PICK UP OF CHLORIDE AND NITRATE OF SYNTHETIC SAMPLE BY USING WATER HYACINTH (EICHHRONIA)

Rajshekhar Shahabadi[1] , Dr.Shivasharanappa.G.Patil[2]

[1] Postgraduate Student, Department of Civil Engineering, PDA College of Engineering Kalaburgi -585102, Karnataka, INDIA
[2] Professor, Department of Civil Engineering, PDA College of Engineering Kalaburgi -585102, Karnataka, INDIA

Abstract - *Water hyacinth has been used in aquatic systems for wastewater purification in many years worldwide. The role of water hyacinth (Eichhornia crassipes) species in polishing nitrate and phosphorus concentration from municipal wastewater treatment plant effluent by phytoremediation method was evaluated. The objective of this project is to determine the removal efficiency of water hyacinth in polishing nitrate and phosphorus, as well as chemical oxygen demand (COD) and ammonia. Water hyacinth is considered as the most efficient aquatic plant used in removing vast range of pollutants such as organic matters, nutrients and heavy metals. Water hyacinth, also referred as macrophytes.*

***Key Words*: Eichhronia Carssipes, chloride, nitrate.**

1. INTRODUCTION

Phytoremediation used for removing heavy metals and other pollutants by AMATS is a well established environmental protective technique. The most common aquatic macrophytes being employed in wastewater treatment are water hyacinth (*Eichhornia crassipes*), penny wort, water lettuce, water ferns and duck weeds. AMATS for waste-water treatment are the need of developing countries, because they are cheaper to construct and a little skill is required to operate them. The presence of water hyacinth may enhance water quality due to their ability to absorb excessive loads of nutrients. Also, plants can assimilate ammonia that is excreted by fish thereby helping to prevent accumulation of potentially toxic concentrations of ammonia. Plants affect environmental conditions of water by resistance of mixing and gradients in Dissolved oxygen (DO), pH and temperature form in and around plant beds. Water hyacinth mats are evidently important for various macro-invertebrates that live on plant leaves.

2. MATERIALS & METHODOLOGY

The Gulbarga city is located in Karnataka state of India .The eichhronia carssipes plant was collected for experiment from beside the Appa lake kalburgi where the eichhronia collected the water consist of partly rain water mix up with domestic waste water from nearby 2 or 3 wards.

2.2 Analytical Method

Sl.No	Parameters	Methods
1	pH	Electrometric
2	Chloride	Argentometric method
3	Total hardness	EDTA Titrimetric method
4	Dissloved oxygen	Winkler method
5	Total alkalinity	Titrimetric method
6	Nitrate	Phenol di-sulfonic acid method
7	BOD	Titrimetric method

Fig-1: Experimental Setup

3. RESULTS AND DISCUSSIONS

Table -1 The chloride test is done for the 10 gm chloride synthetic sample

	10 gm of Nacl of mixture	
SL.NO	Days	Concentration in mg/lit
1	1	479.85 mg/lit
2	3	470.5 mg/lit
3	5	463.5 mg/lit
4	7	455.8 mg/lit
5	9	450.2 mg/lit
6	11	447.8 mg/lit
7	13	440.3 mg/lit
8	15	435.8 mg/lit

Table-2 Biomass Eichhronia of 10 gm of chloride synthetic sample

Conc. = 10 gm of chloride synthetic sample			
SL.No	Solution	Weight of biomass at 1st day	Weight of biomass after 15 day
1	Chloride	80gm	100gm

Table-3 The chloride test is done for the 20 gm chloride synthetic sample

	20 gm of Nacl mixture	
SL.NO	Days	Concentration in mg/lit
1	1	635 mg/lit
2	3	632 mg/lit
3	5	630.8 mg/lit
4	7	627.3 mg/lit
5	9	624.8 mg/lit
6	11	622.2 mg/lit
7	13	620.3 mg/lit
8	15	618 mg/lit

Table-4 Biomass Eichhronia of 20 gm of chloride synthetic sample

Conc. = 20 gm of chloride synthetic sample			
SL.No	Solution	Weight of biomass at 1st day	Weight of biomass after 15 day
1	Chloride	145gm	160gm

Table-5 The Nitrate test is done for 500 mg Nitrate synthetic sample

SL.NO	**DAYS**	**CONCENTRATION**
1	1	90 mg/lit
2	3	84 mg/lit
3	5	80.6 mg/lit
4	7	75.5 mg/lit
5	9	71.8 mg/lit
6	11	68.1 mg/lit
7	13	65 mg/lit
8	15	62.3 mg/lit

Table-6 Biomass Eichhronia of 500mg of nitrate synthetic sample

Conc. = 500mg of Nitrate synthetic sample			
SL.No	Solution	Weight of biomass at 1st day	Weight of biomass after 15 day
1	Nitrate	159gm	230gm

Table -7 Physico-chemical characteristics of water sample present in field

Sl.No	**Parameters**	**1st Week**	**2nd Week**	**3rd Week**	**4th Week**
1	pH	5.9	6.3	6.5	6.8
2	Temperature	26◦C	29◦C	30◦C	27◦C
3	Chloride	286.1mg /lit	288.3 mg/lit	300 mg/lit	3051mg /lit
4	Total hardness	264 mg/lit	267 mg/lit	270 mg/lit	282 mg/lit
5	Magnesium hardness	106 mg/lit	109 mg/lit	112 mg/lit	115.2 mg/lit
6	Dissolved	5 mg/lit	6.7	7	7.3

	oxygen		mg/lit	mg/lit	mg/lit
7	Total alkalinity	180 mg/lit	185 mg/lit	189 mg/lit	193 mg/lit
8	Nitrate	30 mg/lit	25.5 mg/lit	23.6 mg/lit	19.5 mg/lit
9	BOD	300 mg/lit	260 mg/lit	245 mg/lit	186 mg/lit

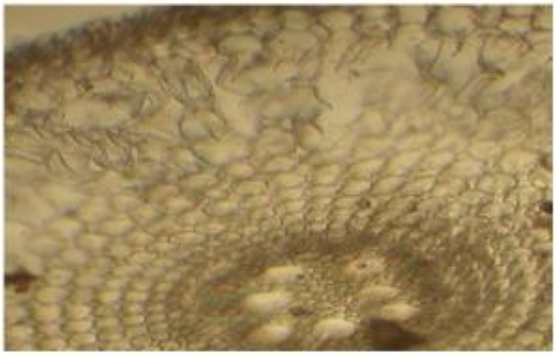

Fig-2: Cross sectioning of the root

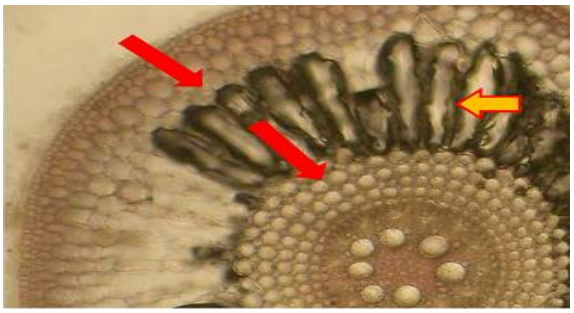

Fig-3: Cross sectioning of the root

Translocation of impurities from the epidermis into vascular bundle and further upward to the plant

Presence of the sewage

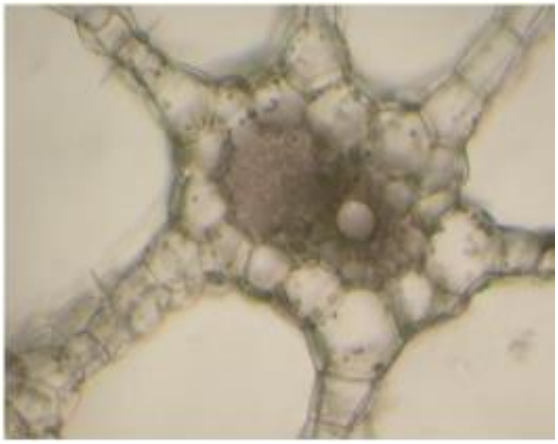

Fig-4: Cross sectioning of petiole

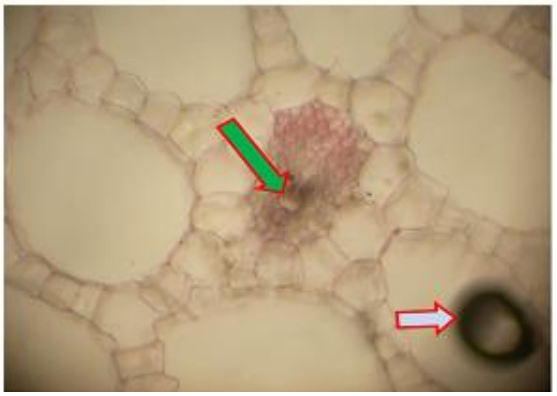

Fig-5: Cross sectioning of petiole

Translocation of impurities through the vascular bundles of the petiole

Translocation of impurities through the vascular bundles of the petiole

4. CONCLUSIONS

Aquatic plants are very effective in removal of nutrients and others chemical parameters too.

- So, Eichhronia carssipes(water hyacinth) plant is a partially submerged plant used in the study.
- Eichhronia carssispes plant used to a certain the removal of chloride and nitrate in constructed wetland.
- Chloride and nitrate added to water which build upto 479.85 mg/lit,635 mg/lit,715 mg/lit,749.6 mg/lit on the first day for 10gm,20gm,30gm,40gm respectively for chloride synthetic sample and 90 mg/lit,45mg/lit on the first day for 500 mg,250mg respectively for nitrate synthetic sample.
- Later every 3 days the chloride and nitrate were measured.
- Eichhronia plant is very effective in removal of nitrate to is 30.77% but quite less effective in chloride to is 9.17%, 2.67%, 2.62%, 3.05%. respective of chloride synthetic sample.
- Average Biomass weight of chloride synthetic sample is 26.25gm.
- Average Biomass weight of nitrate synthetic sample is 65.5 gm.

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