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KEY WORDS: contamination, parameters, distance, comparison, etc…

ASSESSMENT OF GROUNDWATER NEAR WASTE DUMPING YARDS

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ABSTRACT

Physical, chemical and bacteriological analyses of water sampling from five bore wells located around landfill site at Mavallipura, Bengaluru was carry out to ascertain the magnitude of dumpsite pollution on groundwater quality. During study stop, 4 Bore wells were located around the landfill area at an aloofness of 300, 40 0, 600 and 800m. . The analysis was done for four months from January – April. The parameters analyzed during the study period were Conduction, pH , turbidity, Dissolved oxygen (DO), Biochemical oxygen demand(BOD), COD, Total dissolved solids (TDS), Sum Hardness, Total alkalinity , Nitrates, Fluorides, Chlorides , Most Probable number (MPN) and heavy metal such as Lead using standard laboratory procedures. The pH ranged from 6.48 to 8.89 except S1 which is alkaline in nature, the turbidity values ranged from 1 to 58.5 NTU. Tightness of Hardness from 56- 2890 mg/l, TDS as 311- 7117mg/l, Conductivity as 0.47- 10.95 mho, DO from 0- 8.5 mg/l, BOD from 18- 271 mg/l, COD as 16- 2655 mg/l, chlorides as 32- 2880 mg/l, Nitrates from 5-58mg/l, fluorides from 0.29- 21 mg/l and MPN values are varied the most from 0- 161. As these ranges when compared to the standards of drinking water, the samples S1 and S2 are seriously affected. The resultant showed that the other samples were contaminated by E-Coli bacteria; prescribed by WHO and Bureau of Indian standards for drinking water. As the true sample was also collected at 1.5km distance from the landfill area and tested for the parameters, showed that the groundwater taint has been reduced as the distance from the landfill gain.

INTRODUCTION

Groundwater is a globally important and valuable renewable resource for human life and economic growth. It constitutes a major portion of terra firma 's water circulatory arrangement known as hydrological cycle and occurs in permeable geologic formation known as aquifer. Wastefulness includes all the discarded solidness stuff from commercial, municipal, industrial and agricultural activities. Groundwater pollution is due to the rapid industrialization and urbanization that has gradually developed over time without any heed for environmental consequences. In Holocene epoch times, the wallop of leachate on groundwater and other water resources has attracted a lot of attention because of its overwhelming environmental significance. Leachate migration from wastes site or landfill and the release of pollutants from sediments affectedness a high risk to groundwater resource if not adequately managed. Open rubbish dump are the oldest and most common way of disposing of solid wastes, although in recent years, grand have been closed, many are still being used. Waste direction has become increasingly complex due to the increase in human population, industrial and technological revolutions and the processes that dominance the fortune of wastes in the soil is complex and many of them are poorly understood. Issues such as nutrients release rate and other chemical substance, leaching of nutrients, metallic element through macro instruction pore as suspended solid and sludge organic fertilizer issue on the sorption debasement are often not understood by many. Leaching of hydrophobic organics and long term bioavailability and fate of metals fixed by soil organic affair needed to be studied to have a better approach in handling groundwater pollution. Toxic chemicals that have high immersion of nitrate and derived from waste in the soil can filter through a dump and co.

1.1OBJECTIVES

1. Ground water quality appraisal around solidness waste landfill surface area.
2. Analytic thinking of parameters such as chemical substance, bacteriological and heavy metals like Lead, Copper, Iron
3. Analysis of samples from the month of January to April.
4. Comparison of obtained results with world health organization portable water standards and Indian standards for drinking water quality.

2. STUDY AREA

The selected landfill site for labor is Mavallipura, which is located in Bengaluru Karnataka India. It is located 15km away from sub-district headquarter Bangalore North and 15km away from district headquarter Bangalore.

The totality geographical area of Greenwich Village is 303.17 hectares. It has a total population of 1,000 people. There are about 218 business firm in this village. The people in this village are facing the major problem of land water contamination due to the waste dumping yard which is located 3.2 kms away from the village.

3. METHODOLOGY

3.1 GRAB SAMPLING TECHNIQUE

A grab sample, also known as catch sample, consist of single sample taken at specific time. Grab samples are useful in determining the effects of extreme conditions of the water or wastewater during the time samples are being collected or when the water or wastewater flow is intermittent.

3.2 COLLECTION OF SAMPLE

Samples were collected and stored in bottles made of plastic for specific analysis. Bottles were carefully cleaned before each use. The bottle should be filled to the spinning top with as little air as possible remaining and sealed tightly. All sampling were properly labeled with details of the source, date of sampling and meter of sampling. The samples were tested in laboratory within 24 prison term of day from the prison term of collection. If the sample analyzing time exceeds 24 hours then they were preserved at 4şC and the analysis was done within 48 hours.

3.3 SAMPLES COLLECTION POINTS IN THE LANDFILL SITE

The landfill site as mentioned in the study area selected for the assessment is Mavallipura. As the location of the sampling stations must be groundwater, we checked for the availability of bore wells around the landfill and which are currently in use by the people. The bore points were located at certain distances such as 300m, 450m, 600m and 800m as S1, S2, S3 and S4 respectively. Then the samples were collected from the selected sites and were taken to the laboratory for testing.

3.4 Experimental Analysis:

1. After the collection of samples it was brought to the laboratory within 24 hours.
2. The samples were tested separately for every parameter of drinking water standards.
3. The parameters tested were pH, turbidity, conductivity, BOD, COD, heavy metals, MPN.
4. The readings were noted down and calculated using suitable formulas.
5. The results were noted down and graphs were plotted.
6. The results were compared with the standards of drinking water.

4. RESULTS

The main objective of this project was to test the groundwater samples around the waste landfill. The experiments were conducted for each of the samples for all the drinking water parameters.

In this section the results obtained for the parameters are compared to one another and discussed.

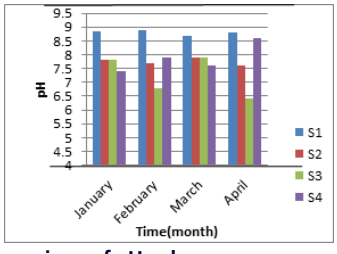

Chart 1: comparison of pH values

The chart -1 represents the comparative results for pH of S1, S2, S3 and S4.
The above graph shows the PH values

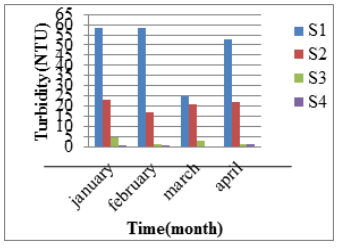

Chart 2: Comparison of turbidity

The Chart -2 represents the comparative results of turbidity for all the samples

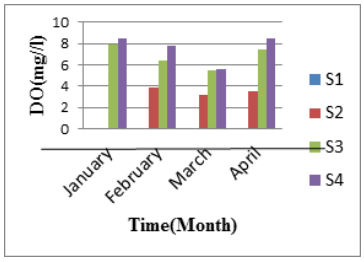

Chart 3: comparison of DO

The chart 3 represents the comparative results of dissolved oxygen.

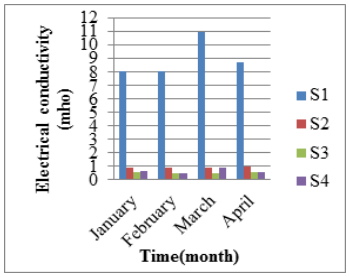

Chart 4: comparison of conductivity

From the above graph, it is evident that sample 1 has the highest electrical conductivity which leads to high total dissolved solids in sample 1.

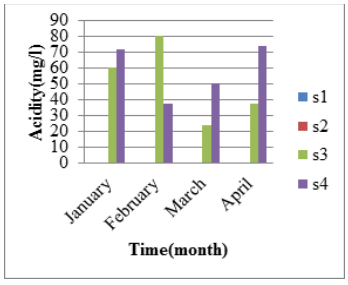

Chart 5: comparison of Acidity

From the above graph it is evident that S3 and S4 samples are acidic in nature.

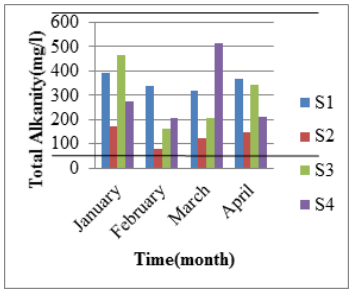

Chart 6: comparison of Alkalinity

From the above graph, it is evident that the Alkanity of all samples are within the acceptable limits as well as permissible limits as per IS 10500:2012 which is 200-600 mg/l. We can conclude that S4 is slightly alkaline compared to other samples.

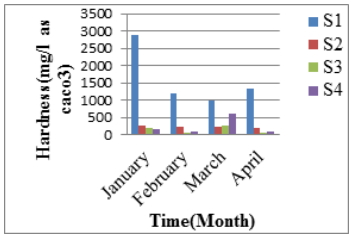

Chart 7: comparison of Hardness

From the above graph, it is evident that S1 and S2 have higher total hardness compared to S3 and S4 samples which are within the acceptable limits as per IS 10500:2012.

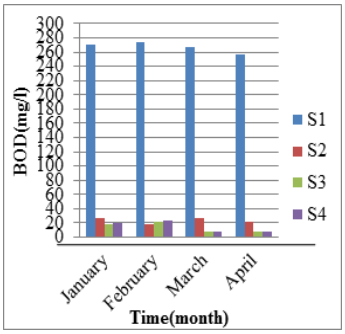

Chart 8: comparison of BOD

From the above graph, it is evident that all the samples have high BOD values which makes the water unfit for drinking as per IS 10500:2012 .Especially S1 has the highest BOD compared to all the samples.

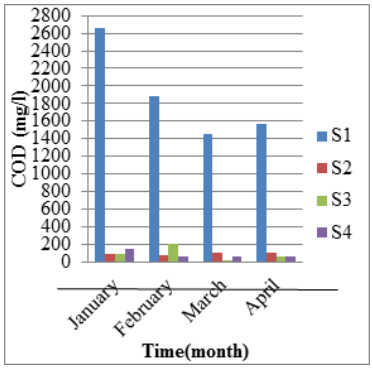

Chart 9: comparison of COD

From the above graph, it is evident that sample S1 has highest COD value compared to all other samples. Whereas Sample S2, S3, S4 have exceeded the acceptable limits as per IS 10500:2012.

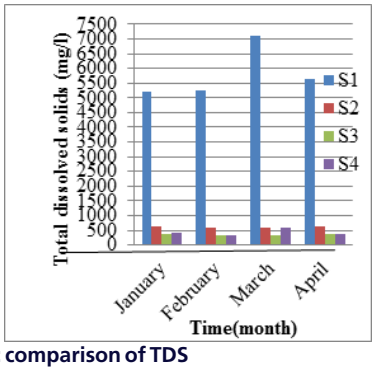

Chart 10: comparison of TDS

From the above graph, it is evident that samples S1 and S2 have high TDS which is beyond the acceptable limit as per IS 10500:2012. Since their electrical conductivity is very high, so their TDS is also high.

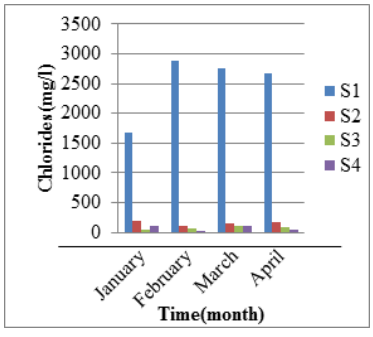

Chart 11: comparison of chlorides

From the above graph, it is evident that only sample S1 has high chloride content which has exceeded the permissible limit as per IS 10500:2012

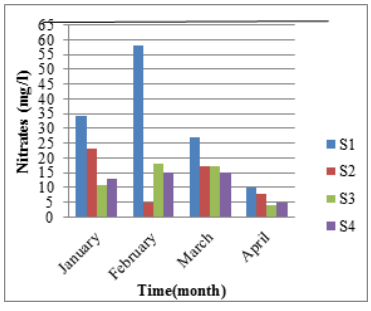

Chart 12: comparison of nitrates

From the above graph it is evident that, the Nitrates level are being reduced for every month, so there is no problem of excess Nitrates and the values obtained are within the desired limit.

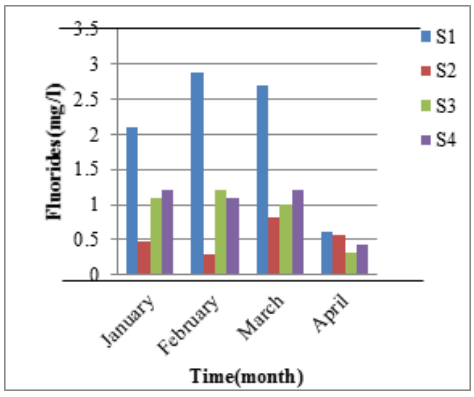

Chart 13: comparison of Fluorides

From the above graph it is evident that, the fluorides level are being reduced for every month, so there is no problem of excess fluorides and the values obtained are within the desired limit.

The below table shows the values of lead

Month	Lead values of Samples (mg/l)			
	S1	S2	S3	S4
January	BDL	BDL	BDL	BDL
February	0.74	BDL	BDL	BDL
March	BDL	BDL	BDL	BDL
April	ND	BDL	BDL	BDL

From the above table it is evident that, the lead content is not at all detected in all the four samples. Hence we can conclude that the ground water does not contain any amount of lead

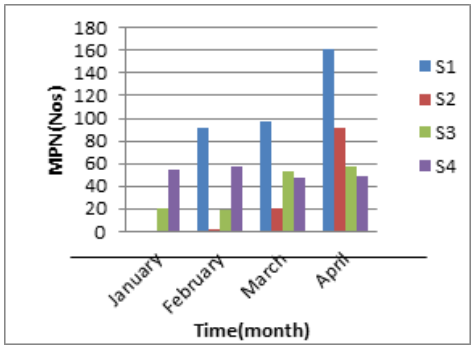

Chart 14: comparison of MPN

From the above graph it is evident that, the no of total coliforms are very high in sample S1 and S2 and other two samples also have crossed the permissible limit, so the ground water near the landfill is very dangerous for life.

From the graphs of all the parameters, it is evident that samples S1 and S2 are most contaminated and the most important the E coli bacteria is present in the other samples too in which it is the serious threat to human lives.

5. CONCLUSIONS

1. As the groundwater is very precious it should be protected to good extent.
2. By the judgment of groundwater system around the waste matter landfill show that the water is contaminated to a severe extent.
3. The parameters are varied periodically due to the climatic changes in the environment.
4. It is observed that prevention is better than cure in which proper precautions should be taken before the dumping of waste on the land.
5. Comparing the results it was uncovering that also the land was also contaminated on which the waste was dumped.

6. We can conclude that the groundwater pollution has been reduced, as the distance from landfill area increases.

6. REFERENCES

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