



ROOT ZONE WASTE WATER TREATMENT

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Abstract—Water resources are the sources of water that are potentially useful for everyday activities. And now a day this resource is steadily decreasing and getting polluted. Household sewage is directly led into river without any primary treatment. In Residential areas domestic sewage water started playing its major role due to the increasing population. In this experimental investigation, instead of allowing this daily used domestic sewage water into the drainage as waste, it can be recycled naturally by using the roots of the Canna Indica plants and soil bacteria for domestic re-usage such as for Gardening, Flushing of toilets.

Keywords-Household Sewage, Domestic Sewage, Canna Indica, Gardening, Flushing Of Toilets.

I. INTRODUCTION

Root Zone treatment system can be defined as “the efficient use of plants to remove, detoxify or immobilize environmental contaminants in a growth matrix (soil, water or sediments) through the natural biological, chemical or physical activities and processes of the plants”. Plants are unique organisms equipped with remarkable metabolic and absorption capabilities, as well as transport systems that can take up nutrients or contaminants selectively from the growth matrix, soil or water. The term 'Root Zone' encompasses the life interactions of various species of bacteria, the roots of reed plants, soil, sun and water. They are also known as constructed wetlands or subsurface flow systems. In this system, these plants conduct oxygen through their stems into their root systems and create favorable conditions for the growth of bacteria. The wastewater flow through the root zone in a horizontal or vertical way, where the organic pollutants are decomposed biochemically by the bacteria present in the rhizosphere of root plants. The filter media are selected carefully to provide favorable conditions for both plants and bacterial growth and to avoid clogging. Organic pollutants are removed drastically from wastewater and are reduced to their elemental forms. It also has the potential to accumulate heavy metals in the root zone. Out of about 61948 million liter per day of sewage generated treatment capacity exists for only about 23277 million liter per day. Thus, there is a large gap between generation and treatment of wastewater in India. Even the treatment capacity existing is also not effectively utilized

due to operation and maintenance problem. Operation and maintenance of existing plants and sewage pumping stations is not satisfactory, as nearly 39% plants are not conforming to the general standards.

II. OBJECTIVE OF THE RESEARCH

1. To analyze the characteristics of inlet and outlet wastewater in the root zone treatment system
2. To investigate the feasibility of applying a constructed root zone treatment system to treat the domestic sewage waste water.
3. To study the reduction of pollutants present in wastewater after treatment by using root zone treatment system.
4. To treat the wastewater naturally by using canna indica plants .

III. METHODOLOGY

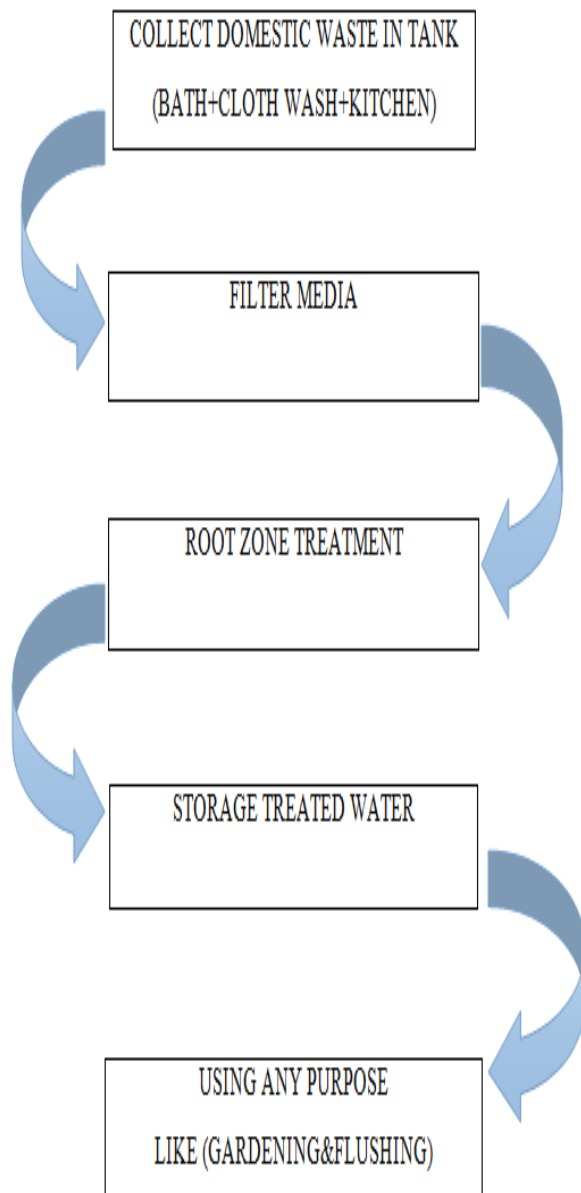
A. Construction of Treatment Unit

1. The unit consist of a basin i.e a rectangular tray with inlet pipe at top and outlet pipe at the bottom of the tray.
2. The basin is filled with layers of gravel and sand, planted with aquatic plant named Canna Indica and by three layers of sand, the bottom layer filled with coarse sand (small stones), the intermediate layer filled with fine-grained oval gravel, after that is a layer of charcoal and the top layer filled with sandy loam.
3. The canna indica plants are allowed to grow to maturity. While the growth of plants till maturity fresh water is supplied. After the



growth of canna indica plants sewage waste water is fed through the inlet and allowed to infiltrate.

TURBIDITY	244 NTU	74 NTU
BOD	190 mg/l	38 mg/l
COD	135 mg/l	20 mg/l



Water Samples



After Treatment

IV. CONCLUSION

The root zoning technique is very useful for small scale work while we can plan it for huge network also. This has resulted in pollution of fresh water bodies due to increased generation of domestic waste, sewage, industrial waste etc. This Study reviews the effective method by comparing wetland waste water treatment method and water hyacinth treatment method. During supplying waste it was observed that sewage is very good for plants as during the sewage treatment process plants are seen to be grown very well. Therefore, from the result we came to the conclusion that this method is effective for reducing turbidity, and bringing pH near to that of neutral water.

REFERENCES

1. Sammar khalil and Beatrix W.Alsanius (Department Of Crop Science, Swedish University of Agricultural Sciences, Alnarp) (Hultberg et al. 2000,McCullagh et al.1996, Paulitz 1997).
2. Reddy, K.R., and W.H. Patrick, jr. Division s 4 Soil Fertility And Plant Nutritio Fate of Fertilizer Nitrogen in the Rice Root

TABLE I: TEST RESULTS

Parameters	Before Treat Ment	After Treat Ment
PH	5.26	6.8



- Zone I 1986. Fate of Fertilizer Nitrogen in the Rice Root Zone. Soil Sci. Soc. Am. J. 50:649-65.
3. Er.Rajendra kumar V. Saraf . Root zone evaluation fessler nursery experience in treatment of waste water by root zone technology, FIE, FIWWA Woodburn, Oegon, May 24, 2007.
4. Nakamura, T. Harter Y. Horino, and T. Mitsuno abstract et l .Assessment of root zone nitrogen leaching as affected by