

## TREATMENT OF DOMESTICWASTE WATER USING PHYTOREMEDIATION

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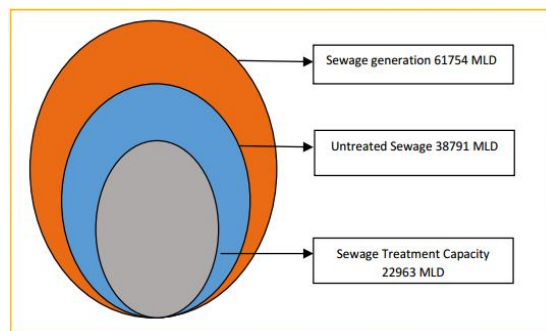
### Abstract

*Due to Global warming and Green house gas effect there are many changes in Climate. The Change in climate plays an impact role in rainfall. Sudden heavy rainfall in one place of Earth is making more droughts in another place. Due to increase of population, Climate change we have to analysis more practices to save water. 135 LPCD of water is basic requirement for a human .In this 135 liters we can reuse and recycle nearly 100 LPCD by proper way.*

**Keywords:** *Grey water, Water hyacinath, Phytoremediation, Hydraulic Retention Time, STP*

### I. Introduction

According to Environmental Information System (ENVIS) Centre on Hygiene, Sanitation, Sewage Treatment Systems and Technology by Ministry of Environment, Forests & Climate Change, Govt of India reports the National status of waste water generation & treatment during 2015. In 2015 the estimated sewage generation in the country was 61754 MLD as against the developed sewage treatment capacity of 22963 MLD. Because of the hiatus in sewage treatment capacity, about 38791 MLD of untreated sewage (62% of the total sewage) is discharged directly into nearby water bodies. The five states viz Maharashtra, Tamil Nadu, Uttar Pradesh, Delhi & Gujarat account for approximately 50% of the total sewage generated in the country.



**Fig 1 Status of waste water generation and Treatment in India**

### II. Composition of waste water

Municipal wastewater is mainly comprised of water (99.9%) together with relatively small concentrations of suspended and dissolved organic and inorganic solids. Among the organic substances present in sewage are carbohydrates, lignin, fats, soaps, synthetic detergents, proteins and their decomposition products, as well as various natural and synthetic organic chemicals from the process industries.

Wastewater produced due to human activities in households is called domestic wastewater i.e. wastewater from the kitchen, shower, wash basin, toilet and washing clothes .

The strength and composition of the domestic wastewater changes on hourly, daily and seasonal basis, with the average strength dependent on per capita water usage, habits, diet, living standard and life style. The main reason is variation in water usage in households.

Wastewater components can be divided into different main groups as shown in Table 3:2. They can adversely affect the aquatic life if discharge them into environmental.

Physically, domestic wastewater is usually characterized by a grey colour, musty odour and has a solids content of about 0.1%. The solid material is a mixture of faeces, food particles, toilet paper, grease, oil, soap, salts, metals, detergents, sand and grit.

Chemically, wastewater is composed of organic (70%) and inorganic (30%) compounds as well as various gases. Organic compounds consist primarily of carbohydrates (25%), proteins (65%) and fats (10%), which reflect the diet of the people. Inorganic components may consist of heavy metals, nitrogen, phosphorus, pH, sulphur, chlorides, alkalinity, toxic compounds, etc. Gases commonly dissolved in wastewater are hydrogen sulphide, methane, ammonia, oxygen, carbon dioxide and nitrogen. The first three gases result from the decomposition of organic matter present in the wastewater.

Biologically, wastewater contains various microorganisms and contains many pathogenic organisms which generally originate from humans who are infected with disease or who are carriers of a particular disease.

### III. Phytoremediation

Phytoremediation is the direct use of living green plants for in situ, or in place, removal, degradation, or containment of contaminants in soils, sludge's, sediments, surface water and groundwater. Phytoremediation is:

- A low cost, solar energy driven cleanup technique.
- Most useful at sites with shallow, low levels of contamination.
- Useful for treating a wide variety of environmental contaminants.
- Effective with, or in some cases, in place of mechanical cleanup methods.

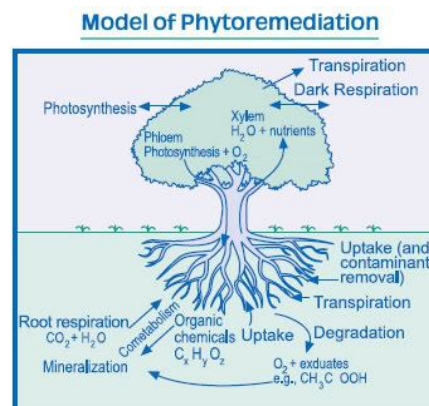


Fig :2

Source : <http://ehsmanager.blogspot.in>

Plant roots also cause changes at the soil-root interface as they release inorganic and organic compounds (root

exudates) in the rhizosphere. These root exudates affect the number and activity of the microorganisms, the aggregation and stability of the soil particles around the root, and the availability of the contaminants. Root exudates, by themselves can increase (mobilise) or decrease (immobilise) directly or indirectly the availability of the contaminants in the root zone (rhizosphere) of the plant through changes in soil characteristics, release of organic substances, changes in chemical composition, and/or increase in plant-assisted microbial activity.

Phytoremediation is an alternative or complimentary technology that can be used along with or, in some cases in place of mechanical conventional clean-up technologies that often require high capital inputs and are labor and energy intensive. Phytoremediation is an in situ remediation technology that utilizes the inherent abilities of living plants. It is also an ecologically friendly, solar-energy driven clean-up technology, based on the concept of using nature to cleanse nature.

IV Water hyacinth :Water hyacinth is a free-floating perennial plant that can grow to a height of 3 feet. The dark green leaf blades are circular to elliptical in shape attached to a spongy, inflated petiole. Underneath the water is a thick, heavily branched, dark fibrous root system. The water hyacinth has striking light blue to violet flowers located on a terminal spike. Water hyacinth is a very aggressive invader and can form thick mats. If these mats cover the entire surface of the pond they can cause oxygen depletions and fish kills. Water hyacinths should be controlled so they do not cover the entire pond.



**Fig 3**

**Source : <https://fineartamerica.com>**

#### **V. Description of examination**

- The Raw water in Container A is kept idle for 12-24 hours for to settle suspended solids in the bottom.
- If necessary Aeration will be given by fish tank accessories.
- Then the Raw water after suspension is get into slowly to container B which is having water hyacinth after drain the water in container B.
- The water is having minimum Hydraulic retention time from 24-36 Hours .If possible this study may decrease /increase depending upon pH values.
- After Hydraulic retention time the water is collected in container C .
- After 2-3 hours of Hydraulic retention time Water is used for growing saplings.
- This study may get acknowledgment of Central silk board for growing Mulberry plants.
- Mulberry Plants/saplings are grown with raw water, Treated water and Normal portable water.

- All Parameters are analyzed for raw water and treated water.
- The sludge deposits in container A and C are weighted.
- If possible the sludge deposits may get Lab analysis for further studies.

### Conclusion

The Central pollution control Board in the report “ STATUS OF SEWAGE TREATMENT PLANTS IN SOUTHERN ZONE ,PROJECT HEAD-VI (12) OF AAP 2015-16 dated 30 October 2015 mentioned about two Sewage Treatment Plants (STP) in Madurai .In Madurai -Avaniyapuram STP the sewage treatment is done for 20 MLD against its design capacity of 125 MLD and in the Madurai-sakkimangalam sewage treatment is done for 10 MLD against its design capacity of 45.7 MLD . By this data this two plants are performing nearly 20% of its design capacity. So, nearly 80% of sewage against its design capacity is polluting water bodies, land etc .To avoid pollution in all aspects is the main scope of the experiment.

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