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Total organic carbon and its variation in grey water samples

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Abstract
Organic carbon is present mostly in water and soils. It is being transformed in to various forms like dissolved carbon, inorganic carbon and particulate carbon depending on elements, temperature and pressure. The source of organic carbon is food waste, sewage, effluents from sugar industry, distilleries, and paper and pulp industries. Total Organic Carbon (TOC) is a pollutant in water. During organic carbon decay the bacteria consumes dissolved oxygen, thereby makes the water unfit for human consumption. In this present study an attempt has been made to analyze grey water samples for Total Organic Carbon (TOC), Inorganic Carbon(IC) and Total Carbon (TC). TOC values varied from 96 mg/l to 1098 mg/l.

Keywords: Organic Carbon, Variation, pollutant in water

1. Introduction
Organic matter plays a major role in the aquatic system. It affects biogeochemical processes, nutrient cycling, biological availability, chemical transport and interactions (Niemirycz, 2006)[4]. Total carbon is a sum of inorganic carbon and organic carbon. Mostly organic carbon is bio degradable either under aerobic conditions or under anaerobic conditions. TOC analysis can be utilized for monitoring microbial contamination (Brian, 2002)[1].TOC analysis is a useful tool for monitoring the migration of organic chemicals in water flow. There are inorganic carbon and organic carbon containing substances in natural waters (Edward, 2001)[2]. It is commonly considered that marine derived organic carbon is readily degradable whereas terrestrially-derived organic carbon is refractory, eventually becoming integrated into permanent sedimentary deposits. (Loh.P.S, 2002)[3].

2. Literature Review
Brian Wallace et.al, 2002[1] analyzed different water samples for TOC values and concluded that TOC analysis as a precursor to disinfection in potable water. If the TOC values are more, the dosage of disinfectant should be increased or the contact period of disinfectant should be increased.
Edward Todd Urbensky, 2001[2], identified in his study both inorganic carbon and organic carbon containing substances in natural waters.
NiemiryczE,(2006)[4],It was observed that Biological Oxygen Demand(BOD) and Chemical Oxygen Demand(COD) are directly proportional to Total Organic Carbon(TOC) values. It can be concluded that TOC analysis is an indirect estimation of COD values.

3. Methodology
Grey water samples were collected from Caledonian College of engineering canteen. Total ten samples were collected at regular intervals. Samples 1 to 4 collected during morning hours, samples 5 to 7 collected during afternoon hours and samples 8 to 10 collected during evening hours. The samples were analyzed using Shmadzu make Total Organic Carbon analyzer. All the samples were filtered using Whitman No 1 filter paper and fed in to TOC analyzer auto sampler tray.

4. Results and Discussions

The Total Organic Carbon, Inorganic Carbon and Total Carbon analysis of all the 10 samples were shown in Table 1.

Table 1: TOC, IC and TC values of Grey water samples.

S. No	Samples details	Total OrganicCarbon, mg/l	Inorganic Carbon, mg/l	TotalCarbonmg/l
1	GW-1	478	8	486
2	GW-2	310	13	323
3	GW-3	333	15	348
4	GW-4	398	13	411
5	GW-5	996	21	1017
6	GW-6	1098	29	1127
7	GW-7	552	10	562
8	GW-8	234	18	252
9	GW-9	180	21	201
10	GW-10	96	21	117

5. Discussions

The morning hours grey water samples GW-1 to GW-4, TOC values varied from 310 mg/l to 478 mg/l. IC values varied from 8 mg/l to 15 mg/l and TC values varied from 323 mg/l to 486 mg/l.

The afternoon hours grey water samples GW-5 to GW-7, TOC values varied from 552 mg/l to 1098 mg/l. IC values varied from 10 mg/l to 29 mg/l and TC values varied from 562 mg/l to 1127 mg/l.

The evening hours grey water samples GW-8 to GW-10, TOC values varied from 96 mg/l to 234 mg/l. IC values varied from 18 mg/l to 21 mg/l and TC values varied from 117 mg/l to 252 mg/l.

Total Organic Carbon values varied from 96 mg/l to 1098 mg/l. A graph is drawn keeping grey water samples on x-axis and corresponding TOC values on y-axis and is shown in Fig 1.

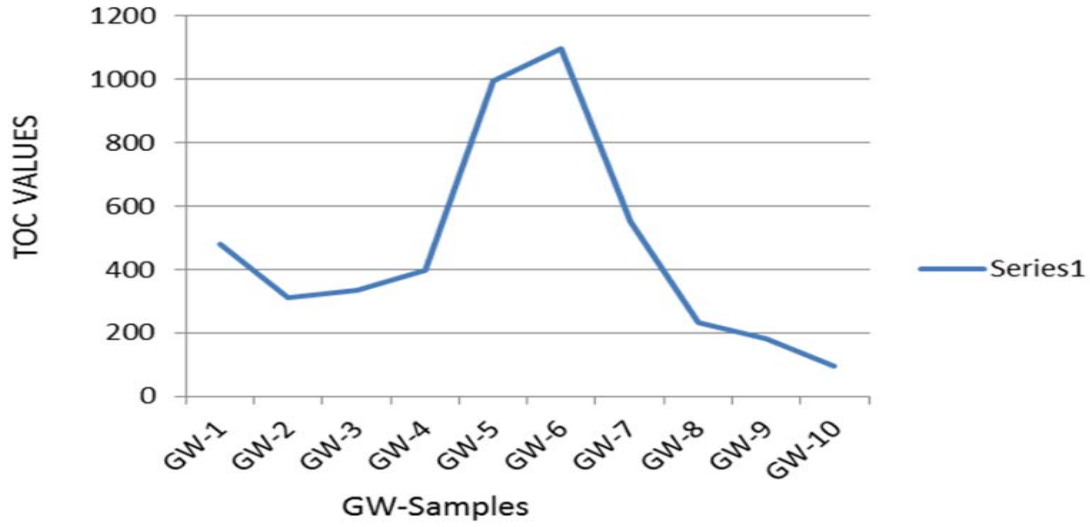

Fig 1: TOC values in Grey Water samples.

Inorganic Carbon values varied from 8 mg/l to 29 mg/l. A graph is drawn keeping grey water samples on x-axis and corresponding IC values on y-axis and is shown in Fig 2.

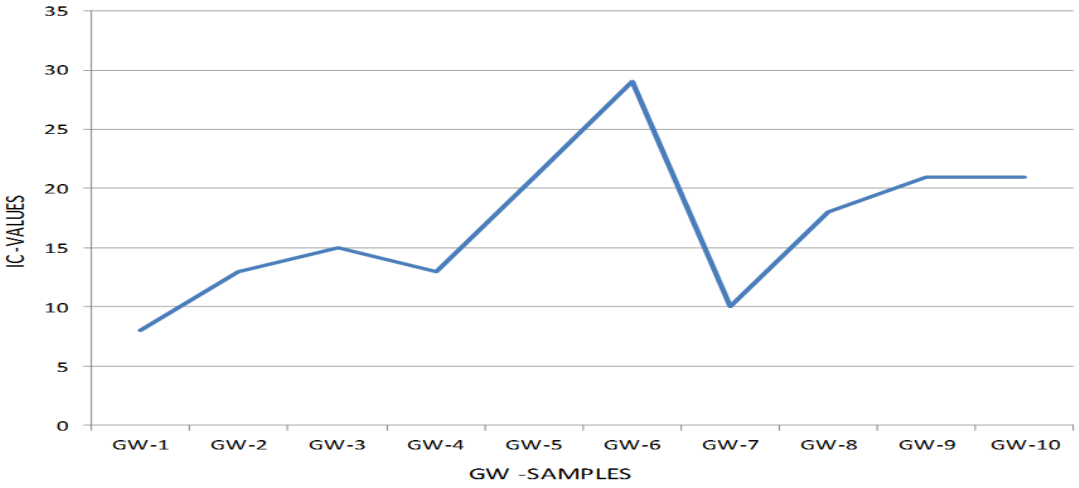

Fig 2: Inorganic Carbon values in grey water samples.

Total Carbon values varied from 117 mg/l to 1127 mg/l. A graph is drawn keeping grey water samples on x-axis and corresponding TC values on y-axis and is shown in Fig 3.

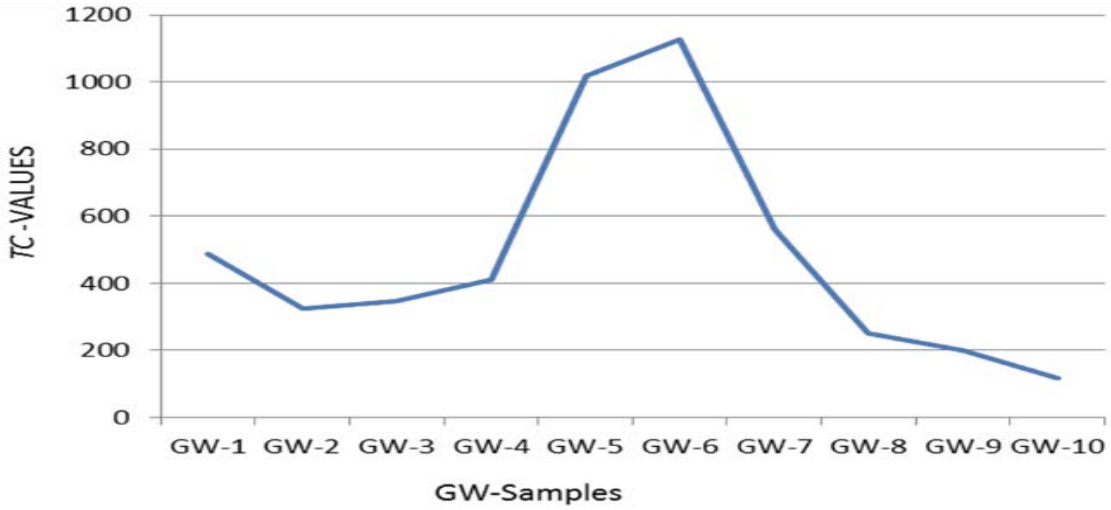

Fig 3: TC values in Grey Water samples.

6. Conclusions

Total Organic Carbon values are the highest during afternoon hours and the lowest during evening hours. The source of organic carbon in grey water samples is food waste and wash water. It was observed that inorganic carbon values in all the samples were very less.

Total Organic Carbon values indicate the pollution load of grey water samples. It is an indirect estimation of BOD and COD values. It is concluded that TOC values are directly proportional to COD values.

7. Acknowledgement

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8. References

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