A REVIEW ON FEASIBILITY OF PRESENT GRAY WATER TREATMENT

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Abstract: *Recognizing gray water as a relevant secondary source of water and nutrients represents an important chance for the sustainable management of water resources.In the last two decades, many studies analysed the environmental, economic, and energetic benefits of the reuse of gray water treated by nature based solution. This work review existing case studies of traditional constructed wotlands and new integrated technologies for gray water treatment and reuse, with a specific focus on their treatment performance as a function of hydraulic operating parameters. The aim of this work is to understand if the application of NBC can represent a valid alternative to conventional treatment technologies, providing guantitution indication for their design, specifically indication concerning threshold valve of hydraulic design parameters to garantes high removal performance are suggested finally indication for their design. Specifically indication concerning there should values of hydraulic design parameter to guarantee high removal performance are suggested. Finally the existing literature. On life cycle analysis of NBS for gray water treatment has been examined, confirming the provided environmental benefits.*

Key Word **: Gray water treatment, Reuse of gray water, filtration, Nature based solution(NBC), Hydraulic operating parameter, pH value biological/ chemical properties.**

1. Introduction

Gray water can be defined as the wastewater generated from the bath, showers, hand basin, washing machines, and dishwashers, laundries and kitchen sinks. This means wastewater from the toilets is excluded when considering the source of wastewater of household. Gray water contains micro-organisms, chemical contaminants (e.g. nutrients and salts) an physical contaminants (dirt and sand). Grey water is all wastewater generated in households or office buildings from streams without fetal contamination, i.e. all streams except for the wastewater from toilets. Sources of grey water include, e.g. sinks, showers, baths, clothes washing machines or dish washers. As grey water contains fewer pathogens than domestic wastewater, it is generally safer to handle and easier to treat and reuse onsite for toilet flushing, landscape or crop irrigation, and other non-potable uses. The application of grey water reuse in urban water systems provides substantial benefits for both the water supply subsystem by reducing the demand for fresh clean water and for the wastewater subsystems by reducing the amount of wastewater required to be conveyed and treated.

The main purpose of grey water recycling is to substitute the precious drinking water in applications which do not require drinking water quality. Non-potable reuse applications include industrial, irrigation, toilet flushing and laundry washing dependent on the technologies utilized in the treatment process. In this case demand of water is more due to various factors but source of water supply is less so that we tried to planed reuse of greywater system in residential buildings.

2. Methodology

2.1 Stabilization Tank

Stabilization tank is one of the low cost treatment used to treat grey water .water stabilization tank designed to treat the wastewater and to reduce the organic content, pathogens from waste water. Stabilization tank is a natural process which takes time because Removal rates are slow, It requires large space as compare to other process

2.2 Root zone wastewater treatment

In this Root zone method cover all the biological activities among different types of microbes, water soil and sunRoot zone The Root zone wastewater system makes use of biological and physical treatment processes to remove pollutants from wastewater. It is a natural process, there is no need to add any chemicals, mechanical pumps or any external energy.

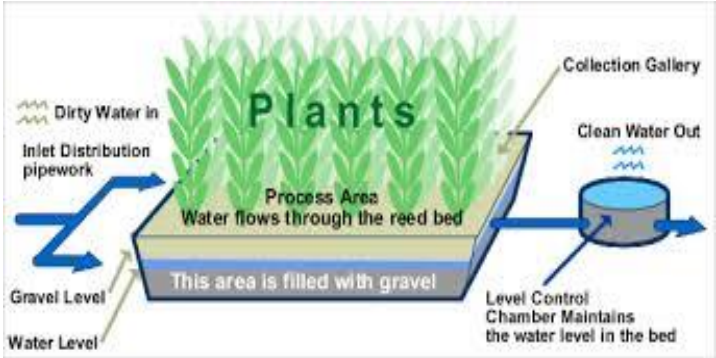

Fig.1 Root zone wastewater treatment

Root zone wastewater treatment also reduces the maintenance cost. It is also one of the low cost technology to treat grey water.

2.3 Filtration through winnowing sieve

This type of filtration is used when the water source is populated by wind borne impurities such as dry leaves , stalks and course particles the raw water is passed through the winnowing sieve and the impurities are filtered. This type of filter is widely used in villages of the Bamaka area.

2.4 Jempeng stone filter method

this is one of the water filtration method developed in bali. Indonesia, a small artificial pond is cut by the side to an irrigation canal which carries muddy water .in this jempeng stone filter unit is carved out of a porous material called cadas .This unit has an average height of 60cm ,dia of 50 cm and wall with a thickness of 10-`12 cm. this unit is placed on the top of a stone supporting gravel bed .this method can even treat highly turbid water.

2.5 Horizontal flow course media filter

Horizontal flow course media filter technique uses coarse gravel or crushed stones as filter media and is very fitted to turbid waters with turbidities larger than fifty NTU.A combination of filtration and sedimentation of suspended solids occurs throughout the horizontal passage of water through the filter. At the same time, biological mechanisms similar to those in slow sand filtration help to get rid of pathogens, although in restricted manner. Research at Asian institute of technology, Thailand.

2.6 Biological treatment

Biological treatment techniques like Membrane Bio Reactor Rotating Biological Contactor and sequential batch reactor to be effective grey waste water

2.7 Membrane bio reactor

Membrane bio reactor is used when the treatment efficiency is important consideration and they are available in two configurations: “external” or “submerged”. In the external configuration the sludge is recirculated from aeration basin to pressure driven membrane system and the suspended solids are recycled back into the bioreactor and effluent passes through membrane.

2.8 Rotating Biological Contactor

It is a biological treatment process in which biological medium remove pollutants in wastewater before disposed treated water to the environment (river, lake or ocean).

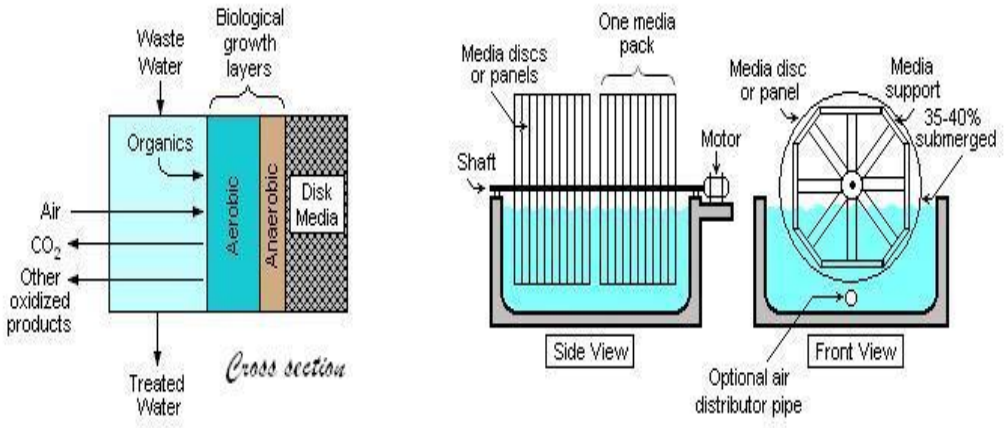

Fig.2 Rotating Biological Contactor

The discs consist of plastic sheets ranging 2 to 4 m in diameter are up to 10 mm thick. module shave arranged in parallel and in series to meet the flow and treatment requirements. The discs are submerged in waste water about 40% of their diameter and 95% of the surface area is thus submerged in waste water and exposed to the atmosphere above the liquid.

3. Applications

- Graywater includes water from showers, bathtubs, sinks, kitchen, dishwashers, laundry tubs, and washing machines.
- The major ingredients of gray water are soap, shampoo, grease, toothpaste, food residuals, cooking oils, detergents, hair etc. In terms of volume, gray water is the largest constituent of total wastewater flow from households.
- In a typical household, 50-80% of wastewater is gray water, out of which laundry washing accounts for as much as 30% of the average household water use.
- The key difference between gray water and sewage (or black water) is the organic loading. Sewage has a much larger organic loading compared to gray water.
- In applications which do not need drinking water quality such as industrial, irrigation, toilet flushing and laundry washing. This will, in turn, reduce freshwater consumption, apart from wastewater generation.
- Community benefit in reducing demands on public water supply.

4. Re-use

- There are two main systems for greywater recycling – centralized or decentralized. In a decentralized system, greywater collected from one or more apartments is treated inside the house.
- Greywater reuse treatment systems can be simple, low-cost devices or complex, expensive wastewater treatment systems. An example of a simple system is to route greywater directly to applications such as toilet flushing and garden irrigation.
- Water-efficient plumbing fixtures are vital when designing a household greywater reuse system. Some examples are low-flow shower heads, faucet flow restrictors, and low-flow toilets.
- Garden irrigation is the predominant reuse method for situations where greywater can be bucketed or diverted to the garden for immediate use.
- Greywater systems are relatively easier to install in new building constructions as house or offices already constructed on concrete slabs or crawlspaces are difficult to retrofit.
- Protection of public health is of paramount importance while devising any greywater reuse program. Although health risks of greywater reuse have proven to be negligible, yet greywater may contain pathogens which may cause diseases.

5. Conclusion

The filtration methods, capability of the filtering media, treated and untreated water qualities are discussed here. The purpose of treated water should be based on the water quality. The natural coagulants selected for the study proved to be effective in the removal of an appreciable amount of solids. Winter melon seeds and neem leaf can be used as an alternative natural coagulant for the treatment of domestic grey water. From this study it is concluded that settling time is slightly affecting the removal efficiency of turbidity and COD removal from grey water using winter melon seeds and neem leaf as natural coagulant, Separation of sewage water into grey water and black water reduces the area of the waste water treatment plant in consequently, reduce the cost. They develop and implementation plan involving governmental policy, communities construction of treatment plant, house hold commitment to recycling, control and checking.

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