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# Golden Research Thoughts

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# Treatment Of Sewage By The Use Of Biofloaters For COD, Sulphate, Nitrate And Phosphate Reduction

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**Abstract:** Eichhornia crassipes is forage weed, because of its ease of propagation, fast growth. This weed is a biotic resource, due to its several properties weed is used for wastewater treatment by Phytoremediation (Root Zone) technology through constructed wetland.

In the present investigation, Eichhornia crassipes was used for the treatment of sewage, because of its highest growth near sewage disposal areas. During the study we analysed the sewage sample two times i.e. before treatment and after treatment. At the time of analysis we analysed COD, BOD, Nitrate, Phospate and sulphate ions. After treatment we get the results in such a manner that colour, odour and other pollutants are removed to get clear water.

**Key words:** Biofloaters , Phytoremediation , analysis , Phospate and sulphate ions.

## INTRODUCTION :

A constructed wetland is an artificial marsh or swamp, created for treating anthropogenic discharge such as wastewater, sewage treatment storm water, for land reclamation after mining or other disturbance. Constructed wetlands are artificial wastewater treatment systems consisting of shallow (usually up to 100 cm deep) ponds or channels which have been planted with aquatic plants, and which rely upon natural microbial, biological, physical and chemical processes to treat wastewater. They typically have impervious clay or synthetic liners, and engineered structures to control the flow direction, liquid detention time and water level. Depending on the type of system, they may or may not contain an inert porous media such as rock, gravel or sand. The constructed wetlands have been used to treat a variety of wastewater including urban runoff; municipal, industrial, agricultural and acid mine drainage.

Phytoremediation is the use of certain plants to clean up water contaminated with metals and/or organic contaminants such as crude oil, solvents, and poly-aromatic hydrocarbons (PAHs). Phyto-remediation is the use of plants to remediate contamination by the uptake of contaminated water by plants. Plants can be used to contain, remove, or degrade contaminants. It is a name for the expansion of an old process that occurs naturally in the ecosystem as both organic & inorganic element cycle through plants. The present study was aimed to study the sewage treatment by using Eichhornia crassipes, to design bio floaters for sewage treatment and to find the efficiency of Eichhornia crassipes.

## MATERIAL AND METHODOLOGY:

The sewage sample was collected from Shelgi Nalaand near Old Pune Naka, Solapur (MS) India, using grab sampling method. The Eichhornia crassipes having Kingdom-Plantae, Subkingdom-Monocots, Division-Commelinids, Subdivision-Commelinales, Order-Pontederiaceae, Family-Pontederiaceae, Genus-Eichhornia and Species-E.Crassipeswas selected as test weed. Eichhornia crassipes, commonly known as Common Water Hyacinth, is an aquatic plant native to the Amazon basin, and is often considered a highly problematic invasive species outside its native range. It extremely high rate of development, Eichhornia crassipes is an excellent source of biomass. The roots of Eichhornia crassipes naturally absorb pollutants, including lead, mercury, and strontium-90, as well as some organic compounds believed to be carcinogenic, in concentrations 10,000 times that in the surrounding water. Water hyacinths can be cultivated for waste water treatment.

The Eichhornia crassipeswere collected from Sambhaji lake Solapur. Milk traysof 35 liter capacity having 66x10cm (width x height) size were used for the construction of treatment unit and array floaters having 54x11cm (width x height) size were used as floating bed. About 24 plants were planted in each array. Different dilutions of sewage viz., 0% (Control with only tap water), 20%, 40%, 60%, 80%, 100% adjusting the total volume to 25 L were prepared and tested for different timeperiods with the interval of 24 hours by the phyto-remediation treatment one after another in triplicate sets. The various physicochemical parameters of untreated and treated samples were tested and treatment efficiencies in terms of common physicochemical parameters are calculated.

## RESULTS AND DISCUSSION:

The treatment in phyto-remediation bed after the period of one day was highest at 40 and 60%. The reduction at 60% effluent concentration (Fig.1) after one day in terms of COD (42.8%) with considerable reduction in BOD(4.8%), nitrates (17.3%), phosphates (8.6%) and sulphates (16.52%) which improved with time than the other treatment concentrations and is represented in Fig. 2, 3, 4 and 5. The macrophytes have been reported to have higher purification efficiencies in waste water treatment. The horizontal hybrid models are suitable for phytoremediation in constructed wetlands where the soil environment favours the treatment process1-3. The phytoremediation treatment with suitable dilution is a viable technology for rural area if designed carefully with the selection of suitable aquatic weeds for the sewage treatment4-8. The treatment process is sustainable and workable in the highly polluted environment including the heavy metals and is useful for industrial effluent treatment process9-12. The present study reveals that the higher treatment efficiency can be achieved at 60% treatment concentration for sewage.

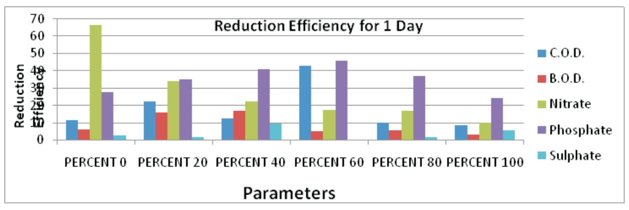


**Fig. 1: Reduction efficiency in terms of various parameters after one day.**

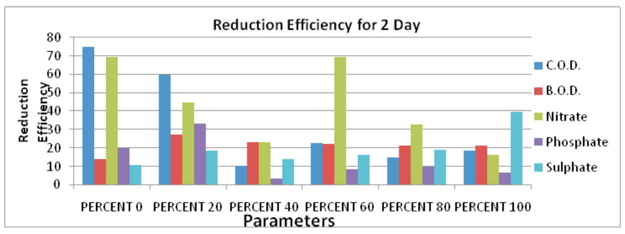


**Fig. 2: Reduction efficiency in terms of various parameters after two days.**

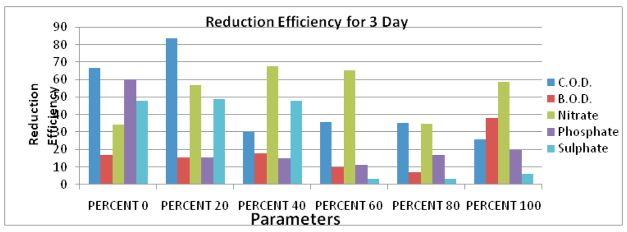


**Fig. 3: Reduction efficiency in terms of various parameters after three days.**

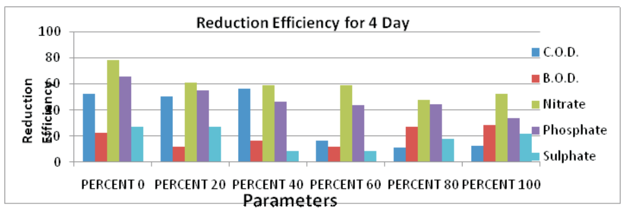


**Fig. 4: Reduction efficiency in terms of various parameters after four days.**

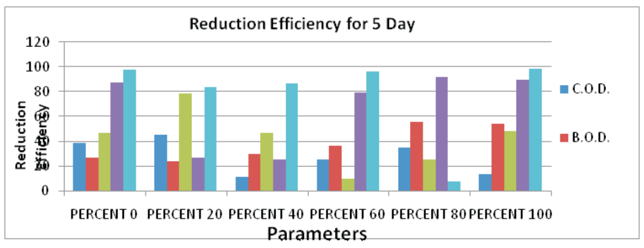


**Fig. 5: Reduction efficiency in terms of various parameters after five days.**

## CONCLUSION

The odour of the wastewater was the big problem as this water was directly used for the gardening purpose. After the successful execution of this project, the Nitrogen (Ammonia) in the water is totally extracted by the combination of vegetation which is mainly responsible for imparting pungent & irritating odour to the wastewater.

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