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Review and Study of Water Hyacinth and Their Application on Environment

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Abstract: ***Eichhornia crassipes, commonly known as (common) water hyacinth, is an aquatic plant native to the Amazon basin, and is often a highly problematic invasive species outside its native range. Day by day growth of water hyacinth is increased in maximum amount and it is a big challenge to control it. As per observation, it is clear that actual application of water hyacinth is useful in a number of the sector but no one can study its adverse effect on the environment. There are no. of research was carried out on that still it is not stated that how it will effect in the environment. This paper just goes for a review of water hyacinth at a different aspect.***

Keywords: Aquatic Plant, Growth, Water Hyacinth.

1. INTRODUCTION

The technology of using water hyacinth for the treatment of institutional wastewater is an alternative method to the conventional methods available. It is more cost effective. Through the use of water hyacinth, a considerable amount of BOD in the wastewater is biodegraded and mineral constituents are removed, however, the overall performance did not meet the required effluent standards laid down by the national regulatory body, National Environmental Safety and Regulations Enforcement Agency (NESREA). This was traced to a lack of adequate maintenance, the breakdown of the hardware, negligence by the operators and lack of proper maintenance procedures for dislodging and harvesting of the plant biomass. In order to make the wastewater suitable for disposal into receiving water body, the system needs to be upgraded and proper maintenance culture should be ensured with the adequate supervision of the Operation & Maintenance activities on the site.

2. LITERATURE SURVEY

1. **R. M. Kutty**, it was described Water hyacinth has been used in aquatic systems for wastewater purification for 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 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 a vast range of pollutants such as organic matters, nutrients, and heavy metals.

2. Piyush Gupta1,* Surendra Roy1, Amit B. Mahindrakar2 stated that Phytoremediation techniques for the treatment of different types of wastewater have been used by several researchers. These techniques are reported to be cost effective compared to other methods. Various contaminants like total suspended solids, dissolved solids, electrical conductivity, hardness, biochemical oxygen demand, chemical oxygen demand, dissolved oxygen, nitrogen, phosphorous, heavy metals, and other contaminants have been minimized using water hyacinth, water lettuce, and vetiver grass. In this paper, the role of these plant species, origin and their occurrence, ecological factors and their efficiency in the reduction of different water contaminants have been presented.

3. Chibueze G. Achi describes that Phytoremediation technology is an age-long concept, which utilizes aquatic or terrestrial macrophytes in the treatment of wastewaters. This study assessed the performance of a water hyacinth based wastewater treatment plant at University of Ibadan, Nigeria. This treatment plant was built with a view of treating institutional wastewater which was otherwise polluting the Awba lake, a source of drinking water on the campus. Wastewater samples were collected at the influent point (IP) and effluent point (EP) of the treatment plant. The samples were analyzed for physicochemical parameters, viz. Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Total Suspended Solids (TSS).

4.D. L. Klass and S. Ghosh stated that Water hyacinth (Eichhornia crassipes) is an aquatic biomass species that exhibits prolific growth in many parts of the world. It has been suggested as a strong candidate for the production of methane because of high biomass yield potential. Several studies have been carried out which establish that methane can be produced from water hyacinth under anaerobic digestion conditions. Both batch and semicontinuous digestion experiments were performed. The highest apparent gas yields reported were obtained in the batch mode of operation over long detention times, but the yields were based on wet hyacinth containing unspecified amounts of water and ash.

5. Y. Nuraini *, M. Felani stated that The objective of this study was to elucidate the possible phytoremediation of liquid waste of tapioca industry using Eichhornia crassipes prior its usage for watering maize grown on an Entisol of Malang. Tapioca liquid waste was mixed with pure water at various concentrations and then Eichhornia crassipes was grown on a water bath filled with the mixture. After twenty-eight days, the mixture of tapioca liquid waste and pure water was analyzed for BOD, COD, DO, TSS, CN, total N, and total P, prior to its usage for watering maize grown in a pot filled with an Entisol. Results of this study showed that during twenty-eight days Eichhornia crassipes grown on 25% tapioca wastewater was capable of reducing BOD, COD, and CN concentrations of the liquid waste and to increase pH of the mixture of liquid and pure water. This has resulted in a significant increase of maize growth.

6. Trinidad Ruiz Téllez* stated that the recent invasion of water hyacinth Eichhornia crassipes (C. Mart.) Solms (1883) in the Guadiana River Basin (Spain) is described and the distribution of this Amazonian floating plant is analyzed from a geobotanical and chronological perspective. Georeferenced locations of invasion in Spain and Portugal are presented and the relative growth rate (RGR) and doubling time (DT) indexes defined by Gopal (1987) were calculated. The sexual reproductive cycles were determined in order to evaluate the invasive capacity at these latitudes. Predictive models of the plant's potential distribution in the Guadiana River were constructed based on expert knowledge and using a Geographic Information System, on the basis of the water's physicochemical parameter.

7.Paul Njogu1*, Robert Kinyua1, Purity Muthoni1, Yusuyuki Nemoto2 state that Water Hyacinth, *E. crassipes*, an invasive water weed thrives in fresh water bodies causing serious environmental problems. In Kenya the weed has invaded Lake Victoria and poses great socioeconomic and environmental challenges. Currently, the weed is harvested from the Lake and left in the open to rot and decay leading to loss of aesthetics, land and air pollution. There is, therefore, need for the development of value addition and economic exploitation strategies. The aim of the study is to assess the potential for utilization of the weed as a renewable energy resource for biogas production. Samples were collected from Lake Victoria, pulped and blend with cow dung at a ratio of 3:1 as inoculum. The resultant mixture was mixed with water at a ratio of 1:1 and fed into a 6 m3 tubular digester. The digester was recharged with 20 kg after every three days. The temperature, pH variations, gas compositions, upgrading and gas yields were studied. The temperature ranged between 22.8˚C - 36.6˚C and pH 7.4 - 8.5. Biogas was found to contain 49% - 53% methane (CH4), 30% - 33% carbon dioxide (CO2), 5% - 6% nitrogen (N2) and traces of hydrogen sulphide (H2S). The biogas was upgraded using solid adsorbents and wet scrubbers increasing the methane content by up to 70% - 76%. The upgraded gas was used to power internal combustion engines coupled to an electricity generator and direct heat applications. The study concludes that *E. crassipes* are a potential feedstock for biogas production especially in areas where it is abundant

CONCLUSION

As per above discussion, it is clear that there is a number of application of water hyacinth used for a different area. As water hyacinth is used for water purification process and removal of heavy metals from waste water. Sometimes ut is also clear that phytoremediation techniques are reported to be cost effective compared to other methods. Various contaminants like total suspended solids, dissolved solids, electrical conductivity, hardness, biochemical oxygen demand, chemical oxygen demand, dissolved oxygen, nitrogen, phosphorous, heavy metals, and other contaminants have been minimized using water hyacinth.

Fig no: 1 Water Hyacinth Grow on River

REFERENCES

[1] Hellmann, JJ; Byers, JE; Bierwagen, BG; Dukes, JS (2008). Five potential consequences of climate change for invasive species. Conservation Biology 22: 534-543.

[2]Ho, YB; Wong, WK (1994). Growth and macronutrient removal of water hyacinth in a small secondary sewage treatment plant.Resources, Conservation and Recycling.

[3]S. R. M. Kutty, S. N. I. Ngatenah, M. H. Isa, A. Malakahmad Civil Engineering Department, Universiti Teknologi PETRONA, World Academy of Science, Engineering and Technology 60 2009

[4] Jayaweera M.W and Kasturiarachchi J.C, (2004). "Removal of Nitrogen and Phosphorus from industrial wastewaters by phytoremediation using water hyacinth (Eichhornia Crassipes)". Journal of Wastewater science and technology. Volume 50, No. 6: Page 217 – 225.

[5] Nesic N. and Jovanovic L. (1996). "Potential Use of Water Hyacinth (E. Crassipens) for Wastewater Treatment in Serbia". Journal of Wastewater treatment using the Aquatic plant.

[6] Paul Njogu1*, Robert Kinyua1, Purity Muthoni1, Yusuyuki Nemoto2 Biogas Production Using Water Hyacinth (*Eicchornia crassipes*) for Electricity Generation in Kenya

