Wastewater Treatment

[1]Pooja Bhandari, [2]Adarsh Rawat, [2]Alok Kumar, [2] Dhiraj Sah, [2]Diveshwar Shah, [2] Sonu Kumar, [2] Shubham Prakash

[1]Assistant Professor, [2] Student
[2] Department of Civil Engineering,
[1] Tula's Institute, Dehradun, India

Abstract : We are planning our project for waste water treatment and management in our residential building in Dhoolkot, Dehradun . As we all know there is a large amount of water getting wasted in our society so it is our responsibility to use that water by cleaning and purify it by applying various treatment method which are affordable and easily available. The objective of our project is to create a new source of reusing the waste water and to reduce the use of fresh every purposes. In our building we use fresh water for purposes like cleaning, bathing, gardening etc. So it is very us to treat the waste water and reuse it for these purposes which will help us to save water for our society . Our project works on the use of effective methods that can be used for the treatment of water free from various impurities such as bicarbonates, suspended solids, chemical compounds etc.

Key words: Activated Charcoal, Waste, Treatment, Water.

I. INTRODUCTION

Wastewater is water whose properties such as physical , chemical or biological have been changed due to certain substances which make water unsafe for some purposes such as drinking . Since a person is dependent on water so due to their day to day activities this water is discharged into the waste , which is also a kind of waste water . This waste water includes some substances from human wastes(urine and excreta) , from laundry , toilet paper , detergents , dirt , micro-organisms , food scraps , various chemicals etc , which can damage the environment and also make a person ill . Due to this reason various amount of water ends up as waste water which makes it very important for treatment . So to remove most of the contaminants that are found in waste water , waste water treatment is used . Therefore waste water management means handling the waste water in order to protect public and the environment . The study at our residential building mainly focuses on the planning of new water source because the building lacks source and large amount of water is needed for the daily purposes . During summer seasons there is a lack of fresh water so in order to overcome this situation a new method is proposed which is by treating the waste water from kitchen,air cooler and also the water after cleaning the clothes . Except for drinking purposes, this new source of treated water can be used for washing or gardening.

II. OBJECTIVES

- To reduce the demand of drinking water.
- To generate a new source of water by reusing the waste water from kitchen and air cooler.
- To increase the supply of water and decrease deficiency of water.
- To make resource management more effective.
- To minimize the cost.
- To make the method more sustainable.
- To reduce the wastage of water.

III. SCOPE

To conduct necessary study for a new method of waste water treatment and also the problem of water deficiency . Also to determine the physical and chemical characteristics of water. This method makes the cost more effective and also improves the efficiency. For the analysis of the cost estimation is also calculated .

IV. METHODOLOGY

Data Required:

- The amount of waste water which is generated in residential building(kitchen,washroom).
- Total number in each room is calculated.
- Characteristics of water.

Methodology:

First the analysis waste water is done and then testing of chemical characteristics of water. Then the treatment methods selected and the filter media is also selected. The design of filter media is then carried out. Then again testing of treated wateris done and finally treated water analysis is carried out
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- Wastewater analysis

The generated quantity of waste water is calculated and for calculation the quantity of water from various room by each person for washing is taken as 1.5L /head/day and also the water which is used by everyone in the building for bathing is taken as 30L/head/day .

Then these are multiplied by the number of persons using per day which will give the total amount of waste water generated per day.

- Waste water testing from the residential building

The calculation of physical and chemical characteristics of water is done . There are parameters like BOD (Biological Oxygen Demand),COD(Chemical Oxygen Demand), Ph, chlorides, turbidity, etc . Which are important for determining the water (used for any purpose) .

- Selecting the treatment

Preliminary treatment is selected which is done by passing water through meshes . Preliminary and primary process in domestic waste water treatment will remove approximately 25 percent of virtually all of the non organic and the organic load . Then in primary treatment the water is passed through the filter media and finally for secondary treatmentthe water is then passed to another tank . For biological treatment algae is used since secondary treatment is the biological treatment .

## Filter media components

- Activated charcoal

In this activated carbon has high adsorption capacity and due to its high degree of micro porosity, just one gram of activated carbon has 3000 sq.meter excess in surface area which is determined by gas adsorption . Activated charcoal traps impurities like pesticides, chemicals, solvents etc in the water whose selected size is 75 micron .

- Sand

The working procedure of sand bed is by providing the particulate solids with many opportunities to be captured on the surface of the sand grain and these are captured by the surface charged repulsion mechanism . For the filtration of the sand 1 mm to 1.36 mm size is used .

- Aggregate

For the filtration of sand filter gravel is used as a support media and for the maximum efficiency aggregate should be rounded rather than angular whose size is about 10 mm to 12.5 mm .

Types Of Wastewater Treatment

Typical Wastewater Treatment Plant
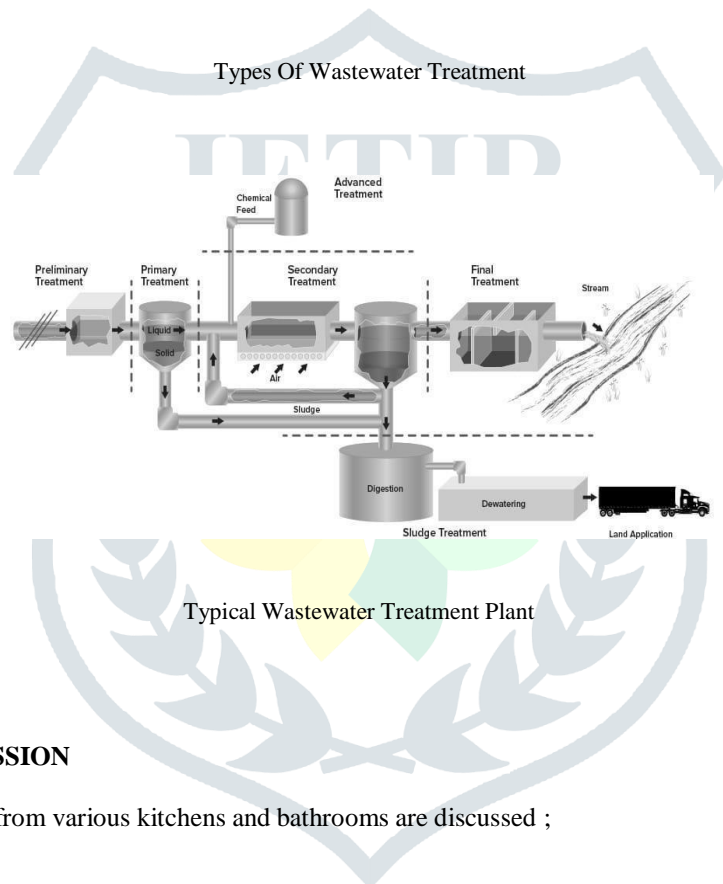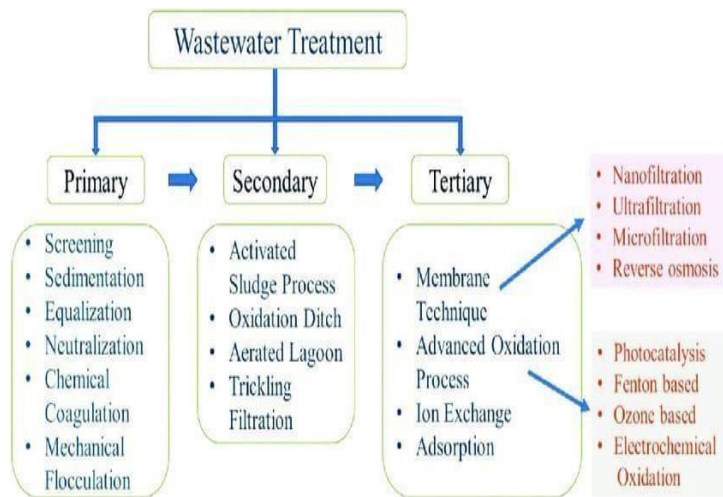
IV. RESULTS AND DISCUSSION

Test results of the wastewater from various kitchens and bathrooms are discussed ;

TABLE 1 TEST RESULT OF WASTE WATER FROM VARIOUS KITCHENS BEFORE
FILTERATION

SI.NO	Parameters	Readings	Desirable limits
1	Turbidity	0.5	1 NTU
2	pH	5.99	6.5 to 8.5
3	Acidity	10	
4	Alkalinity	24	200mg/l
5	Sulphate	1.5	200mg/l
6	Total Dissolved Solids	41	500mg/l
7	Total Hardness	30	200mg/l
8	Calcium	8	75mg/l
9	Magnesium	2.43	30mg/l
10	Chloride	10	250mg/l
11	Fluoride	0.04	1mg/l
12	Nitrate	5	45mg/l
13	Residual Chlorine	0	0.2mg/l

TABLE 2 TEST RESULT OF WASTE WATER FROM BATHROOMS BEFORE FILTERATION

SI.NO	Parameters	Readings	Desirable limits
1	Turbidity	0.8	1 NTU
2	pH	4.66	6.5 to 8.5
3	Acidity	16	
4	Alkalinity	32	200mg/l
5	Sulphate	2.9	200mg/l
6	Total Dissolved Solids	89	500mg/l
7	Total Hardness	61	200mg/l
8	Calcium	6	75mg/l
9	Magnesium	1.3	30mg/l
10	Chloride	48	250mg/l
11	Fluoride	0.02	1mg/l
12	Nitrate	2	45mg/l
13	Residual Chlorine	0	0.2mg/l

TABLE 3 TEST RESULT OF WASTE WATER FROM VARIOUS KITCHENS AFTER FILTERATION

SI.NO	Parameters	Readings	Desirable limits
1	Turbidity	0.33	1 NTU
2	pH	5.8	6.5 to 8.5
3	Acidity	12	
4	Alkalinity	18.6	200mg/l
5	Sulphate	1.9	200mg/l
6	Total Dissolved Solids	32	500mg/l
7	Total Hardness	47	200mg/l
8	Calcium	4	75mg/l
9	Magnesium	0.8	30mg/l
10	Chloride	33	250mg/l
11	Fluoride	0.01	1mg/l
12	Nitrate	3	45mg/l
13	Residual Chlorine	0	0.2mg/l

TABLE 4 TEST RESULT OF WASTE WATER FROM BATHROOMS AFTER FILTERATION

SI.NO	Parameters	Readings	Desirable limits
1	Turbidity	0.9	1 NTU
2	pH	7.8	6.5 to 8.5
3	Acidity	8.5	
4	Alkalinity	15.3	200mg/l
5	Sulphate	2.6	200mg/l
6	Total Dissolved Solids	12	500mg/l
7	Total Hardness	21	200mg/l
8	Calcium	18	75mg/l
9	Magnesium	11.3	30mg/l
10	Chloride	64	250mg/l
11	Fluoride	0.1	1mg/l
12	Nitrate	8	45mg/l
13	Residual Chlorine	0	0.2mg/l

V. CONCLUSION

On the basis of our findings we conclude that there are various ways of making a waste water fit for using again . We have also found that the filtration is one of the best way to purify the waste water having wastes such as hardness due to magnesium and calcium, phenol, chloride, suspended particles etc . After filtration we found that our water is free from any types of impurities such as suspended particles, bicarbonates, phenol, TDS etc . The cleans water can be used for many purposes such as cleaning clothes, gardening, flush etc . We can also used the water when there is scarcity of water in our residential building . All the materials that we are using for this purposes such as activated charcoal , aggregate , fine sand are easily available and can easilyexecuted .Now a days , we are in a position that availability of pure water is decreasing day by day so it is very important for usto use different ways to purify the waste water and reuse it .

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