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Development of New Ways of Waste Water Management System in Rural Areas

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ABSTRACT: Wastewater is water whose physical, chemical or biological properties have been changed as a result of the introduction of certain substances which render it unsafe for some purposes such as drinking. The day to day activities of man is mainly water dependent and therefore discharge 'waste' into water. Some of the substances include body wastes (faeces and urine), hair shampoo, hair, food scraps, fat, laundry powder, fabric conditioners, toilet paper, chemicals, detergent, household cleaners, dirt, micro-organisms (germs) which can make people ill and damage the environment. When improving an existing and/or designing a new sanitation system, sustainability criteria related to the following aspects should be considered: (1) Health and hygiene (2) Environment and natural resources (3) Technology and operation (4) Financial and economic (5) Socio-cultural and institutional aspect.

KEYWORDS: Waste water, household waste, toxic contaminants, insoluble particles, scraps, fat.

I. INTRODUCTION

In the 21st century, rapid growth of the population, urbanization, industrialization, modernization and digitalization results in the increase in wastes such as Domestic, Industrial, Commercial, Mining, Radioactive, Agricultural, Hospital, Electronic wastes, etc. Managing these wastes are becoming biggest problem in the world. Waste management is the process of collecting, transporting, segregating, discarding, destroying, processing, recycling, controlling, monitoring and regulating the garbage, sewage and other waste products. Main objective of the waste management is to save the environment from detrimental effects, free from pollution and also to protect the people's health from the hazardous effects. To manage these wastes, many modern methods are adopted in the worldwide. They are biological reprocessing, recover through recycling, dumping in sanitary landfill, composting, waste to energy, bioremediation, incineration, pyrolysis, plasma gasification, disposal in ocean/sea, etc. These waste management techniques make the environment a better place for the living creatures to survive. This also paves the way for the future generation to live in the peaceful and healthy environment. Finding and adopting the best waste management technique is the need of the hour and also necessary for the welfare of the people in the world. By this, the waste management process will become very effective and successful. This paper tries to portray the different waste management techniques which has been adopted in the various parts of the world. Further it also tries to suggest some best waste management technique by critically reviewing the discussion and findings of the other researcher's study. Sewage is water- carried wastes, in either solution or suspension that flow away from a community. It is also known as waste water flows or used water supply of the community. It is more than 99.9% pure water characterized by its volume or rate of flow, its physical condition, its chemical constituents, and the bacteriological organisms that it contains. Depending on their origin, wastewater can be classed as sanitary, commercial, industrial, or surface runoff. The spent water from residences and institutions, carrying body wastes, washing water, food preparation wastes, laundry wastes, and other waste products of normal living, are classed as domestic or sanitary sewage. Wastes that result from an industrial process or the production or manufacture of goods are classed as industrial wastes. Their flows and strengths are usually more varied, intense, and concentrated than those of sanitary sewage. Surface runoff, also known as storm flow or overland flow, is that portion of precipitation that runs rapidly over the ground surface to a defined channel.

1. OBJECTIVES:

1. To improve quality of wastewater.
2. Elimination of pollutants, toxicants and many such harmful substances.
3. Preservation of water quality of natural water resources.
4. To make wastewater usable for other purposes.
5. Prevention of harmful diseases.
6. To reduce effect of waste water on living.
7. To obtain alternative source for water for moping, flushing, ground clearing, gardening.



8. To reuse grey water escaping from institute for institute itself.

2. NEEDS:

1. For proper waste water management at Institute level.
2. For protection of humans and the ecosystem from harmful and toxic elements found in wastewater.
3. For avoiding waste water effect on human, living as well as effect on river and marine life.
4. For obtaining another water source if Institute activities like flushing, moping, etc.
5. For reducing pressure of waste water from environment.
6. To avoid adverse effects on groundwater.
7. For reduction of water pollution, soil pollution.
8. For controlling diseases happening due to waste water.
9. For betterment of environment near to institute.

3. ADVANTAGES:

1. **Rids Potential Diseases** - Wastewater treatment systems eliminate disease-causing bacteria and kills harmful organisms.
2. **Low-Cost** - Wastewater systems can last for up to 15 years if they are maintained correctly.
3. **Minimal Odour Emissions** - In comparison to earlier systems, modern waste water systems eject minimal odours.
4. **No Water Bills** - Water charges are an unfortunate reality in many countries in today’s world. If you have your own wastewater system on your property, you do not have to worry about water bills.
5. **Little Maintenance** - Modern wastewater systems require very little maintenance and last much longer than the older models.
6. **Feasibility** - A new way of wastewater system has become more feasible in modern times and developments in technology allow modern systems to be eco-friendlier, economical and easier to maintain in comparison to previous models.

4. DISADVANTAGES:

1. **Space** - A wastewater treatment plant requires to have enough space to position the plant and for the treated water to distribute in an area the required distance from boundaries.
2. **Installation costs** - When compared with a connection to your local town sewage or a septic tank set-up the cost of a sewage treatment plant can be seen as a disadvantage.
3. **Power** - The wastewater treatment plant requires reliable electricity to operate pumps.

II. METHODOLOGY

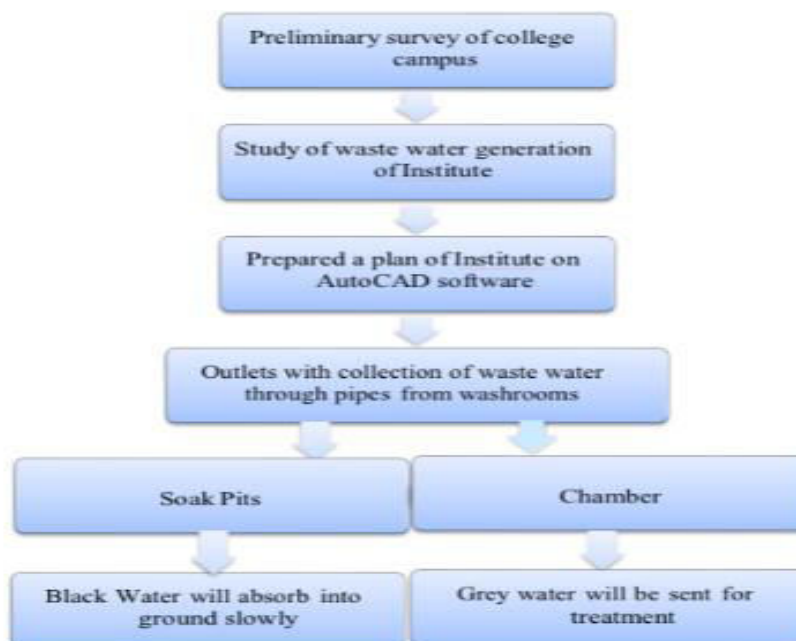


Fig. 1 Flowchart of Methodology



III. EXPERIMENTAL RESULTS

Sr. No.	Test Parameter	Results Obtained	BIS Specification 10500:2012 Normal Values	
			Desirable Limits	Permissible Limits
1	Physical Appearance	Yellowish tinge with very fine suspended particles	-	-
2	Odour	Unpleasant odour	Agreeable	Agreeable
3	Turbidity (as N.T.U)	144	1.0	5.0
4	pH Value	7.18	6.5 to 8.5	No relaxation
5	Chlorides (as Cl)	169	250	1000
6	Nitrates (as NO ₃)	26.004	45	No relaxation
7	Total Hardness (as CaCO ₃)	616	200	600
8	Alkalinity (as CaCO ₃)	476	200	600
9	Total Dissolved Solids	1209	500	2000
10	Iron (Fe)	0.435	0.3	No relaxation
11	Fluoride (as F)	0.670	1.0	1.5

Note: All the bold values show that tests are successfully passed

Table 1 Test Results

IV. CONCLUSIONS

Conclusions are made from the obtained results, Central Public Health and Environmental Engineering Organization (CPHEEO) and IS 10500:2012.

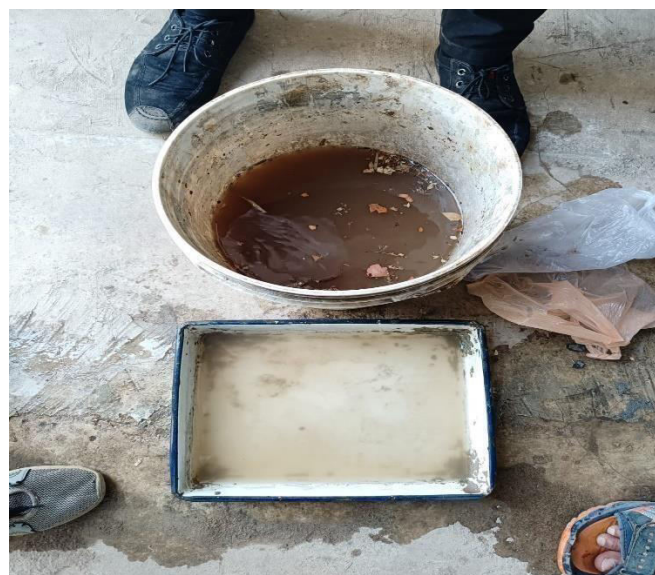
1. The alkalinity to be moved from bicarbonates to chlorides or sulphates to prevent also choking the soil pores by evaporation of the temporary hardness. Hence this treated water is useful for landscaping.
2. The Indian water closets when flushed can sprout and splash the flush water above the rim and onto the foot rest areas, it is necessary that such reuse shall be only after activated carbon and ultra filtration membranes.
3. It shall not be made mandatory in layouts and confined condominiums and multiplexes and encouragement and persuasion shall be adopted.

4. the policy of septic tanks on-site followed by twin drain shall be encouraged as a practical possibility. Hence this water is useful for flushing purpose at institute as well hostel level.
5. As results obtained, this water is useful in mopping and cleaning purpose for institute and hostels as pH value is 7.18 which is basic and safe for mopping. It does neither cause skin irritation nor any kind of damage to structure.
6. Though this water is not good for consumption but it fulfils the demand of institute, hostels during dry days. Hence institute is now self-sufficient for using adequate amount of water.

V. PHOTO GALLERY



1 Fly ash treatment unit model



2 Waste water before and after treatment



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