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Construction of Wetland as a Biological Unit in Phytorid Technology

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Abstract: ***Now a day, there is the scarcity of water , to overcome this there should be the reuse of water which is already used. The phytorid technology is the constructed wetland in which the wastewater treatment done in the biological unit. Phytorid technology is a patented technology and it is very effective in water waste water treatment. that means its sustainable treatment of wastewater . by considering this growing pollution of water bodies due to discharge of waste in them, it is necessary to initiate alternative thinking as conventional methods through STPs that is Sewage treatment Plants have there is a need it required less energy and natural treatment. This study is basically focused on natural plant that it is eco-friendly system it is good for developing countries.***

I. INTRODUCTION

A. General

The traditional wastewater treatment methods like used for treatment of contaminated water these are chemical, physical, and microbiological methods , this are costly to installed and operate also.Some are the biological unit are advanced wastewater treatment (active sludge treatment, microbial treatment, chemically enhanced primary treatment - CEPT, advanced integrated pond system - AIPS, aerated and non-aerated lagoons, etc.) . this methods are found to be more best than conventional treatment . this treatment contain physical, chemical and microbiological processes but the problem is that it require skilled , perfect technical knowledge and investment is too high for establishing that type of plant in small scale.so on small basis investment for waste water treatment plant the phytorid technology is good.

B. Phytorid Technology

This phytorid technolody is based on the Phytoremediation . Phytoremediation is ris the popular wastewater treatment systems in which constructed wetland (CW) systems is used. Phytoremediation utilizes plants to decontaminate water environment and is very cost effective and treatment process. It requier minimum technical skill during selection of the plant variety to be used and its way of plantation is simple.[1]

Phytorid - this systems are based on natural treatment methods such as filtration, Sedimentation , nutrient uptake by plants and microbial action in a constructed system which is filled with media. Specifically, identified three species of plants which are known to have good nutrient uptake rates are planted in the phytorid bed.

Constructed Wetland is essentially a civil structure. These are constructed tank as vertical BED with under gravity flow. The phytorid Technology is a subsurface flow type wherein water is applied to the beds filled with porous media such as gravel and stones. The hydraulics is maintained in such a manner the whole plant should be in under gravity manner.

screen chamber => sedimentation tank oil and sump removal => phytorid BED

General layout of Phytorid SWAB waste water treatment plant

II. LITERATURE REVIEW

A. Horizontal Subsurface Flow CW (HSSF CW)

Study about the development and evaluation of a pilot horizontal subsurface flow constructed wetland (HSSFCW) for removal of biochemical oxygen demand (BOD), chemical oxygen demand (COD), total dissolved solids (TDS), total nitrogen (TN) and total phosphorus (TP) from primary piggery wastewater. In their report they used two locally available plants, Pennisetum clandestinum and Pennisetum purpureum, were planted in two of three cells while the remaining unplanted cell served as the control. Monitoring of the wetland influent and effluent wastewater was carried out every two weeks for 7 months. [3]

B. Vertical Subsurface Flow CW (VSSF CW)

A vertical flow (reed bed) constructed wetland was used for treating bio-solid and gray water.Their results present a positive performance in treating the bio-solids and well_stabilized accumulated organic material in the bed formed fertile soil. Moreover, using vertical flow reed bed of liquid waste treatment showed removal of around 70% of organic matter indicator Biological Oxygen Demand (BOD5) and Chemical Oxygen Demand (COD). [8]

C. Improved System RVFCW

Study about A full-scale Vertical Flow Constructed Wetland (VFCW) was designed, built, and put into operation in Oman to provide a sustainable wastewater treatment solution within the Middle Eastern context. The VFCW had two stages (vertical flow 1 and 2; called VF1 and VF2, respectively) with a total treatment area of 995 m2 and was planted with common reeds, while the treated effluent was recirculated to an anorexic tank. The VFCW was continuously fed with high_strength domestic wastewater for 1.5 years . [14] . It says Water is used for a variety of domestic and industrial purposes. Due to the rapid growth of industry, the water in polluted urban areas does not melt goods and ingredients turn into dirty water. Now the world of the day is in conflict major water challenges. With proper use of water, it is important to receive it properly describe cost effective methods using natural resources. The water is dirty they are also used after performing certain medical procedures.[12] .“Phytorid technology based” It states that in developing countries, especially India, a large part of people do not have access to safe drinking water. ‘Phytorid Technology’ is patented technology and efficiency in water pollution. It helps a second time too high municipal wastewater treatment, sludge management, industrial treatment or agricultural wastewater and rewarding treatment are discarded. [1].

III. CONSTRUCTION

This is the frist part of the project . in which the model that is prototype is constructed, this is the initial stage of actual work of project. After study literature review it was decided that the project should be in the two stages:

1) Construction of wetland
2) Comparative analysis on the basis of various parameter of three CW by plating different different plant species as mention above.

This chapter include that details of construction of model .

A. Screen Chamber

The kitchen canteen waste water is separated by using bar screens of 5 mm and 3 mm aperture size. can function properly. Wastewater is then pumped using a sump into the sedimentation tank.dimension of screen chamber- cubical type of box made by steel .

Length - 1.5m ,width - 0.65m, height- 0.4m

Size of seive/mesh - seive is 10mm, second seive 4mm

B. Sedimentation Tank , Oil & Grease Removal System and Sump

The specified design of sedimentation system allows suspended solids to settle down in the tank and achieve simultaneous removal of BOD .The specified design (as shown in figure below) of sedimentation system allows suspended solids to settle down in the tank and achieve simultaneous removal of BOD (by more than fifty per cent). This would require no pH adjustment and clarification system to remove settled solids if domestic wastewater treatment is being targeted. and basically this unit is of circular tank of steel which has sloppy base at which the sump is removed. and at the top it has the outlet for oil and grease remove [1inch dia pipe] and below that pipe again the outlet for the water, which do irrigation to three phytorid BED.Dimension of sedimentation tank - 80cm diameter, having 1.5m height.

C. Phytorid BED / Constructed wetland

The specified design (as shown in figure below) of sedimentation system allows suspended solids to settle down in the tank and achieve simultaneous removal of BOD (by more than fifty per cent). This would require no pH adjustment and clarification system to remove settled solids if domestic wastewater treatment is being targeted. and basically this unit is of circular tank of steel which has slopy base at which the scump is removed. and at the top it has the outlet for oil and grease remove [1inch dia pipe] and below that pipe again the outlet for the water, which do irrigation to three phytorid BED The bed works on the principle of sequential aerobic treatment. the construction of this bed is done by using following materials. similar three BED are constructed .

Colocasiaesculenta, Canna indica ,Spider lily.these type of plant where suggested as it good work in phytorid system.

D. Proposed Applications

For the treatment of wastewater generated in the form of: domestic wastewaters - that is the eastablishment of that plant is the premices of GCOEA, by using canteen kitchen wastewater.

Phytorid plant

IV. RESULTS

The result are below BOD ,COD and suspended solids are removed as follow. The testing is done to compere the outlet and inlet sample.

Treatment efficiency of Phytorid system

Pollutant	Performance(%removal)
Total suspended solids	75-95
Biochemical oxygen demand	80-93
Chemical oxygen demand	85-95

V. ADVANTAGES OF TECHNOLOGY

1) No requirement of electric power .
2) No need of skilled operation.
3) Negligible sludge production.
4) No odour. is form.
5) The application chemicals is not required
6) Lower costs of treating water

VI. LIMITATIONS OF THE TECHNOLOGY

The maintenance of that plant should be periodic .
The land requirement is high as compared to biological treatment.

VII. OPERATION AND MAINTENANCE

Uniform flow should be maintain .
required inert materials..
Sampling of inlet and outlet will be carried out for a period of 1 week every

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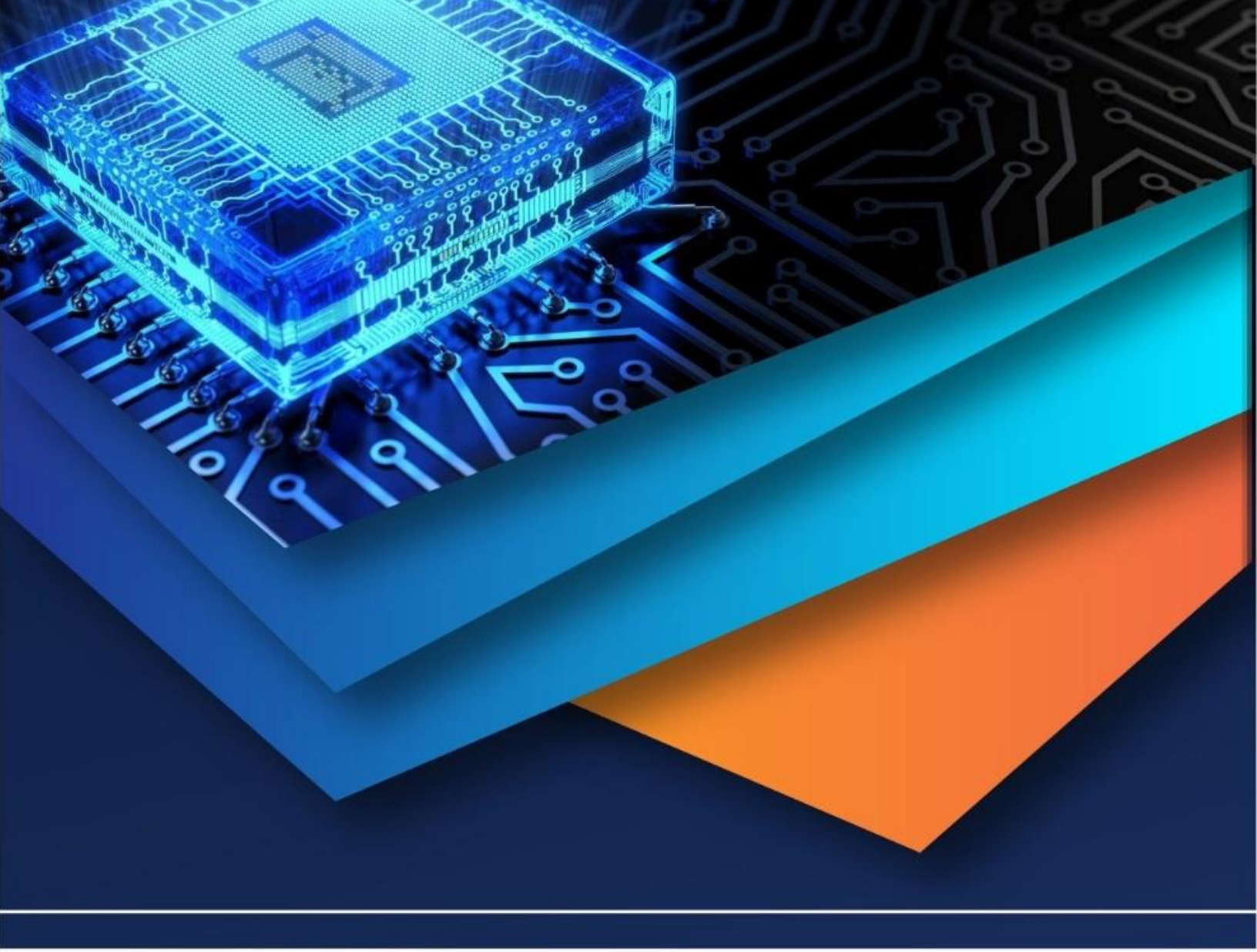

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