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Use of Natural and Artificial Multimedia Filter as an Adsorbent for Filtration of Sewage Waste Water

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Abstract *- Water is one of the most important elements involved in the created and development of healthy life. It is our responsibility to manage this resource , not only as a social , industrial and commercial good but also for the benefit of all present and future living matter , this paper review the used of low cost natural and artificial integrated multimedia filter combination of green coconut shells and plastic scrubber for the filtration of sewage waste water . A laboratory scale multimedia filter model consisting of two reactors placed in series was development for treatment of sewage waste water two reactors were packed with a different combination of packing media such as plastic scrubber and green coconut shells. The results obtained from this experimental study removed BOD, COD, TS and ph.*

Key Words**: sewage waste water, plastic scrubber, Green coconut shell etc.**

1. INTRODUCTION

Wastewater engineering is the branch of environmental engineering in which the basic principles of science and engineering are applied to solve the issues associated with the treatment and reuse of wastewater. The ultimate goal of wastewater engineering is the protection of public health in a manner commensurate with environmental, economic, social and political concerns. When untreated wastewater accumulates and is allowed to go septic, the decomposition of the organic matter it contains, will lead to nuisance conditions including the production of malodorous gases. In addition, untreated wastewater contains numerous pathogenic microorganisms that dwell in the human intestinal tract. Wastewater also contains nutrients, which can stimulate the growth of aquatic plants and may contain toxic compounds or compounds that potentially may be mutagenic or carcinogenic. For these reasons, the immediate and nuisance-free removal of wastewater from its sources of generation, followed by treatment, reuse, or dispersal into the environment is necessary to protect public health and the environment. In this paper study about treatment of wastewater using natural and artificial multimedia filter was carried out to achieve optimum cleaning

1.1 OBJECTIVES

Considering the requirements of wastewater treatment system to be economical and simple in operation, the study will be under taken with following objectives.

- To study the feasibility of treatment of domestic wastewater using integrated multimedia filter.
- To study the performance of integrated multimedia filter packed with artificial and natural filter media.
- To study the treatment efficiency of selected parameters like BOD, COD, pH and TS for treating effluent using integrated multimedia filter packed with artificial and natural media.
- To study the efficiency of treatment using different media and their combinations.

1.2 RESEARCH METHODOLOGY

The complete system works on the principle of attached growth process, where bacteria are responsible for degradation of the contaminants. The performance of the model will observe by using different types of natural and artificial filter media. In all, three trials will carry out to judge the performance of treatment unit. The various combinations of natural and artificial media will use in the study. The model will operate for varying detention time of 08 hours to 20 hours with an increment of 2 hours. The model will fed with medium strength domestic wastewater from Dr. Ajeenkya D .Y. Patil University campus.

1.3 MATERIAL AND METHODS

Filter media a filter media is one of the prime components in the multimedia filter system as it provides large surface area to enhance the microbial growth. Efficiency of multimedia filter depends upon the types of media, sizes, surface porosity and roughness of filter media. Therefore the selection of a suitable filter media is critical part in the design of operation and multimedia filter process, in order to obtain the higher removal efficiency. In the present study different types of two media were used such as green coconut shells and plastic scrubbers (Fig. 1 and Fig. 2). The laboratory scale model was fabricated with HDPE sheet (high density polyethylene) and consists of two reactors placed in series with up flow and down flow regime the total reactor volume was of 150 liters capacity. The model was based on the principle of attached growth system. Two reactors were packed with different packing media of different sizes. The depth of the media was kept accordingly. The inlet and outlet arrangement were provided at appropriate locations.

The sewage wastewater was fed into inlet tank the wastewater from inlet tank enters the inlet chamber and flows in sequence i.e. from the first reactor to the last reactor and then enters the collecting chamber and was collected from the outlet. The wastewater from the inlet chamber enters the first reactor through the perforated PVC pipes. The perforated PVC pipes were provided so as to provide uniform distribution throughout the reactor. The wastewater thus passes uniformly through the first reactor and gets partially treated and enters the second reactor. The wastewater which was partially treated in the first reactor moves to the second reactor in up flow regime. The wastewater thus rises uniformly at the same time it gets treated. The wastewater thus passes uniformly through the second reactor and gets treated and enters the collecting chamber by the up flow movement. The wastewater was collected in the collecting chamber and after reaching the outlet level the treated effluent was collected in the outlet tank. The model was packed with green coconut shells and plastic scrubbers as packing media in layered configuration.

Fig.1.Green Coconut Shells

Fig.2. Plastic Scrubber

Table 1 : Flow regime the two reactors of the model

Reactor	Flow regime
1st	Down flow
2nd	Up flow

2. RESULTS AND DISCUSSION

During the study, the effluent was collected in the collection tank and was analyzed for various parameters such as pH, BOD, COD and TS. Throughout the study the multimedia filter was operated for varying detention time of 12hrs, 18hrs and 24hrs. It was observed that removal efficiency for BOD was 54.9% , COD was 57.8% and TS was 73.1% for 20 hours of detention time. The multimedia filter process gave best result for TS removal. It is observed that after 20hr of treatment there is no significant changes in removal of all parameter

Table 2: Performance of the model at 20 hours detention time

Sr. No	Raw sewage			Treated sewage			Percent increase/Removal		
	BOD	COD	TS	BOD	COD	TS	BOD	COD	TS
1	200	320	218	98	95	65	51	70	70
2	227	378	296	101	110	78	55	71	74
3	243	349	312	106	152	82	56	56	74
4	197	401	345	86	192	90	56	52	74
5	293	312	381	125	148	102	57	53	73
6	246	386	375	116	118	96	52	69	74
7	258	394	365	120	184	101	53	53	72
8	230	406	256	108	195	69	53	52	73
9	188	367	355	80	168	92	57	54	74
10	278	342	358	112	178	97	59	48	73

3. CONCLUSION

Multimedia filtration technology has potential for application to small-scale systems. Multi-media filters are the recent development in the filtration technology which involves use of multiple media other than the conventional media as opposed to sand used in the conventional sand filters. It can also be concluded from the study that the multimedia filter may be considered as efficient treatment process for domestic wastewater. The recent developments in the media types such as coconut shell and plastic scrubber have expanded new areas for study. Also the above media may enhance the performance of the treatment system. Hence this technology is environment friendly and cost effective

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