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Treatment of municipal waste water with special reference to activated carbon combined with sand

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ABSTRACT

Waste water was collected from the municipal town of Madurai and was subjected to filtration in two different filters. The first filter employed sand for the process of filtration where as the second filter carbon for the same. Finally when the clarified water is drawn out of the filter, it shows that there is a considerable reduction in the physico-chemical parameters then that of the untreated municipal water. The BOD value was dropped as 128 mg/l to 55 mg/l after filtration and pH was reduced to 6.85 from 6.93 based on physico-chemical parameters the treated municipal waste water was suggested is fit for irrigation purpose.

Key words: Municipal waste, Sand Filter, Activated Carbon, Physico-Chemical parameter

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INTRODUCTION

In many arid and semi-arid countries water is becoming increasingly scarce resource and planners are forced to consider and evaluate them so that these may be used economically and effectively to promote further development [8]. At the same time with the population explosion the need for increased food production is also apparent. The potential irrigation to raise both agricultural productivity and the living standards of rural poor has long been recognized. US EPA 2004 focused an increased coverage of domestic water supply but also resulted in the release of bulk amounts of municipal waste water. In India average per capita generation of solid waste is about 300-600 g/days. The total municipal solid waste generated by 23 metros in India has been heavy metals, carcinogens and mainly organic chemicals [9].

Reported [11] that activated carbon also called as activated charcoal or activated coal is a form of carbon that has been processed to make it extremely pours and to provide a very large surface area for adsorption and chemical reaction take place. Due to its high degree of micro porosity it is suggested for waste water treatment [2,3].

A sand filter is composed of a tightly packed column of silica. Being highly pours it is employed in the gravity based separation of organic matter from the municipal sewage. Since it is nonabsorbent it does not cause the retention of water. Hence activated charcoal and sand filters are the most widely preferred as well as cost effective methods for municipal waste water treatment [5]. Waste water not only is a supplemental irrigation water but also is a source of plant nutrients such as nitrogen, phosphorus; organic matter [13].Soil is a natural medium for plant growth, serves as a natural pool of water and nutrients, a medium for the filtration and breakdown of injurious wastes. Soil also is a participant in the cycling of carbon and other elements through the ecosystem. So any changes

in soil properties may influence on the above mentioned soil functions, therefore on plant growth and production. It is predicted that the total sewage effluent in all sectors in Iran will be around 10000mcm in year 2022[14].

MATERIALS AND METHODS

The samples were collected from Madurai municipal down. These samples were placed inside the ice box and brought to the laboratory for further analysis. The samples were processed within 24 hours after collection. The samples were subjected to physico-chemical parameter analysis[1].The parameters include pH, Electrical Conductivity (EC), Total Suspended Solids (TSS),Total Dissolved solids (TDS),Biological Oxygen Demand (BOD),Chemical Oxygen Demand(COD),Carbonate [1].

RESULTS AND DISCUSSION

Reported [7] that municipal water after treatment process through activated charcoal and sand filter shows a tremendous change in its characteristics. The result obtained show a decrease in the organic content, indicates that it can be useful for irrigation purpose. The results [6,12,4] show considerable changes in the following parameter.

The pH was reduced to 6.85 from 6.93 and the electrical conductivity was dropped from 2.80 to 2.45 dsm-1. There was a steep drop in BOD from 128mg/L to 55mg/L. whereas COD was reduced from 310mg/L to 178mg/L. The TDS was found to be 1250mg/L when compared to initial concentration of 2058mg/L. And TSS was reduced from 1520mg/L to 710mg/L. The final concentration of carbonate was found to be 12mg/L compared to initial concentration of 23mg/L. The coli form number was reduced from 23/100ml to 12/100ml. Finally the total hardness dropped from 1400 to 1110 (Table 1).

Table:1 Physico-Chemical properties of municipal waste water

Parameters	Municipal waste water	
	Before	After
pH	6.93	685
EC(dsm-1)	2.80	245
BOD(mg/L)	128	55
COD(mg/L)	310	178
TDS(mg/L)	2058	1250
TSS(mg/L)	1520	710
Carbonate(mg/L)	23	12
Coli forms(No/100mL)	1400	1110
Total hardness(mg/L)	50	4.5

CONCLUSION

The municipal waste is composed of dilute water waste from residence business, houses and industries. It consists of inorganic waste which supports the growth of harmful micro-organisms and they are quiet difficult to dispose as well as organic waste are offensive and dangerous. “The accompanied with the sand effectively used for the treatment of the municipal waste water”.

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