A Natural Based Waste Water Treatment: An Option

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Abstract- This research is concerned with study focus and check the suitability of waste stabilization ponds (WSP) for treating wastewater. Experimental work has depends on three pond i.e. sedimentation pond, Algae pond, Duckweed pond depending for considerations such as economical and specification. A model of these three ponds i.e based on (aerobic) in parallel series constructed in a reduce scale experimental work. Then second pond for algae pond i.e natural based oxidation process, i.e aeration process to aerobic pond to the series as third pond for improve the effluent for other parameter. A model of three pond (sedimentation pond , Algae and duckweed pond) in series of experimental work., the three ponds had the same area (1.8 x 0.6 x 0.08) . From these waste stabilization pond for wastewater treatment in rural areas or even small communities are easily and economical work, but it may required more examinations to get best results.

Keyword- Algae Pond, Duckweed Pond, Cost Optimization, Waste Stabilizations Pond, Waste Water Treatment

I. INTRODUCTION

A Rapid population growth and increased urbanisation over the years have led to quantum increase in generation of domestic sewage in India. The large amount of sewage generated in most cities and towns of the country has exceeded the capacity of the available treatment systems. The pollutants present in wastewater and their characteristics are as, dissolved and suspended solids, microbes and other organic matter is high amounted in wastewater. Several natural based, innovative and alternate approaches of biological treatment of wastewater have been evaluated over the years for their economical feasibility, operational ease and system sustainability that is in other word optimum treatment option. Further, aquaculture are known to have high capacity of biological purification of organic wastewater suggested recycling systems using Algae and duckweeds based treatment of municipal wastewater.

Duckweed Aquatic Plant-

Algae is help to photosynthesis process, Duckweeds (small free floating plant) are promising for use in sustainable wastewater treatment.

The present study attempts to evaluate the efficacy of an Algae and duckweed based wastewater treatment system. in reduction of wastewater parameter in domestic sewage during the process of biological treatment efficiency of the system.

II. MATERIALS AND METHODS

Natural treatment systems include land treatment, floating aquatic plants & constructed wetlands. All natural treatment systems are proceeded by some from mechanical pre-treatment for the removal of gross solids. An aquaculture-based wastewater treatment system is integrating with Algae based and duckweed based wastewater treatment plant.

Blue Green Algae- The type Cyanobacteria species are, also known as blue green algae comprise a unique group of organisms with worldwide distribution. These are considered as algae because of their microscopic morphology, pigmentation and oxygen evolving photosynthesis process. They are by far the largest group of photosynthetic prokaryotic as judged by their widespread occurrence, frequency, abundance and morphological diversity. They grow at any place and in any environment where moisture and sun light are available. The species of algae grow in specific environment i.e. pH and therefore their distribution pattern, ecology, periodicity, qualitative and quantitative occurrences differ widely. The abundance and composition of blue green algae and their population in surface waters of ponds and lakes have been easily seen in the . It is said that they flourish well either in nutrients rich warm water or at times in water with apparently low and mild temperature and sun light conditions.
Fig. 1 & 2 Duckweeds, or water lense, are flowering aquatic plants which float on or just beneath the surface of still or slowly-moving bodies of fresh water and wetlands above. On its own, a floating duckweed plant may seem small and insignificant, but when the very small plants band together they become a vital role play in the aquatic ecosystem, the length of duckweed plat ii between 2 to 3 cm.

Fig. 3 Azolla is a small free-floating fern approximately 1 to 3 cm wide. Leaves of the mosquito fern overlap, giving a quilted look to the surface and hiding the stem. A single root protrudes from each stem. Azolla can vary in colour from green to red and are generally found in quiet ponds protected from wind action and large sunlight. Azolla can be aggressive invaders in quiet ponds and are often found mixed in with duckweed or water meal.

Algae pond and duckweed pond based wastewater stabilizations ponds for wastewater treatment was carried out at experimental model. The type of study helpful to contribute towards improved environmental management through improving the quality of effluent being discharged into natural waterways i.e river. This was to be achieved through the development and facilitation of the use of Algae and duckweed based wastewater stabilizations ponds to achieve less consumption of electricity. A model of three pond (sedimentation pond, Algae and duckweed pond) in series of experimental work., the three ponds had the same area (1.8 x 0.6 x 0.08) . Waste water quality information was collected in following chemical, physical and bacteriological parameters included: pH, biological oxygen demand, and chemical oxygen demand, Dissolve oxygen.

The Algae and duckweed based waste stabilization ponds 80 -90 % successfully for the treatment of wastewater.

Waste Stabilization Ponds

Waste stabilization ponds offer many benefits, including simple operation & maintenance, & excellent removal of pathogenic organisms. The Waste stabilization ponds are usually classifieds according to the nature of the biological activity that is : anaerobic, aerobic, aerated, aerobic, or facultative. The theory of waste stabilization pond system may comprise one pond only (facultative) or several ponds in series (anaerobic, facultative, maturation). In addition, it may be desirable to construct a number of series of the same type to permit parallel operation are their . A pre-treatment anaerobic waste stabilization pond is essentially to increase removal efficiency of the overall system, & decrease the detention period of the process. A facultative waste stabilization pond is one in which there is an upper aerobic zone (maintained by algae) & lower anaerobic zone. The stabilization of wastes is brought about by a combination of aerobic, anaerobic, and facultative bacterial system. A tertiary maturation pond is designed to provide for secondary effluent polishing & seasonal nitrification & the number of disease-causing bacteria is reducing through extended detention time. The stabilization pond are modified by the addition of air by the mechanical aerator in the facultative stages. This has the beneficial effect of increasing the treatment quality, while reducing the land area required for the ponds. The operation cost, is much higher due to the mechanical aeration process or mechanical based plant.

Description of waste stabilization ponds and the arrangement of the ponds in the model. The experimental model contains A Algae based and duckweed based biological treatment system was established adjacent to the comprised a sedimentation tank (1.8 x 0.6 m, depth 0.08 m), Algae Pond (1.8 x 0.6 m, depth 0.08 m) , duckweed ponds (1.8 x 0.6 m, depth 0.08 m) as situated in series for growing Algae and duckweeds (Fig.1). The sedimentation tank was constructed before the a Algae based and duckweed based pond.
III. CONCLUSION

In view of the above statements, it is evident that the system offers considerable potential for biological wastewater treatment, with respect to reduction of BOD, COD. Further, DO is to maintain and also pH. The efficiency of the system makes it an ideal alternative wastewater treatment system for the tropics, especially for small cities and towns with. The efficiency of the system being a function of the temperature regime, retention time and sewage concentration, establishment of such a system in any place needs location evaluation and process standardisation.

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