Minerals pick up in Domestic Sewage at AMU Campus

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ABSTRACT

The Domestic waste water are so important it can be reused as drinking water, in industry (cooling towers), in artificial recharge of aquifers, in agriculture and in the rehabilitation of natural ecosystems ,waste water having many minerals in it and it is beneficial for the soil, There are lots of minerals in domestic sewage and it is usefull, so we can select three positions in campus and we collected many samples in it ,we analysis of all the result obtained, it becomes clear that domestic sewage is polluted and affects the soil and plants , we construct an efficient network in campus where we picking minerals in domestic sewage . There are numerous processes that can be used to clean up wastewaters depending on the type and extent of contamination.

Keywords: Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Conductivity, pH, COD.

1. INTRODUCTION

An important issue here is that the water of our world is not dividing up fairly between all its inhabitants, water shortages are most likely to occur in developing countries, which have the highest population rate. Approximately 1385 million cubic kilometres of water are available on earth. 97.5% of the water is salt water that can be found mainly in oceans. Only 2.5% is freshwater plants, animals and humans can use that.

However, nearly 90% of this freshwater is not readily available, because it is centred in icecaps of the Antarctic. Only 0.26% of the water on this world is available for human and other organisms, this is about 93,000 cubic kilometres. Only 0.014% of this water can be used for drinking water production. As most of it is stored in clouds or in ground Water is used for three main purposes; agricultural uses, industrial uses and domestic uses. Each country uses a different amount of its available water for these three main purposes. In percentages, the global uses for the three main purposes are divided up as follows;

- Agricultural(mostly irrigation)= 69%
- Industry = 23%
- Domestic use(household = drinking water, sanitation) 8%

Sampling methods

The different types of sampling procedures are as follows:

a. Grab, spot or catch sampling: A single catch sample collected from the sampling spot at any instant as a grab sample

b. Composite Sample: Composite sample are nothing but a mixture of grab sample collected at the same sampling point at different times. sometimes this procedure is called time composite sampling.

   Composite or integrated sample are collected. Grab samples collected at predetermined time interval of 30 minutes or one hour, proportional to the flow, are mixed or composted over a 24-hourperiod;

d. Integrated samples: Mixtures of grab sample collected from different points simultaneously, or as nearly as possible, are called as integrated samples.

Dry Survey:-

The study has been conducted in Amu Campus :

- Number of student residing outside the university campus =10,000
- Total number of student residing inside the university campus=30,000
- Number of academic staff=5500
- Number of Non teaching Staff=9000
- Total number of Staff=14500
- Total number of staff residing inside the university campus =6000
- Number of members in one family=5
- Total number of staff (including the family)=36,000

Sampling procedure adopted:-

Samples collected from within university campus of Aligarh. It is collected from three locations in the campus; the area where the sample is to be taken is given as follows.

- Sir Ziauddin area
- Allama Iqbal area
- Civil Engineering area
- Secondary water (to be taken as standard)

2. RESULT AND DISCUSSIONS

- ***Solids:***

Suspended and dissolved solids, both organic and inert, are common testes of polluted waters. In drinking water, the maximum recommended total dissolved solids concentration is 500mg/. Suspended and volatile solids are common parameters used in defining a municipal or industrial wastewater. The term suspended solids and dissolved solids refer to matter that is retained and passed through a filter, respectively.

Table1.1 Determination of total solids

S No.	Volume of sample V(ml)	Before Evaporation A(g)	After Evaporation B(g)	Difference (A-B) g	TS (A-B).10ex6/V mg/l
Sample No1					
1	50	48.089	48.129	0.04	5.898
SampleNo.2					
2	50	54.813	54.849	0.036	1.144
Sample No3					
3	50	51.269	51.299	0.030	0.128
Sample No4					
4	50	50.539	50.561	0.022	1.898

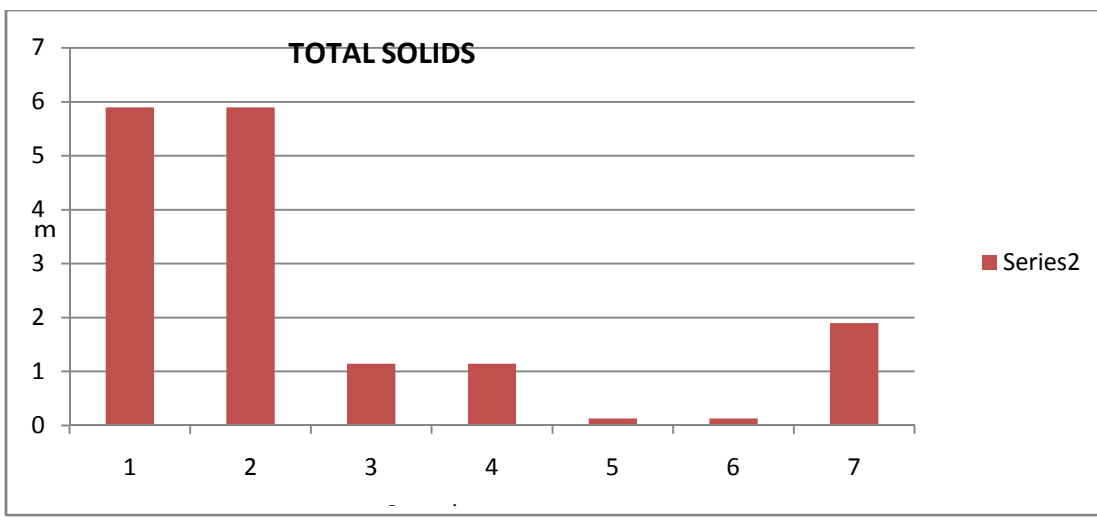

Fig:1.1 Determination of total solids

- **pH:**

Water dissociates to only a slight degree yielding a concentration of hydrogen ion equal to 10exp-7 moles per litre.

Table1.2 Measurement of pH

S No.	MEASUREMENT OF PH	
	Sample	PH
1	Allama Iqbal Hall	7.5
2	Sir Ziauddin Hall	7.5
3	Civil Engg.	7.5
4	Water	7

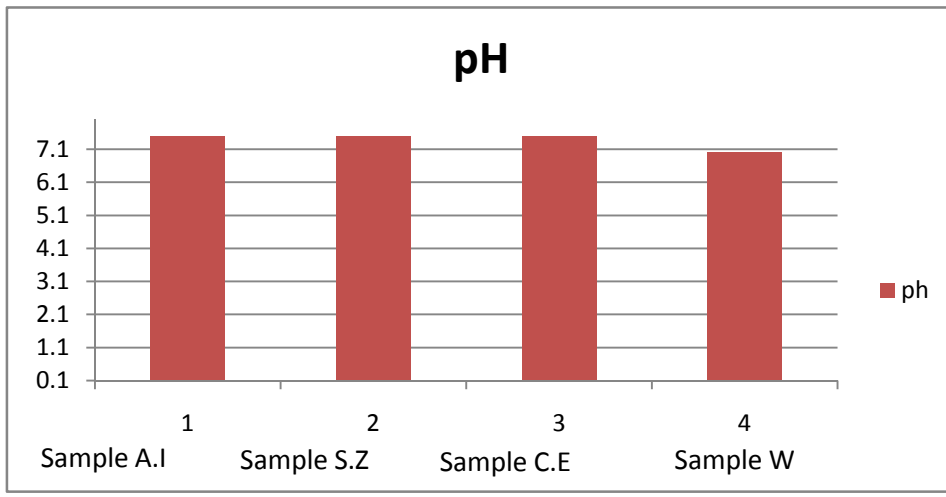

Fig:1.2 Determination of pH

- **Chloride :**

Chlorides occur in all natural waters in widely varying concentration. The chloride content normally increases as the mineral content increases.

- **Chemical oxygen demand:**

COD is widely used to characterise the organic strength of wastewater and pollution of natural water. The test measures the amount of oxygen required for chemical Oxidation of organic matter in the sample to carbon dioxide and water. This mixture refluxed (vaporized and condensed) for 2 hour. Most type of organic matter are destroyed in this boiling mixture of chromic and sulphuric acid. Equation after cooling, washing.

Organic + $Cr_2 O_7 + H^+ \rightarrow CO_2 + H_2o + 2Cr^{+++}$

The dichromate remaining in the specimen is titrated with standard ferrous ammonium sulphate using fermions' indicator. Ferrous ion reacts with dichromate ion as in above equation with an end point colour change from blue-green to reddish brown.

$$6Fe^{+++} + Cr_2O_7 + 14H^{+} \rightarrow 6Fe^{+++} + 7H_2$$

Table 1.4 Determination of Chemical Oxygen Demand(cod):

S No.	Burette Reading		Titrant used (FAS) ml
	Initial Reading	Final Reading	
Sample No.1	20 ml		
1	0.0	20.8	}A=20.9
2	0.0	20.9	
3	0.0	20.9	
Sample No.2	20 ml		
1	0.0	21.7	
2	0.0	21.9	}A=21.9
3	0.0	21.9	
Sample No.3	20 ml		
1	0.0	21.9	
2	0.0	22.0	}A=22.0
3	0.0	22.0	

- **Conductivity**

Table.1.5 Measurement of conductivity:

Sample No.	Specific Conductivity
1	113
2	84
3	100
4	65

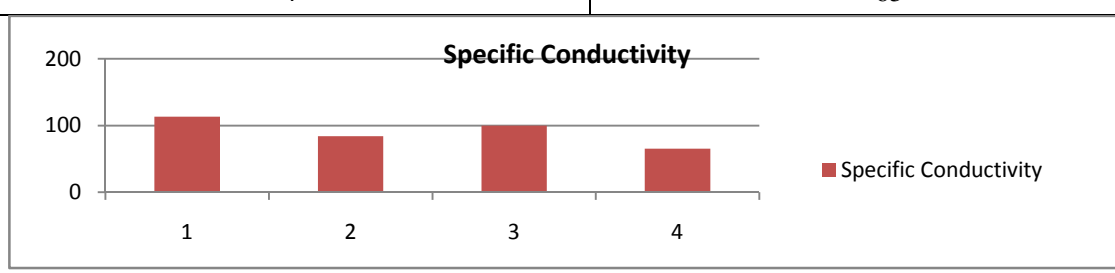

Fig1.5 Measurement of conductivity:

- **Hardness**

Hardness caused by multivalent metallic cat ion; those most abundant natural water are calcium and magnesium. Hard water from both underground and surface supplies are most common in areas having extensive geological formation of limestone. Although satisfactory for human consumption Ca and Mg precipitate soap, reducing its cleaning action and cause scale Water with less than 50mg/l hardness are reconsidered soft up to 150mg/l moderately hard, and in excess of 300mg/l very hard.

Table 1.6 Determination of total hardness:

S No.	Initial Readings (ml)	Final Readings(ml)	Difference(ml)	Titrant Used (EDTA)(ml)
Sample No.1	25(ml)			
1	0.0	16.4	16.4	}A=16.5
2	0.0	16.5	16.5	
3	0.0	16.5	16.5	
Sample No.2	25(ml)			
1	0.0	17.6	17.6	}A=17.7
2	0.0	17.7	17.7	
3	0.0	17.7	17.7	

The parameters of domestic sewage in amu:

Table1.7Parameters of domestic sewage in amu.

S No.	PARAMETER	Ground Water	Domestic sewage(avg.)	Mineral Pick up	Percentage inc.	Effluent Discharge Standard	Drinking water standard
1	pH	7.0	7.5	-	6.67	5.5-9.0	6.5-8.5
2	Conductivity (microS/cm)	650	990	340	34.34	700	-
3	T.D.S(mg/l)	1868	2357	489	20.76	2100	500
4	T.S.S(mg/l)	30	32.67	2.67	8.162	100	
5	Total Hardness(mg/l)	328	357.33	29.33	8.21	-	300
6	Ca Hardness(mg/l)	132	155.33	23.33	15.02	-	75
7	Mg Hardness(mg/l)	196	202	6	2.97	-	30
8	COD(mg/l)	120	208	88	42.31	250	-

3. CONCLUSION

After an analysis of all the result obtained, it becomes clear that domestic sewage is polluted and affects the soil. The main agent of pollution present in domestic sewage is total dissolved solids

and conductivity. It is highly enough has compared to standard data of effluent discharge by control pollution board. So the domestic sewage cannot be used for irrigation purpose .chloride content is low due to mainly concentrate in domestic area rather than industrial belt. Suitable method should be adopted to reduce the concentration of undesirable substance and make the waste water suitable for discharge in the environment.

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