimated by the author [5] using Bovine Serum albumin as standard. The culture filtrate or aq extract was heated with alkali, allowed to stand for 10 min and then allowed to react with Folin Phenol reagent. Absorbance of the reaction mixture was measured at 545 nm. The fungi *Aspergillus flavus, Aspergillus niger, Cladosporium herbarum, Curvularia lunata and Trichoderma viridae* were grown in the laboratory on potato dextrose broth. For the experimentation, concentration of Lead (as Lead acetate) and fungi were put in to Potato Dextrose Broth.

RESULTS AND DISCUSSION

From the results presented in table 1 to 5 it is observed that there was decrease in dry weight of all the test fungi with increase in concentration of Lead. In *Cladosporium herbarum* Maximum decrease (990-250=740 mg) was observed at 20ppm concentration of Lead and a very less growth (80mg) recorded at 50ppm

How to Site This Article:
Prasannarani Tanneru. 2016. Effect of Lead on Growth and Total Proteins Produced In the Culture Filtrate of Different Fungi. *Biolife*, 4(2), pp 300-302.
DOI: https://dx.doi.org/10.5281/zenodo.7317807
Received: 4 April 2016;
Accepted; 21 May 2016;
Available online : 4 June 2016

lead. It indicates that even at low concentration of metal growth was inhibited greatly except *Trichoderma viridae* and *Aspergillus niger* which doesn't show significant decrease in dry weight at low concentration.

Table-1. Effect of lead on growth of *Aspergillus flavus* Link.

Sr. No.	Lead (ppm)	Dry weight of *Aspergillus flavus* in mg after days.			
		2	4	6	8
1	Control	150	245	338	430
2	10	50	140	200	250
3	20	25	80	110	180
4	30	25	70	110	160
5	40	20	65	100	150
6	50	18	50	98	130

Table-2. Effect of Pb on growth of *Aspergillus niger* van Tiegh.

Sr. No.	Lead (ppm)	Dry weight of *Aspergillus niger* in mg after days.			
		2	4	6	8
1	Control	60	100	180	270
2	10	50	110	170	260
3	20	50	100	160	260
4	30	50	100	160	260
5	40	40	110	150	250
6	50	30	100	140	230

It is evident from the results (Table 6) that the total protein content was found to be decreased maximum at initial concentration i.e. 10ppm Pb in *A. flavus* and *Trichoderma viridae* where as it is less decreased in case of other fungi. Maximum decrease (2.448-2.134=0.314mg, 2.536-2.237=0.299mg, 2.338-2.168=0.170mg, 2.244-1.895=0.349mg and 2.413-2.096=0.317mg) in protein content of culture filtrate of *Aspergillus flavus, Aspergillus niger, Curvularia lunata, Cladosporium herbarum and Trichoderma viride* respectively was observed at 40ppm concentration of lead.

Table-3. Effect of lead on growth of *Cladosporium herbarum* Link.

Sr. No.	Lead (ppm)	Dry weight of *C. herbarum* in mg after days.			
		2	4	6	8
1	Control	250	390	790	1250
2	10	100	210	610	990
3	20	80	150	185	250
4	30	40	80	100	120
5	40	30	60	90	90
6	50	20	50	80	80

***Table-4:* Effect of lead on growth of *Curvularia lunata (Wakker)* Boedijn.**

Sr. No.	Lead (ppm)	Dry weight of *Curvularia lunata* in mg after days.			
		2	4	6	8
1	Control	200	600	1800	2560
2	10	130	220	280	300
3	20	80	100	100	120
4	30	30	60	80	84
5	40	20	60	62	65
6	50	20	40	50	55

Table-5. Effect of Pb on growth of *Trichoderma viride* Pers exS. F. Gray.

Sr. No.	Lead (ppm)	Dry weight of *Trichoderma viride* in mg after days.			
		2	4	6	8
1	Control	80	214	360	555
2	10	72	168	296	444
3	20	56	137	296	416
4	30	48	137	254	396
5	40	40	91	211	360
6	50	8	30	84	222

However no further change in protein content was

Table 6: Effect of Lead on Total Protein content in culture filtrate of different fungi.

S.N.	*Fungi*	Total Protein content in mg at different concentrations of Lead (ppm) after 8 days.					
		Control	10	20	30	40	50
1	*A. flavus* Link.	2.448	2.384	2.308	2.283	2.134	2.134
2	*A. niger* van Tiegh.	2.536	2.512	2.476	2.398	2.237	2.237
3	*C. herbarum* Link..	2.338	2.302	2.213	2.186	2.168	2.168
4	*C. lunata* (Wakker) Boedijn.	2.244	2.213	2.126	2.109	1.895	1.895
5	*T. viride* Pers. exS. F. Gray.	2.413	2.328	2.282	2.148	2.096	2.096

observed at 50 ppm concentration of pH. Maximum reduction 2.338-2.168=0.170 mg is noted in culture filtrate of *Cladosporium herbarum.* Lead is the heavy metal pollutant causing concern in contaminating agricultural lands, particularly in the vicinity of industrial areas, dumping grounds of industrial wastes and national highways which are enriched with mercury [6].

Heavy metals today have a great ecological significance due to their toxicity and accumulative behavior. Lead is one of the most important pollutants among many toxic elements. According to authors [7] Fungi cultures are known to show higher towards heavy metals and hence are potential candidates for efficient metal sorption. From these studies it may be concluded that heavy metals are known to exert harmful effects on the physiology and biochemistry organisms causing health hazards through food chain and also gives support to the study conducted by authors [8, 6, 4]. Present investigation emphasized that the test organisms like fungi can be chosen for their tolerance and can be used as accumulators of heavy metal pollution as these metals have a great impact on the biochemical produced by organism also by causing great imbalance in the ecobiological cycle.

Conflict of Interests

Authors declare that there is no conflict of interests regarding the publication of this paper.

References

[1]. Foy, C.D., Chaney, R. L. and White, M.C.: (1978). *Annu. Rev. Plant Physiol*. 29, 511-566.
[2]. Mehera, A. and Farago, M. E.: (1994), *Plants and Chemical Elements: Biochemistry, Uptake Tolerance and Toxicity*, Farago, M. E. (ed.), VCH Publishers, New York, pp. 31.
[3]. Vangronsveld, J. and Clijsters, H. (1994). *Plants and chemical Elements: Biochemistry, Uptake, Tolerance and Toxicity* , Farago, N. E. (ed), VCH Publishers, New York, pp. 149.
[4]. Prasad, M. N. V.: (1997). *Plant Ecophysiology*, Prasad, N.N.V (ed), John Wiley and sons, Inc., New York, pp. 207
[5]. Lowry, O. H., Rosebrough, N.J., Farr, A. L. and Randall, R. J. (1951). Protein estimation with the Folin Phenol Reagent.
[6]. De, A. K.: (1994), *Environmental Chemistry*, Eiley Eastern Ltd., New Delhi, pp. 81.
[7]. Paknikar, K. M., Palnitkar, U. S. and Puranik, P. R. (1993). Biosorption of metals from solution by mycelial waste of *Penicillium chrysogenum*. Pp. 229-235 In: *Biohydrometallurgical Technologies*, Vol II. (Ed by A.E. Torma, M. L, Apel and C.L. Brierley. TMS Publ.
[8]. Bazzaz, F. A., Rolfr, G.L. and Carlson, R. W.: (1974) *Plant Physiol*. 32, 373-376.