J.S.S. BANASHANKARI ARTS, COMMERCE AND SHANTIKUMAR GUBBI SCIENCE COLLEGE, VIDYAGIRI, DHARWAD

Affiliated to Karnatak University, Dharwad

Accredited with 'A' Grade in last three cycles

Fourth Cycle NAAC Accreditation
SELF STUDY REPORT (SSR)

CRITERION - III

3.5.1 (QnM)

Number of Collaborative activities for research, Faculty exchange, Student exchange/ internship per year

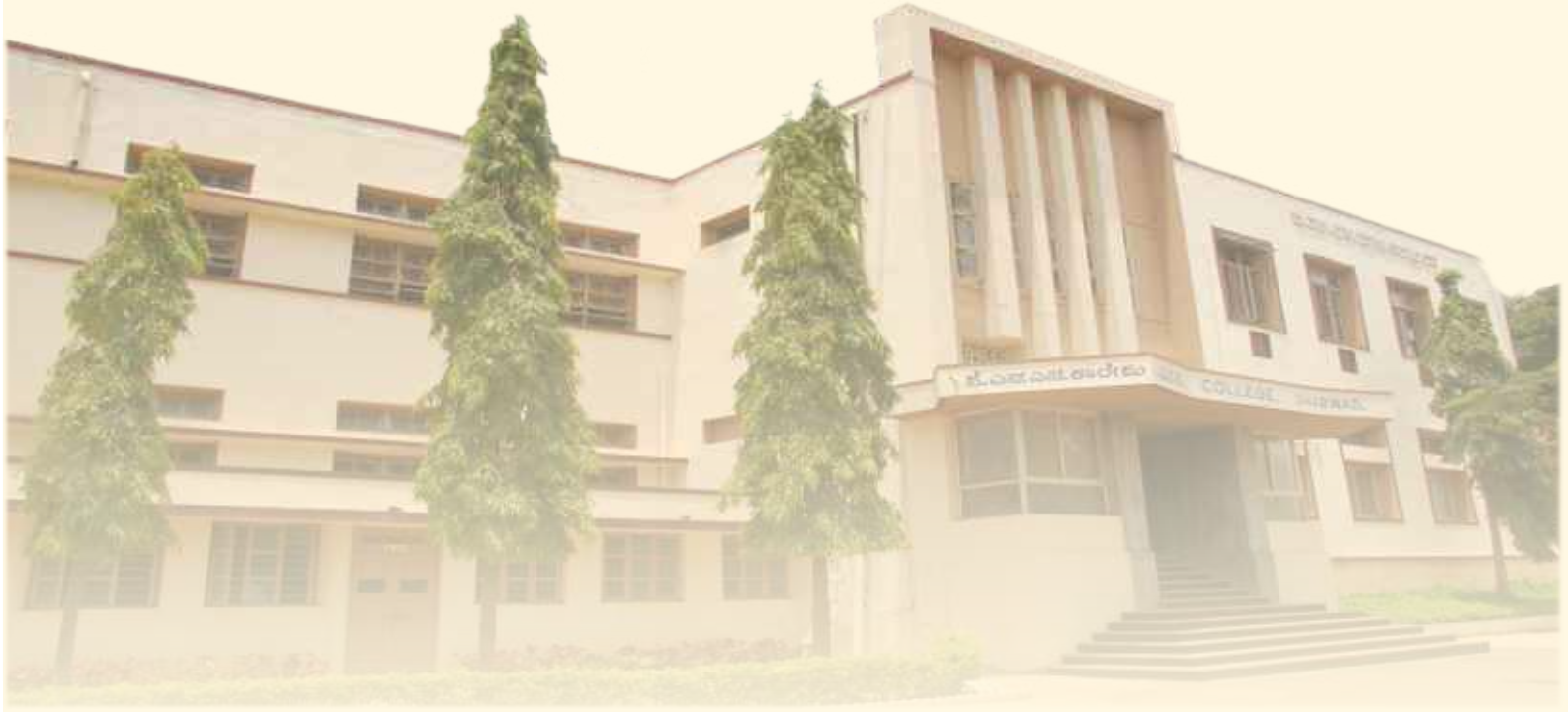
Submitted to

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL, BENGALURU

J.S.S. BANASHANKARI ARTS, COMMERCE AND SHANTIKUMAR GUBBI SCIENCE COLLEGE, VIDYAGIRI, DHARWAD

Affiliated to Karnatak University, Dharwad

Accredited with 'A' Grade in last three cycles



Linkage with
BLDE's Associations Commerce, BHS Arts and TGP Science College, Jamakhandi

ಬಿ.ಎಲ್.ಡಿ.ಇ. ಸಂಸ್ಥೆಯ

ವಾಣಿಜ್ಯ ಜಿ. ಎಚ್. ಎಸ್. ಕಲೆ ಮತ್ತು ಟಿ. ಜಿ. ಪಿ. ವಿಜ್ಞಾನ ಮಹಾವಿದ್ಯಾಲಯ,
ಜಮಖಂಡಿ-587 301

Estd : 1910 (ರಾಣಿ ಚನ್ನಮ್ಮ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಶಾಶ್ವತ ಸಂಯೋಜನೆ ಹೊಂದಿದೆ) Estd : 1963

ಜಿ. ಬಾಗಲಕೋಟ ಕರ್ನಾಟಕ ರಾಜ್ಯ

B.L.D.E.Association's

COMMERCE, B.H.S. ARTS & T. G.P. SCIENCE COLLEGE, JAMKHANDI-587 301.

Dist. Bagalkot (Permanently affiliated to Rani Channamma University,Belagavi) Karnataka State

Fax / Tel.:+918353-220183 (Principal) 220003 (Office) email: bldeajkd@yahoo.in Website : http://www.bldeajkd.ac.in

NAAC 3rd Cycle Accredited with 'A' Grade (CGPA 3.32)

Ref No.:

INSTITUTIONAL ACADEMIC LINKAGE

Date :

BLDEAS COMM, BHS ARTS AND TGP SCIENCE COLLEGE JAMKHANDI DIST- BAGALKOT

AND

J.S.S' BANASHANKARI ARTS, COMMERCE AND SHANTIKUMAR GUBBI SCIENCE COLLEGE, VIDYAGIRI, DHARWAD

The objective of this Institutional Academic Linkage (IAL) is to encourage and facilitate. The development of collaborative and mutually beneficial programmes which serve To enhance the intellectual life, academic development and cultural development among the student faculty mernbers between two institutions Thus **BLDEAs Comm, BHS Arts and TGP Science College Jamkhandi Dist- Bagalkot and J.S.S. Banashankari Arts, Commerce and Shantikumar Gubbi Science College, Vidyagiri, Dharwad,** have agreed that in support of their mutual interest in the field of education, research arid extension activities:

The two institutions will;

a) The exchange of information relating to their activities in teaching and research in fields of mutual interests.

b) Promote appropriate joint research projects and joint courses of study.

c) Endeavor to encourage students and staff for a formal exchange.

d) Conduct Short courses, Project work as mutually agreed in writing between the parties prior to commencement of this activity.

The aim of the memorandum of understanding shall be to achieve a broad balance in the respective contributions and benefits of the collaboration and this shall be subject to periodic review by both the department.

The two departments agree to assist in the seeking of appropriate work space, library and technical facilities as appropriate.

In the implementation of specific cooperatives programs a written agreement covering all relevant aspects including funding and the obligations to be undertaken by each party will be negotiated, mutuallyagreed and formalized in writing, prior to the commencement of the program.

The agreement will take effect from the date of its signing and shall be valid for a period five years from **3-10-2016 to 1-10-2022** between the parties and may be extended by mutual written agreement.

Either party may terminate the agreement at any time during the term by the provision of three months written notice to the party.

SIGNATURES

BLDEA's COMM, BHS ARTS AND TGP SCIENCE COLLEGE JAMKHANDI DIST- BAGALKOT

PRINCIPAL
Commerce B.H.S. Arts & T.G.P.
Science Degree College, JAMKHANDI

J.S.S' BANASHANKARI ARTS, COMMERCE AND SHANTIKUMAR GUBBI SCIENCE COLLEGE, VIDYAGIRI, DHARWAD

PRINCIPAL
J.S.S. Banashankari Arts, Commerce &
Shantikumar Gubbi Science Colle
DHARWAD-580 004

ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 10, Issue, 12(A), pp. 36285-36291, December, 2019

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

TOXICITY EVALUATION OF LEAD IN AQUATIC MACROPHYTES

Rolli.N.M[1]., Hujaratti R.B[2]., Gadi, S.B[3]., Sangannavar, M.C[1] and Seth, R.C[1]

[1]BLDEA's Comm., BHS Arts and TGP Science College, Jamkhandi, 587301, Karnataka, India
[2]Research and Development Centre Bhartiar University, Coimbatore (641 046)
[3]JSS College, Dharwad, Karnataka, India

DOI: http://dx.doi.org/10.24327/ijrsr.2019.1012.4895

ARTICLE INFO

Article History:

Received 4th September, 2019
Received in revised form 25th October, 2019
Accepted 23rd November, 2019
Published online 28th December, 2019

Key Words:

Toxicity, Lead, Aquatic plants, Accumulation, Biochemical parameters, Symptoms.

ABSTRACT

The present study was focused on Lead (Pb) toxicity on macrophytes and biochemical parameters and profile of metal accumulation in aquatic macrophytes. The laboratory experiments were conducted for the assessment of Morphological Index Parameters (MIP), biochemical parameters and accumulation status of lead (Pb) in test plants at various concentrations, viz, 0.1, 0.5, 1.0, 1.5 and 2.0 ppm at regular interval for 12 days exposure duration. The test plants viz. *Salvinia.& Spirodela* were used for toxicity evaluation and profile of metal accumulation (Lead-Pb) from synthetic medium. The test plants were cultured in a modified Hoagland solution supplemented with $Pb(NO_3)_2$. The test plants shows visible symptoms like withering of roots, chlorosis, necrosis etc. particularly at higher concentrations i.e 1.5 ppm and 2.0 ppm, lower leaves gets decayed. However, at lower concentration i.e 0.1 ppm shows normal growth. The estimation of total chlorophyll, protein and carbohydrate of test plants showed significant increased at lower concentration i.e 0.1 ppm and decreased with increase in exposure concentrations i.e 0.5 to 2.0 ppm. It reveals that the toxic effect was directly proportional to its concentrations and exposure duration. The accumulation status was maximum in following orders (*Salvinia* > *Spirodela*) at low and higher concentrations of lead at 4 & 12 days exposure duration. However, accumulation profile in the test plants was maximum at 4 days exposure irrespective of metal concentrations and gradually decreases at subsequent exposure concentrations and duration.

INTRODUCTION

Heavy metal contamination in the water bodies is increasing at an alarming rate due to industrial and anthropogenic activities (1). Heavy metal pollution is a major environmental problem facing the modern word (1, 17). The danger of heavy metals is aggregated by their indefinite persistence in the environment because they cannot be destroyed biologically but are only transformed from oxidative state or organic complex to another. In addition, they are highly toxic for both aquatic flora and fauna (2). Heavy metals persisting in sediments may be slowly released into the water. Heavy metals viz, Zinc (Zn), Copper (Cu), Iron (Fe), Manganese (Mn)etc are represented as micronutrients (3) and are only toxic when taken in excess quantities, but nonessential ions like lead (Pb), Cadmium (Cd) and Nickel (Ni) inhibit various metabolic activities even in small quantities; (4, 5). The heavy metal lead (Pb) is selected as toxicant for the present study because it is used in several industries in India and are highly toxic to animals, humans and plants. Biological treatment of waste water through aquatic microphytes and macrophytes has great potential for its purification, which were effectively accumulates heavy metals (6). Aquatic macrophytes accumulate considerable amount of toxic metals and make the environment free from the xenobiotics. Thus, they play a significant role in cleaning up of environment and make it free from toxic pollutants. The metal tolerance of plants may be attributed to different enzymes, stress proteins and phytochelatins (7). Accumulation of metal at higher concentration causes retardation of biochemical activities and also generation of -SH group containing enzymes (8).

In the present investigation *Salvinia* and *Spirodela* common aquatic floating macrophytes, are used to study the effect of different concentrations of lead on morphology, biochemical constituents and efficiency in the accumulation of lead from the experimental pond under laboratory conditions.

Corresponding author:* **Rolli.N.M
BLDEA's Comm., BHS Arts and TGP Science College, Jamkhandi, 587301, Karnataka, India

Environmental & Analytical
Toxicology

Rolli et al., J Environ Anal Toxicol 2015, 5:6
http://dx.doi.org/10.4172/2161-0525.1000319

Research Article Open Access

Metal Accumulation Profile in Roadside Soils, Grass and Caesalpinia Plant Leaves: Bioindicators

Rolli NM*, Karalatti BI[1] and Gadi SB[2]

[1]BLDEA Degree College, Jamkhandi, Karnataka, India
[2]JSS College, Dharwad, Karnataka, India

Abstract

Heavy metals are important environmental pollutants and their toxicity in human, plants and animals have been received much more attention. A study was conducted to investigate the heavy metal pollution of roadside soil, grass and *Caesalpinia* species of Bagalkot city (India). The highest levels of metal concentration of Pb, Cu, Cd, Mn, Zn, Cr and Ni were found in the samples from very traffic congestion. The soil samples at a depth (0-20 cm) grass leaves and *Caesalpinia* leaves were taken from different sampling sites *viz*; S_1, S_2, S_3, S_4 and S_5 on state high way with high traffic roads passing through Bagalkot (India) were determined by Atomic Absorption Spectrophotometer. Results showed that soil and both grass and *Caesalpinia* contained elevated levels of the metal. It was found that the primary source of the contamination occurs mainly by the vehicular exhausts. The increased circulation of the toxic metals in soils, grass and *Caesalpinia* may result in the inevitable build up of such xenobiotics in the food chain. The variation in heavy metal concentration is due to the changes in traffic density and anthropogenic activities. Thus, it is concluded that grass, *Caesalpinia* and soil samples were used as bioindicators of metal pollution in roadside.

Keywords: Bioindicators; Xenobiotics; *Caesalpinia*; Grass; Food chain

Introduction

Environmental pollution has increasing in tremendous rate after global industrialization that has negative impacts on human health and ecosystem services [1]. The contribution of cars and road transports to the global emission of atmospheric pollutants is regularly increasing [2]. The road transports also induce the contamination of nearer soils by a pollutant transfer via the atmospheric fallouts [3] or road runoff [3,4]. Bagalkot is one of the busiest city in Karnataka, emission from transport vehicles results in significant heavy metal accumulation in roadside soils of Bagalkot city.

Nowadays, the toxic effects of heavy metals are burning issues and been studied by many researchers [5,6]. Entrance of heavy metals may occur in human and animal food chain as a result of their uptake by edible plants grown in contaminated soil [7]. The toxic and hazardous effects of some heavy metals on human health are very significant and may cause many fatal diseases. Lead (Pb) is one of the heavy metal that is responsible for anemia, neurological disorder, hyperactivity and changes in blood enzymes in human body [8]. Cadmium (Cd) and Zn are important toxic metals and longtime exposure of which may causes renal, pulmonary, hepatic, skeletal, reproductive and many other carcinogenic effects [9,10].

It is widely recognized that the principal reasons of heavy metals (Pb, Cu and Cd) derived from traffic congestion, long-range transport and household heating [2]. The spreading of contaminants is influenced by meteorological parameters such as rainfall, wind and traffic intensity [7]. The same meteorological conditions affect the concentration of same contaminants in the roadside soil [2]. The traffic density determines the lead level in soil and vegetation [11-13].

Soil samples and vegetation is the most economic and reasonable ways for assessing heavy metal status in the atmosphere [1]. Acacia [14], grass [15], other plants [16], and other organisms such as fish [17] have also have been used for monitoring. In order to assess contamination by metals in the vicinity of a highway, several studies have been carried out dealing with the different 3.1 compartments: study of global deposits, roadside soil and vegetation [2]. Information on accumulation of heavy metal on roadside soil of this city due to highway traffic and vehicles is very limited [18]. But this could be the new threat for agriculture. Determination of heavy metal accumulation in roadside soil may be an index of the environmental pollution of Bagalkot city. Keeping this view in mind, the research was conducted to know the heavy metal accumulation of roadside soil, grass and *Caesalpinia* of Bagalkot city.

Materials and Methods

Bagalkot is the city of Northern region of Karnataka at latitude 16°04' N to 16°21' N and longitude 75°26' E to 76°02' E. The city is suffered from high traffic density caused by vehicles. The grass, *Caesalpinia* and soil were collected during 2013, which were three meters away from the State Highway (Figure 1 and Table 1) passing through Navanagar. Grass and *Caesalpinia* samples were collected from each site at three random spots that were spaced approximately at one meter interval. The leaves were clipped with stainless steel scissors. All the samples of each site were then combined to give composite samples of about 300 to 500 gm.

The leaves of Grass (*Cynodon dactylon*) and *Caesalpinia (Caesalpinia pulcherrima*) samples were dried at 80°C for 48 hr fine by powdered and sieved through 0.2 mm sieve. One gram sample was digested using Gerhardt digestion unit using mixed acid digestion method [19]. The digested material was diluted with double distilled water and filtered through Whattman paper 41 and made upto 100 ml.

Similarly, soil samples were dried, powdered and sieved through

*Corresponding author: Rolli NM, BLDEA Degree College, Jamkhandi, Karnataka, India, Tel: 09448896839; E-mail: dmmrolli@rediffmail.com

Received July 22, 2015; Accepted August 24, 2015; Published August 29, 2015

Citation: Rolli NM, Karalatti BI, Gadi SB (2015) Metal Accumulation Profile in Roadside Soils, Grass and Caesalpinia Plant Leaves: Bioindicators. J Environ Anal Toxicol 5: 319. doi:10.4172/2161-0525.1000319

Journal of Agriculture and Ecology Research International
6(1): 1-8, 2016; Article no.JAERI.21770
ISSN: 2394-1073

SCIENCEDOMAIN *International*
www.sciencedomain.org

Bioindicators: Study on Uptake and Accumulation of Heavy Metals in Plant Leaves of State Highway Road, Bagalkot, India

N. M. Rolli[1*], S. B. Gadi[2] and T. P. Giraddi[1]

[1]BLDEA's Degree College, Jamkhandi, 587301, Karnataka, India.
[2]Department of Botany, JSS College, Dharwad, 580004, Karnataka, India.

Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAERI/2016/21770
Editor(s):
(1) Alejandro E. Ferrari, Department of Science and Technology, UNQ, Universidad Nacional de Quilmes, Argentina.
(2) Krzysztof Skowron, Department of Microbiology, Nicolaus Copernicus University in Toruń, Collegium Medicum of L. Rydygier in Bydgoszcz, Poland.
(3) Daniele de Wrachien, Department of Agricultural and Environmental Sciences of the State University of Milan, Italy.
Reviewers:
(1) Isiaka A. Ogunwande, Lagos State University, Lagos, Nigeria.
(2) Shruti Murthy, Bangalore University, India.
(3) Rajaram Pandurang Dhok, Savitribai Phule Pune University, Pune, India.
Complete Peer review History: http://sciencedomain.org/review-history/12858

Original Research Article

Received 2nd September 2015
Accepted 10th December 2015
Published 31st December 2015

ABSTRACT

In this study, Caesalpinia (*Caesalpinia pulcherrima*) and grass (*Cyndon dactylon*) was evaluated as the bioindicators of heavy metals such as the Lead (Pb), Copper (Cu), Cadmium (Cd), Manganese (Mn), Zinc (Zn), Chromium (Cr) and Nickel (Ni) contaminated in Bagalkot and along the state high way upto Mudhol. The soil samples at depth (0-20 cm) and caesalpinia and grass leaves were taken from different sampling stations namely Navnagar bypass road (S_1), Gaddanakeri cross (S_2), Tulasigeri (S_3), Kaladagi (S_4), Lokapur (S_5), Chichakhandi (S_6) and Mudhol (S_7). The concentrations of Pb, Cu, Cd, Mn, Zn, Cr and Ni were measured using GBC- 932 plus Atomic Absorption Spectrophotometer (Austretia). The results of the study shows that the concentrations of heavy metals in caesalpinia ranged from Pb 20.36 to 29.39 µg/gmm, Cu 3.92 – 5.94 µg/gm, Zn 24.40 to 35.7 µg/gm, Cd 1.01 to 1.78 µg/gm, Mn 27.01 to 69.10 µg/gm, Cr 1.20 to 7.8 µg/gm and Ni 7.9 to 13.1 µg/gm. In grass heavy metal ranges between for Pb 20.16 to 28.01, Cu 3.95 to 5.76

**Corresponding author: E-mail: dmmrolli@rediffmail.com;*