

# A SURVEY OF ANGIOSPERMIC MACROPHYTES IN BIOREMEDIATION PROCESS AROUND WATER BODIES IN NANDED DISTRICT OF MAHARASHTRA STATE (INDIA)

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**Abstract:** Bioremediation is a natural process involving microbes to Macrophytes. Macrophytes are angiospermic plants growing near water or inside the water bodies. The absorption of minerals from the soil is a natural process but some plants absorb various useful and harmful elements beyond their osmotic potential i.e. against the concentration gradient. Such plants are useful in pollution control around the cities situated on river bank. The present study enlists some such Macrophytes from Nanded District of Maharashtra State, India. Quantitative estimation of some of the hazardous elements absorbed by these plants is also being depicted herewith by means of AAS.

**Key Words:** Bioremediation, Microbes, Minerals, Macrphytes.

## 1. INTRODUCTION:

Water pollution is one of the most important global problem. In India most of the rivers are the source of survival for the people. The rapid industrialization process where the industries dump their industrial waste in the rivers particularly enhance this problem of pollution substantially. This has been now spread in the semi urban areas particularly in the cities and township developing on the banks of rivers (Abassi and Vinitarn, 1999).

Marathwada region of the Maharashtra State is well known backward area and Nanded City which stands at No. 2 in Marathwada also had recently developed number of small scale industries, particularly located on the southern side in the MIDC area. They manufacture galvanized tin sheets, Agrochemicals, fertilizers, etc. They don't have an efficient system of disposal of their

Industrial effluents which are then directly dumped into the river Godavari by small Nalas, resulting in water pollution by heavy metals like Zinc, Copper, Mercury, lead and Arsenic around the city and adjacent area (Kapaly et.al. 1999). There are number of macrophytic plants which grow around the river bank and they can absorb such heavy metals beyond their osmotic potential (Demirezen and Aksoy, 2004, Ali and Sultan 1999). These plants can spontaneously reduce the flow of heavy metals and help in reduction of water pollution. (Card well et.al. 2002)

The present investigation is about seven such plants from this particular geographical region. These plants are important from the point of view of bioremediation and hence they are also to be conserved.

## 2. MATERIALS AND METHODS:

**Location:** Nanded district of Marathwada region of Maharashtra State is located at 18°-15' north latitude and 77°-15' east longitude. The only source of water is Godavari river which flows towards southern part of main city. There are several small scale industries on the southern side across the river. These small scale industries regularly dump their industrial waste in Godavari river through small channels i.e. Nalla. Seven macrophytes around this dumping area were collected and chemically analysed by Atomic absorption studies for their presence of Zn, Cu, Hg, As and Pb. These angiospermic macrophytes were first correctly identified with pertinent literature (Naik1998). These studies are conducted during 2014-15 the amount of elements occurring in these plants is shown in ppm.

## 3. RESULT AND DISCUSSION:

The Table No. 1 depicts the list of the 7 macrophytes with their botanical identity along with the AAS studies about the occurrence of Zn, Cu, Hg, As and Pb. All these metals cause heavy toxicity. The results indicate that the plant *Eclipta alba*, *Anisomelous malbarica*, *Hygrophila ringens* and *Indigofera glandulosa* can absorb considerable amount of Mercury and Arsenic while *Ipomea caranea* sub. Sps. *Fistulora Acacia nilotica* and *Ageratum conyzoides* can absorb more amount of Zinc, Copper and Lead considerably as all these 7 plants can absorb some or other hazardous metal they can be useful in the bioremediation process particularly in the industrial townships and cities on the bank of water bodies such as rivers, further studies are in progress.

**Table No. 1**

List of Some Macrophytes and the heavy metals absorbed by them in

## Nanded district of Maharashtra.

Sr. No.	Name of Plant	Family	Amount of elements absorbed by the plants in ppm.				
			Zn	Cu	Hg	As	Pb
1	<i>Ageratum Conyzoides</i> L.	Asteraceae	16.000	11.000	20.000	0.200	48.000
2	<i>Acacia nilotica</i> (L.) Del.	Mimosaceae	2.000	33.000	24.000	38.000	35.000
3	<i>Anisomeles malbarik</i> R.Br.	Lamiaceae	30.000	11.000	22.000	4.000	28.000
4	<i>Eclipta alba</i> L. Hassk	Asteraceae	20.000	11.060	18.000	20.000	23.007
5	<i>Ipomea carnea</i> Jcq. Subsp. <i>Fistulora</i>	Convolvaceae	48.000	20.000	23.000	0.150	30.000
6	<i>Indigofera slandulosa</i> wendl.	Fabaceae	30.000	10.000	18.000	30.000	12.000
7	<i>Hygrophila ringens</i> L. Stud.	Acantneaceae	30.110	10.000	29.000	20.000	47.008

## Photo plates of plants

1. *Ageratum conyzoides* L.2. *Acacia nilotica* (L.) Willd.3. *Anisomeles malabarica* (L.)4. *Eclipta alba* (L.)5. *Ipomea carnea* Jace.6. *Hygrophila ringens* L. Stud.

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**REFERENCES:**

1. Ali, M and M.E. Soltan, Heavy metals in aquatic Macrophytes, water and hydrosols from river Nile, Egypt. J. Uni. Arbi. Biol., Cairo 9:99-115, (1999).
2. Abassi, S.A. and Vinitran S., Water quality in and around an industrialized suburb of Pondichery. Journal of Environmental health 41 (4) 253-263. (1999).
3. Cardwell A, Haldker, N. and Greenway M. Metal accumulation in aquatic Macrophytes from southeast queens Land, Australia, Chemosphere 48:653-663. (2002).
4. Demirezen, D. and Aksoy a, Accumilation of heavy metals in *Typha angustifolia* L. and *Potamogeton pectinatus* L. living in sultan Marsh (Kayseri, Turkey), Chemosphere 56: 585-696 (2004).
5. Kaplyay R.D. Patode RS. Panaskar DB and Ayaskar A.R. Influence of aquatic rock and percolating water, geochemistry of groundwater of Tuppa industrial area of New Nanded. J. Ind. Poll. Cont. 15 (2) : 165-173 (1999).
6. Naik V.N., Flora of Marathwada Vol. I & II, Amrut Prakashan Aurangabad (1998).