Implementation of Sewage Treatment Plant by using Phytorid Technology

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***Abstract*— The growing population, urbanization, economic and industrial development are not only putting pressure on the water resources in terms of quantity, pressure is increasingly in terms of quality.Mainly Domestic sewage, industrial effluents and agriculture and mining runoff cause severe water pollution. Besides competition among the different users for scarce water resources one of the most pressing problems in the cities is the lack of sanitation and inadequate treatment facilities, resulting in severe water pollution, posing health and environmental risks.The Major finding or issues surveillance of STP's in Major Indian cities are around 95% of the systems are not fully functional, Interrupted operation due to frequent power failure, Hydraulic or organic overloading, Inadequate oxygenation due to power failure and mechanical breakdown of aerators, uneven sewage distribution, difficulties in sludge handling and financial difficulties.**

I. INTRODUCTION

The availability of various treatment technologies to be potentially applied for the treatment of urban wastewater is very large. The decision regarding the process to be adopted should be derived from a balance between technical and economical criteria, taking into account quantitative and qualitative aspects of each alternative. There are no such generalized formulas for this but in metro city like Mumbai; some criteria should be taken into account like treatment efficiency and reuse, capital cost, power consumption, land requirement, operation and maintenance cost, sludge disposal, manpower requirement and most important environmental impact.

The 'Phytorid Technology' is a combination of the physical, chemical and biological processes which resulted into ultimate treatment for the waste water. This particular technology works without electricity, minimum maintenance, less manpower and importantly self sustainable.

'Phytorid Technology' is being very, effective in water pollution control as it functions as "pollutant" sinks for sediment, nutrients, and metals. There are different mechanisms plays an important role in treating waste water in the wetland, principal measures are sedimentation,bacterial action, filtration, decomposition, nutrient uptake and vegetative system.

The system comprises of a sequence of two independent cells.**Advanced Filter Cell (AFC),** that supports a permutation of different sizes of stones and gravel wherein anaerobic digestion occurs **Phytorid Treatment Cell (PTC)** made up of different layers of life supporting media (Gravel) as in AFC, planted with wetland plants.

'Phytorid Technology' can treat the wastewaters by naturally without the addition of chemicals. It has been accomplished with the use of aquatic or semi aquatic plants along with their associated biota. 'Phytorid Technology' is an improved wetland ecosystem for treatment of wastewater. It involves proper utilization of biological treatment capacity with optimized engineering parameters.The filterable wetland will be sown with aquatic and/or semi-aquatic plants where wastewater will flow in through vertical and horizontal specially designed units for better hydraulics and adequate retention period. These units will be designed and evaluated for its efficiencies with regard to removal of BOD/COD, suspended solids, phosphorous, nitrogen and fecal coliforms. It is useful for secondary and tertiary treatment of municipal wastewater, management of sludge, treatment of industrial or agricultural effluent as well as for the treatment of landfill leachates.

II. OBJECTIVE

• The general objective is the removal of suspended and floatable material, treatment of biodegradable organics and the purging of the pathogenic microbial flora.

III. TYPICAL DESIGN FEATURES

The Treatment methods are usually classified as physical, chemical and biological (Figure 1).

The 'Phytorid Technology' is the combination of all these three processes needs in the treatment of sewage. The general concept design for the 'Phytorid Technology' is 'Advanced Filter Cell (AFC), that supports a permutation of different sizes of stones and gravel wherein anaerobic digestion occurs and Phytorid Treatment Cell (PTC) made up of different layers of life supporting media (Gravel) as in AFC, planted with wetland plants (Figure 2) and Final Collection Cell (FCC).Nevertheless the design may be further modified as per specification and land availability.

The system with subsurface flow type is proposed for the treatment of the sewage or for domestic wastewater. The system consist baffled basin or a channel with a barrier to prevent seepage along with suitable depth of porous media which also serve the purpose of support for growing plants in the treatment cell. The design of the subsurface flow system assumes that the water level in the cell will always remain below the filter media.

The vegetation to be utilized in the said technology is a very important aspect as far as treatment is concern. Various aquatic and non aquatic species have been utilized to attain maximum efficiency in the treatment of domestic waste water. The plants include Phragmites australis, Phalaris arundinacea, Glyceria maxima, Typha spp., Scirpus spp., Canna spp., Typha spp. etc.

The waste water treatment is dependent on both plant species and microbial consortia that specific to the used plant system. So the ultimate removal of the organic and inorganic load from the waste water is the consolidate effect of the biota.

IV. METHODOLOGY

The treatment system shall comprise Advance Filter Cell (AFC) along Phytorid Treatment Cell
(PTC) for flow of 180m3/d + 75 m3=255 m3 /day.

V. ADVANTAGES OF TECHNOLOGY

The waste water treatment with PHYTORID TECHNOLOGY is easy, efficient; require less manpower, and totally sustainable method to the all conventional methods.

Technology is cost effective and efficient in the removal of faecal coliforms, BOD, COD, nutrient are up to 95 percent, which is higher than traditional methods.

The system used natural vegetation and the plant specific associated micro biota, as leads to eco-friendly sewage treatment technology.The area occupied by the treatment system also improves the aesthetic of the surrounding area.The subsurface flow treatment is totally free of mosquitoes and odour nuisance.The treated water can be used for enhancement of environmental architecture such as road side fountains.

The effluent can also be used for irrigation, gardening, toilet flushing etc.

The treated water achieves the permissible limit for sewage discharge in the fresh and marine water body

VI. TREATMENT EFFICIENCY

The 'Phytorid Technology' being natural method, the treatment efficiencies for removal of different pollutants are given in Table 1. The tabulated efficiency will be achieved after the system is stabilized which may required a period of one month after commissioning.

Table 1: Performance of system for urban waste

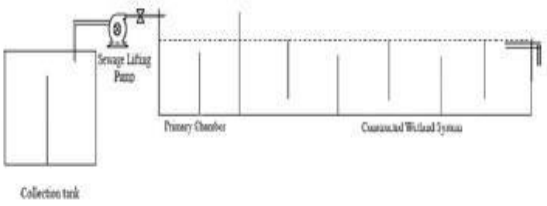
Pollutant	Performance (% removal)
Total suspended solids	75-95
Biochemical oxygen demand	80-96
Chemical oxygen demand	80-94
Total nitrogen	80-92
Phosphate	80-92
Fecal coliforms	85-95

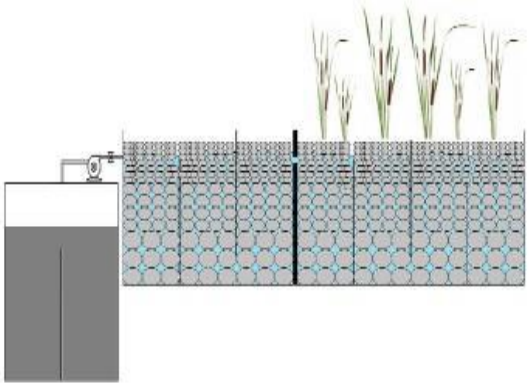
VII. OPERATION AND MAINTENANCE

The technology is natural treatment system, as the result operation is mostly passive and requires little operator intervention. Maintaining uniform flow across the treatment cells through inlet and outlet

adjustment is extremely important to achieve optimum treatment performance. Sampling of inlet and outlet will be carried out for a period of 6 months for every month.

VIII. CONCEPTUAL DESIGNS





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