Phytorid Technology

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Abstract- *The waste water from a society including excreta will be collected, carried and disposed to a safe point of disposal. This primitive method of collecting & disposing of wastes, has now been modernized & re-placed by a system, in which these wastes are mixed with enough quantity of water & carried through closed conduits and under the conditions of gravity flow. This sewage is disposed of, after giving it suitable treatments. The treated sewage effluents can be disposed of either in a running body of water, such as a stream, or can be used for irrigating crops. However, India being a devel-oping country, still uses the old conservative system at various place, particularly in villages & towns. The metropolitan cities &few bigger towns of our country, no doubt, have generally equipped with more facilities of the modern water carriage sewerage system which require lot of funds and space availability.*

Phytorid technology is a type of system, which reduces the impact of sewage water and converts it into useful water for gardening as well as irrigation purpos-es.

Hence, it is decided to work on the project of Phytorid Technology in order to reuse the wastewater generated in society and to reduce the cost of sewer systems.

I. INTRODUCTION

Primary water source is likely to be polluted to a great extent through discharge of harmful substances. It is estimated that at every 1 m3 of contaminated water once discharged into water bodies will also contaminate further 8 to 10 m3 of pure water. Out of 31 diseases that are major cause of death in developed countries, from which 21 are due to contaminated water. The above facts highlights the need to find improved water treatment to meet the problems of food security, water availability and also use of water efficiently. It is beyond any doubt that the energy will be the main concern of the nations in coming years.

Identification and adoption of the appropriate technology to overcome these pressures is therefore essential. The object of sewage treatment is to stabilize the organic matter present in a sewage to produce an effluent liquid and sludge, which can be disposed-off into environment without causing health hazard or nuisance. The endeavour should be adopt modern and cost- effective technologies and equipment to achieve value for money and also maximum user satisfaction.

The septic tanks which treat the sewage water by pure anaerobic process can be considered as preliminary STP. The requirement for a better treatment of sewage coupled with a development of technology lead a way forward towards the aerobic process. This requires pumping and blower operation which is energy consuming process. Thus, conventional STP requires the energy for achieving better results. The aerobic process requires oxygen which is provided to the bacteria.

It is important to appreciate the fact that only 3% of the world's water is fresh & roughly one-third of it is inaccessible. The rest is very unevenly distributed & the available supplies are increasingly contaminated with the waste & pollution from industry, agriculture & households.

Over the years, increasing population, growing industrialization, expanding agriculture & rising standards of living have pushed up the demand for water. Efforts have been made to collect water by building dams & reservoirs & creating ground water structures as wells. However, there is a growing realization that there are limits to „finding more water"& in the long run, we need to know the amount of water we can reasonably expect to tap & also learn to use it efficiently. Hence, it very essential to reuse the wastewater for various purposes using various advanced techniques from which Phytorid technology is the one.

II. PHYTORID TECHNOLOGY

Phytorid Technology (Constructed Wetland Technology) is self-sustainable technology for wastewater treatment that mainly works on the principals of natural wetland. The technology is a complex ecosystem which acts as a nutrient sinker and remover. This technology is designed to treat wastewater from small houses, residential societies, hotels, commercial complexes and municipal sewage and also pretreated industrial effluent. Phytorid uses natural mechanisms to treat the wastewater and it is a low cost, natural and efficient alternative to the conventional energy intensive options. Earlier, this technology has been tested and also used to treat the lakes, nallahs, domestic wastewater, industrial effluents but has not been tested for its application on tall residential buildings making this research unique. The study includes the application and feasibility of Phytorid system and its integration into one of the tall residential building in Mumbai, a growing urban center of India.

Fig: Aesthetic View of Phytorid Bed

SALIENT FEATURES OF PHYTORID TECHNOLOGY

- Phytorid technology is Cost effective.
- Phytorid technology requires Negligible operation and maintenance expenses.
- Phytorid technology has Minimum electricity requirement.
- Phytorid technology facilitates recycle and reuse ofwater.
- Phytorid technology has No foul odor and No mosquito nuisance.
- The possibilities of local reuse and recycle of treated wastewater are as follows:
- Phytorid technology can be reuse for non-potable purposes such as toilet flushing, carwashing, horticulture/gardening and groundwater recharge and such other uses.
- Reuse inland scape and agriculture-commercial nurseries, parks/gardens, roadside / roadway median strips, golf courses, green belts and irrigation.
- Phytorid technology Recreational / environmental uses development of fisheries, ponds, lakes replenishment, marshes and wetlands.
- Aquifer recharge – for replenishment and sustainable ground water use.

III. MATERIALS&METHODOLOGY

3.1-MATERIALS USED:

Various materials used for the development of Phytorid bed are as follows:

Coarse Aggregate of 20mm effective diameter: It is used for road construction as a lower layer beneath the asphalt surface. Currently this fraction is the most commonly used in the Ukraine's construction industry. It is used both for small private construction as well as for construction of large industrial spaces. Aggregates of this fractions are used as sub-bases in construction of highways and railways and in production of concrete and massive structures from reinforced concrete. It is used as the filler for parking areas and bases for foundations when building work areas for the operation for heavy construction machinery and as filler for increased strength concretes

Coarse aggregate will be provided at a layer of 200mm as base layer and will be collected from college site

Fine Aggregate (Fine sand) of 2.36 mm size*:* When the aggregate is sieved through 4.75mm sieve, the aggregate passed through it called as fine aggregate. Any Natural sand is mainly used as fine aggregate, silt and clay also come under this category. The soft deposit consisting of sand, silt and clay is also termed as loam. The purpose of any fine aggregate is to fill the voids present in the coarse aggregate and to act as a work ability agent.

Fine aggregate will be provided at middle layer of 200mm as middle layer and collected from college site.

Coco-peat soil: Coco-peat is a multipurpose growing medium made from coconut husk. This fibrous coconut husk are usally pre-washed, machine dried and also made free from any impurities such as sand and other contaminations like plant and animal residue. Coco-peat is also a very good alternative to traditional peat moss and Rock wool. Its air-filled porosity and also high-water holding capacity make it an ideal growing medium for the plant crops. It is 100% organic and also ecofriendly, free from soil borne pathogen and weed.

It will be provided at top layer at 200mm &will be bought from nursery.

Garden-Soil is a mixture of organisms, minerals, liquids, minerals, gases and organic matter that together support life. Earth's body of soil, also called as pedosphere, has important functions such as a medium for plant growth, as a means of water storage, supply and purification, as a modifier of Earth's atmosphere, also as a habitat for organisms. Darkened topsoil is also called as garden soil.

It will be mixed in some quantity with coco-peat.

3.2-PLANTS USED:

Bamboo palm: It is the most sustainable bio resource. It is also the fastest growing plant in the world having advantage over deforestation. It also has excellent absorbent capacity which makes it useful in cosmetics. It is capable of

removing harmful gases and absorbs unpleasant smell from surrounding that is why it is used in refrigerators and deodorants. It has highly porous structure and it has ability to trap many harmful compounds in it. It adsorbs benzene, ethyl benzene, methanol, ammonia, 2, 4-di-chlorohydroxylbenzene and chloroform. Because of these ultimate properties, bamboo palm is used in purification of water and wastewater treatment. Experiments also showed that biological bamboo charcoal can remove arsenic and fluoride ions completely from water in single run. In present scenario every country is facing scarcity of clean water and billions of moneys is invested in the treatment of waste water, as well as in purification

fig; bamboo palm

CannaIndica: Canna Indica is a perennial growing to between 0.5m and 2.5m, depending on its variety. Canna Indica can be used for the treatment of industrial waste waters efficiency under conditions of low water and N availability but rapid growth and resource use under conditions of high water and N availability. For such flexibility in resource use can allow Pampas grass to persist in low-resource environments and expand as resource levels increase.

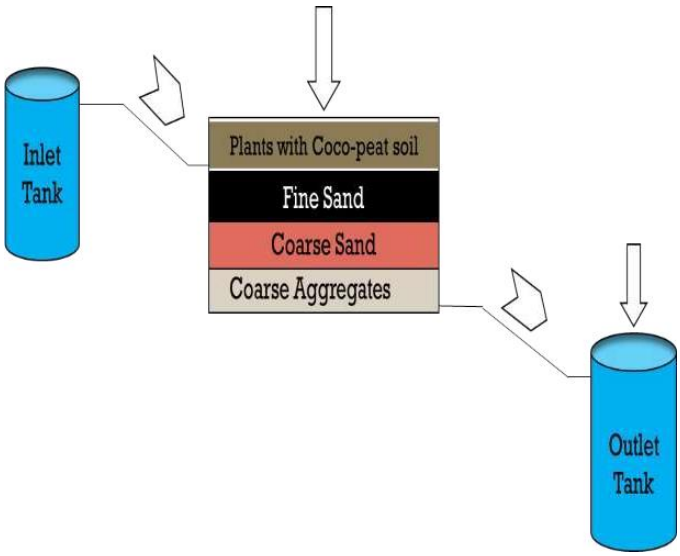
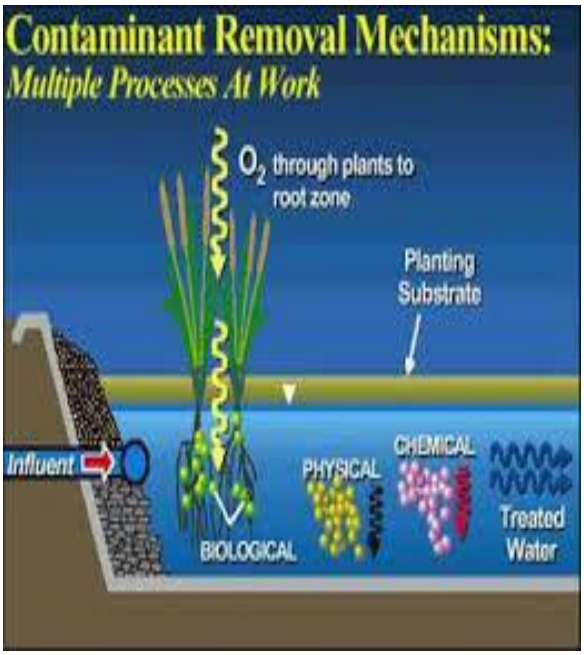


Fig:Phytorid setup

IV. METHODOLOGY

- Pre-treatment of waste-water sample will be carried out.
- Aggregates will washed with water thoroughly.
- Phytorid Bed will be prepared :
  Bottom Layer: Coarse Aggregates (200mm).
  Middle Layer: Fine sand (200mm)
  Top Layer: Plants with Coco-peat, soil (100mm).
- Sample will be collected in 20 litres bucket and allowed to flow through pipe under gravity in the phytorid bed.
- Later immediate sample will be collected.
- 24 hours Sample will be also collected.
- Collected samples will be tested for BOD, COD, TDS, Ph, DO.

Then values of pre-treatment and post-treatment will be compared with Maharashtra Pollution Control Board.



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