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Assessment of drinking water quality in some selected primary schools in Visakhapatnam

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ABSTRACT

Water represents the basic elements supporting life and the natural environment, a primary component for industry, a consumer item for humans and animals, and a vector for domestic and industrial pollution. Much of ill health that affects humanity, especially in the developing countries can be traced to lack of safe and wholesome water supply. There can be not state of positive health and well being without water. In order to find out the relationship amongst different physico-chemical parameters of water samples, correlation coefficient are worked out and the large number of significant correlations are obtained. The result obtained from 25 water samples from selected places i.e. MVP Colony and Old post office area were found to be acceptable for drinking purpose .While those collected from Lawson's Bay colony, Akkyapalem, Dugra Bazar and Yendada were found unfit for drinking purpose. So, it can be concluded that though the quality of water in most places in Visakhapatnam is acceptable there are also few places where water needs to properly treated before consumption.

Keywords: Drinking water quality, selected schools and Water quality index.

INTRODUCTION

Historically, the provision of urban environmental services in general and piped water in particular, has been the responsibility of the public sector. However, due to the rapid increase in urban populations, governments are often facing major difficulties in meeting the citizens' basic needs **[1].**

This issue is of major concern in developing countries, where existing conditions of the water supply infrastructure is poor, services are inferior, and financial resources for the construction and maintenance of infrastructure are inadequate **[2].** Water is not only a vital environmental factor to all forms of life, but it has also a great role to play in socio-economic development of human population. The extent of ground water pollution depends on rainfall pattern, depth of water table distance from the source of contamination, soil properties, such as permeability **[3].** Water pollution is a growing hazard in many developing countries owing to human activity. Visakhapatnam is a rapidly growing city due to constantly increasing population and industrial activity. Many residential colonies springing up in and around city. The municipal corporation of Visakhapatnam has been constantly trying to find new source of water in addition to existing ones to cope up with the increasing industrial and domestic demands. Visakhapatnam is one of the important Pilgrim and Tourist centers in Andhra Pradesh. In this area ground water and municipality water are the sources for agriculture, drinking and other domestic purposes. The Municipal Corporation of Visakhapatnam has been supplying drinking water to government schools of Visakhapatnam.

In recent years, the role of the informal private sector has been gaining much attention, because it is seen to be most accountable to the low-income population. More specifically, the informal private sector is widely involved in the provision of water through what is commonly known as "water vending", which is defined as the act of providing water through tanker trucks or mobile water vendors, stand-pipes, and water shops, with the exclusion of the "bottled water" industry (World Health Organization and United Nations Children Fund, 2000) **[4]**. In most developing countries where public water and sanitation networks are not trusted or are altogether absent, consumers resort to alternative sources of freshwater, such as small-scale water vendors. By keeping in view about cited information the present work has been undertaken to assess the quality of drinking water in few government schools and one private school. For the present study some government schools are selected and drinking water samples are collected from them.

MATERIALS AND METHODS

Study Area:
Visakhapatnam is situated in between 17 40 '30" and 17 45' North Latitudes and 83 16' 15" and 83 21' 30" East Longitude on the East Coast of India .Major Industries have been established in and around the city. The city is surrounded by hill ranges of Eastern Ghats and the main city is located between the hill, with Kailashgiri on the North and Dolphin Nose on south.

The present study was carried out in some selected government schools. The studies have been conducted in 24 schools and one Sample from TSR reservoir from where Municipality tankers are collecting water carried to schools.

Collection of water Samples:
Total eleven Physico-chemical parameters of the water samples that were analyzed were obtained from 24 sampling sites. All water samples were collected in well cleaned sterilized (sun –Dried) wide mouthed bottles. All the water samples were brought to the Environmental Engineering Laboratory with necessary precautions and were properly labeled. The physical, chemical and bacteriological analysis was done within six hours. The dissolved oxygen was fixed in well sterilized 300 ml BOD bottles by using Manganous sulphate and Alkali-Iodide –azide. The physico-chemical and microbiological attributes which were carried out in the laboratory were as follows (APHA 1992) **[5].**

The physico –chemical attributes:
pH, Conductivity (milli mhos.), Total Solids (mg/L), Total Dissolved Solids (mg/L), Dissolved Oxygen (mg/L), Chlorieds (mg/L), Nitrates (mg/L), Phosphates(mg/l), Sodium (mg/L), Potassium (mg/L), Fluorides(mg/L)

RESULTS AND DISCUSSION

The result of physic-chemical parameters of drinking water samples collected from different schools are shown in table no:1a &1b

The pH of a solution in numerically equal to the negative power to which 10 must be raised in order to express the hydrogen ion concentration in a solution. The pH has no direct adverse affect on health, however a low value below 4.0 will produce sour taste and a higher value above 8.5 show alkaline taste. The permissible value prescribed by Central Pollution Control Board is 6.5-8.5 and 7.0-8.5 as World Health Organisation Standards. The pH value of all the samples were observed between a range of 6.26-7.63.

The electrical conductivity values are an index to represent the total concentration of soluble salts in water. The electrical conductivity in all the samples were well below the permissible limit of 2.75 milli mohs/L. The electrical conductivity of all the samples were observed between a range of.001-2.27 milli mhos.

The suspended Solids (in particular clays and organic particles) have large adsorption surface and constitute an ideal support for ions, Various molecules and microorganisms. The Total Solids of all the samples were observed between a range of 40mg ./L-1580mg./L.

The individual of a substance are mixed in among the water molecules, these are dissolved solids. Total Dissolved Solids of all the samples were observed between a range of 40 mg./L- 1500mg./L.

Table-1a: Physico-Chemical parameters of selected sampling sites

Sno	Parameter	Q1	q2	q3	q4	q5	q6	q7	q8
1	Ph	10.5563	10.5009	1.2389	10.4594	10.1827	10.5563	10.4318	10.2242
2	Dissolved Oxygen	32.8	33.2	30.8	30	34	14.4	20	3.2
3	TDS	0.02	0.012	0.022	0.006	0.004	4.1	0.006	0.12
4	TS	0.088	0.08	0.104	0.04	0.04	0.016	0.048	0.504
5	Chlorides	0.064	0.016	0.072	0.016	0.048	0.064	0.088	0.664
6	Nitrates	-	-	-	-	-	0.0129	0.0018	0.1143
7	Sodium	0.08825	0.0612	0.0725	0.0097	0.0047	0.01	0.0047	0.1375
8	Fluorides	20.064	19.228	27.61	12.584	13.772	41.712	47.256	92.972
9	Σqi	56.08	54.298	62.11	47.115	49.251	70.871	77.836	120.73

Table-1b: Physico-Chemical parameters of selected sampling sites

Sno	Parameter	q9	q10	q11	q12	q13	q14	q15	q16	q17	q18
1	Ph	10.1689	10.2381	9.989	9.408	10.2381	10.044	9.753	9.1312	8.6608	8.6
2	Dissolved Oxygen	21.6	32.8	28	34	32.8	10.4	10.8	9.6	26	26
3	TDS	0.014	0.24	0.008	0.04	0.024	0.086	0.024	0.15	0.078	0.078
4	TS	0.08			0.12		0.04	0.152	0.632	0.368	0.368
5	Chlorides	0.064	0.12	0.144		0.12	0.064	0.088	0.544	0.288	0.288
6	Nitrates	0.0029	0.4674	0.0021	0.0173	0.4674	0.0086	0.0857	0.1433	0.0816	0.0806
7	Sodium	0.0047	0.06	0.075	0.625	0.0157	0.0045	0.1232	0.15	0.1325	0.1325
8	Fluorides	11.088	49.412	66.352	70.532	49.412	46.37	170.016	106.56	63.624	63.624
9	Σqi	43.022	85.225	102.1	107.9	84.359	79.74	202.64	137.3	94.43	93.6

Mean values are given as results. Q is the code of sampling site

The Dissolved Oxygen is Significant Mainly for survival of aquatic life. The higher the concentration of dissolved oxygen the better is the quality of water. It has no direct effect on Public health but the water without dissolved oxygen tastes flat. The dissolved Oxygen was analysed along with the temperature. All the samples were found to have a range of dissolved oxygen between 4mg./L.-6mg./L.

The Chlorides occur naturally in varying concentrations .It increases with the increase in mineral content. River and ground water usually have the considerable amount .Ground water in area adjacent to seas and are in hydrostatic balance with sea water. Overpumping produces a difference in hydrostatic load and intrusion of sea water occurs leading to chloride content increase. The chlorides of all the samples were found to have a range of between 10Mg./L-415mg./L.

As per the guidelines of Central Pollution Control Board (1991) & World Health Organisation (1984) there is no specific permissible limit for Phosphates. The phosphates of all the samples were found to have a range of between 0.02mg./L.-0.516mg./L **[6].**

It is found that all the samples are free from nitrate pollution. The Maximum allowable limit for nitrate in drinking water is 45mg/L **[6]**. The nitrate of all the samples were found to have a range of between BDL (Below Detectable Limit) 9.746mg./L.

All the samples were found to have Sodium & Potassium within the range between respectively. All the Samples were found to have Fluorides within the range of between 0.252mg/L.-3.864mg./L. Some Samples (S8, s15, S16, S18) we reported high values of Fluorides. These are high above the permissible Values. The rating of water Quality index (WQI) of water samples was calculated and represented in table-6. The result of WQI values of these samples are found to be in the range of 43.5215-204.9934 **[7].**

The Water Quality Index is well within the limits in all sampling stations except S8, S11,S12, S15, S16, and S24. Hence it is suggested to take necessary precautions before the water is used for drinking purposes.

CONCLUSION

Visakhapatnam is one of the famous educational hub of Andhra Pradesh. It attracts student's development through which conversation and the co –relation coefficient for economic development can be planned. Water Quality Index indicates the Quality of water unfit for drinking purpose. The sample collected at Akkyapalem, Nagara Palaka

Samstha Prathamika Pathashala (WQI value:204.9934).In order to find out the relationship amongst different physico-chemical parameters of water samples, correlation coefficient are worked out and the large number of significant correlations are obtained. The result obtained from 25 water samples from selected places i.e. MVP Colony and Old post office area were found to be acceptable for drinking purpose .While those collected from Lawson's Bay colony, Akkyapalem, Dugra Bazar and Yendada were found unfit for drinking purpose. So, it can be concluded that though the quality of water in most places in Visakhapatnam is acceptable there are also few places where water needs to properly treated before consumption.

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REFERENCES

[1]. Bennet, E.B. Public-private Cooperation in the Delivery of Urban Infrastructure Services (Water and Waste), Yale-United Nations Development Program-Public Private
Partnerships **1998,** (UNDP-PPP).
[2]. D. G. Shah and P. S. Patel. Physico-chemical characteristics of bore wells drinking water of Kathalal territory district-Kheda, Gujarat. *Der Chemica Sinica*, **2011,** 2(5): 8-11
[3]. Charttergee, A. K. Water supply waste disposal and environmental health (5^{th} edition).Khanna publishers **1994.**
[4] WHO. Guidelines for drinking water quality (2^{nd} edn). WHO **1984** , Geneva.
[5]. APHA. Standard Method for the Examination of Water Wastewater 18^{th} end. Published by American by American Public Health Association water Environment Federation **1992** pg 541-42.
[6].CPCB report. Central Pollution Control Board, New Delhi **1991.**
[7] Shaukat Patel and S.H. Quadri. Physico-chemical parameters of Bore well situated near Industries. *Der Chemica Sinica,* **2011,** 2(5):194-199