A Wetland Hybrid Reactor from locally Available Material to Treat Organic waste

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Abstract **- The first experiment using wetland macrophytes for wastewater treatment were carried out in Germany in the early 1950s. This study helps to keep stable environment and social considerations to the decision-making process so that more sustainable solutions can be achieved.**
The classification of constructed wetland is based on the vegetation type (emergent, submerged, floating leaved, free- floating), hydrology (free water surface and subsurface flow) and subsurface flow wetlands can be further classified according to the flow direction (vertical or horizontal).

Index Terms **- constructed wetland, macrophytes, nutrients, organics, wastewater.**

I.INTRODUCTION

As well as we know food Shelter, and cloth are the Basic need of human For Food Energy, Water is an important source is to be Considered. In Earth filled about 71% Of Water but among them Only 3% of water is available for portable for used. So, water is the major issued among all of them. The polluted water how much Quantity of wastewater very bad effect on Human health. Let us Consider from one example from Nagpur City about 595 Sewage is generated, so we can imagine so how much Quantity of Sewage from All over world .As per survey if NMC ,Sanitation Department approximated 1225 M tone in 2018-2019 as a average about from every home 2.22 Kg Garbage generated .The city generated about 525 millions of liquid waste everyday Due to which this is bigger issue for the Human health due to lack of improper Domestic waste system in according to survey of India about 38255 million liters of sewage produce daily from which only 22 % of sewage in being treated. There area the various method for waste water treatment such as Biological water treatment, Physical water treatment, Chemical water treatment, Activated Sludge Process (ASP). From the waste generated Biogas, which is used as Methane by using anaerobic condition, Generation of Energy from Organic waste is the best way is to reduce, reused the Organic waste therefore continuous effort is to be carried out for improvement of wastewater treatment process. Constructed Wetland (CWs) are Engineered system that have been designed and constructed to utilize the natural processes involving wetland vegetation, soils, and the associated microbial assemblages to assist in treating waste H2O. They are designed to take advantage of many of the same processes that occur natural wetland but do so within a more control environment. CWs for wastewater treatment may be classified according to the life from of the dominating macrophytes, into system with free floating, floating leaved, are rooted emergent and submerged microphyte. Further division could be made according to the wetland hydrology (free water surface and sub surface system) and subsurface flow CWs could be classified according to the flow direction (horizontal and vertical) A Hybrid Wetlands Reactor (wetland system) is generally used to treat organic waste water, in this study we have focused on parameters like PH , TDS, BOD,COD, NITRATE and compare their results observed in different research paper and set a conclusion of Hybrid Marshland how this reactor improve the quality of waste water and helpful to reuse.

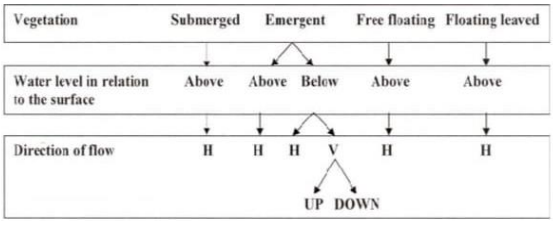

Figure No 1-: The major characteristics of various type constructed wetland for wastewater treatment. H=Horizontal, V=Vertical.

II. OBJECTIVE

A. To identify the best feasible solutions for the wastewater management.
B. To satisfy the parameters of effluent wastewater using filter media prepared from recyclable solid waste material.
C. Design of effective influent reactor consists of multiple filter media for the treatment of wastewater.
D. To improve efficiency of traditional filter reactor by making sustainable changes.

III.CONSTRUCTED WETLAND

Free water surface constructed wetland (FWSCW) FWSCW is consist of shallow basin that fillet by various materials, commonly soil. Sand and gravel that supports the root of plants and wastewater flow direction are normally arrange horizontally (Kadlec and Knight, 1996). 1.2 subsurface flow constructed wetland (SSFCW) in SSFCW, wastewater surface each usually below of the surface of media matrix.
In this system, media material is an important factor because it could avoid clogging to ensure and sufficient hydraulic conductivity (Kaseva, 2003). The different types of CWs could be combine together on various configuration to formation combine -system, which called "Hybrid Constructed Wetland". Hybrid CWs are used to achieve higher efficiency wastewater treatment rather than single CW, particularly in removal of nutrients component. Many configurations would be design for hybrid CWs, such as series FWS and SSF, Vertical SSF(HSSF). Further researches were perform to evaluation of hybrid CWs application for different wastewater treatment. In hybrid systems, the advantages of various system can be combine and improve the wastewater treatment plan efficiency. For example, the total nitrogen (TN) removal needs an/anaerobic condition which would be provided by combination of FWS, VSSF (aerobic condition) and HSSF (anaerobic condition) (VYMAZAL, 2005).

2. Methodology than potential of hybrid CWs wastewater have evaluated in some to stage HF-VF hybrid constructed wetland based on brix and Johanson: VYMAZAL (2005). The two-stage horizontal-vertical-flow constructed wetland system consist of three basic units (BRIX and JOHNSON 1999): A mechanical -treatment step, usually a two or three-chamber settler, for removal of large particles and settleable matter. A horizontal subsurface flow sand or gravel- based constructed reed bed for TSS and BOD removal (and denitrifications if recirculation each applied). An intermitted- loaded vertical flow constructed wetland for nitrification.

IV.LITREATURE PAPER

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9) Constructed wetlands: a review (International Journal of Environmental Studies), MaklasScholz and ByoungHwalee, January 2005, They have studied about the constructed wetland method from various research papers. They studied about the properties of wastewater and compare the result before experiment and after the experiment in constructed wetland. A high variability of the heavy metal removal efficiencies in constructed wetlands has been reported.

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V.RESULTS

Results of different parameter in 4 week of the waste water by using constructed wetland method by typhalatifolia and the parameters are pH , BOD , COD and Turbidity .

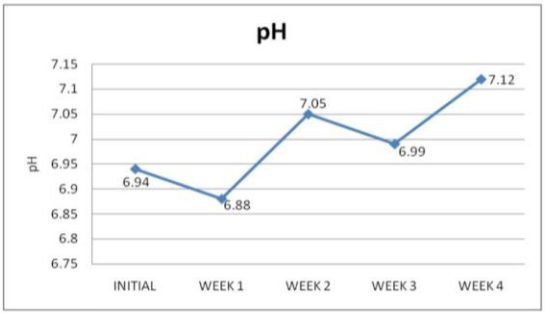

Fig . Variation of pH in the sample

The pH value of sewage has been increasing and decreasing every week without any perfect pattern. While comparing the pH value of the initial and the final week there is an increase in the pH value from 6.94 to 7.12.

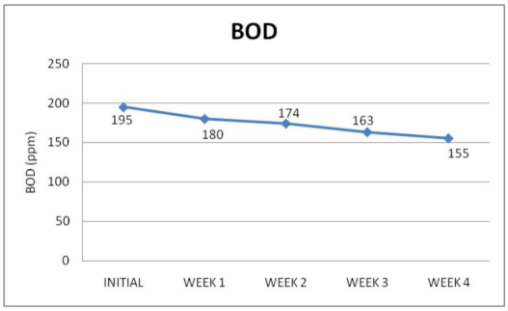

Fig. Variation of BOD content in the sample

BOD is one of the major parameters that has been reduced in the CW system. It has been reduced from 195 ppm during the time when the plant is planted in the sewage at a rate of 20.51% to a value of 155 ppm by the final week. This reduction in the BOD value

indicates that Typhalatifolia is effective in the treatment of sewage since BOD is one of the major parameters to be minimized in the treatment process of water.

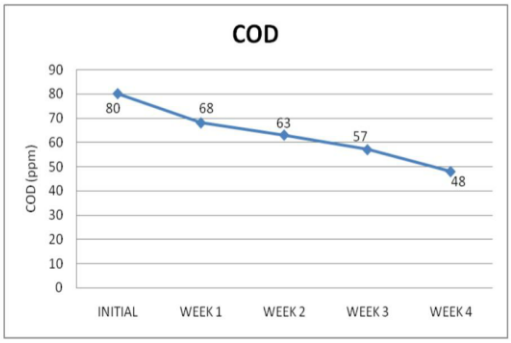

Fig. Variation of COD content in the sample

Along with the BOD reduction, the CW system has also reduced the COD content in the sewage water at a rate of 40% from 80 ppm at the initial week to value to 48 ppm during the week 4.

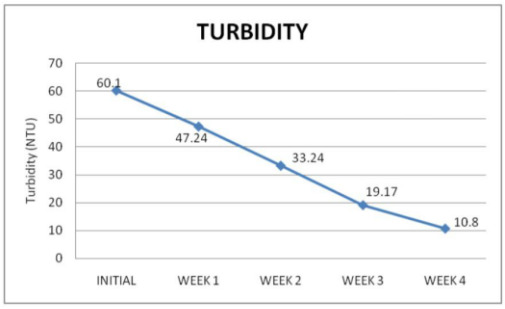

Fig. Variation of turbidity in the sample

The turbidity value of the sewage water was as high as 60.1 NTU before the water was used in the CW setup. The CW setup with Typhalatifolia has considerably reduced the turbidity of the sewage water as the weeks pass by. At the end of the 4th week, the turbidity value has considerably reduced to 10.8 NTU which is about 82.02% lesser than the initial value.

VI.CONCLUSION

In the contexts of constructed wetland methods, we observed during the study of this method that effectiveness over the treatment and management of wastewater with the conclusive experimental results are very much impressive. Most of the important wastewater parameters get satisfied during the treatment through this method. Economy and efficiency of this method is satisfactory as per the results and cost of construction and maintenance in various experimental studies.

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