Vol III Issue X July 2014

ISSN No : 2249-894X

Monthly Multidisciplinary Research Journal

Review Of Research Journal

Welcome to Review Of Research

RNI MAHMUL/2011/38595 **ISSN No.2249-894X**

Review Of Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial Board readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

Advisory Board

More.....

Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.ror.isrj.net

Review Of Research
Vol. 3 | Issue. 10 | July. 2014
Impact Factor : 2.1002 (UIF)
ISSN:-2249-894X

Available online at www.ror.isrj.net

ORIGINAL ARTICLE

PHYSICO-CHEMICAL QUALITY OF DRINKING WATER IN GREATER VISAKHAPATNAM MUNICIPAL CORPORATION ANDHRA PRADESH

Vijaya Kumar[1] and M. Umadevi[2]

[1] Principal & Professor Dept of Civil Engineering,
Sivani Institute of Technology Chilakapalem, Srikaulam (Dist).
[2]Associate Professor, Dept of Commerce & Management studies,
Andhra University, Vishakhapatnam.

Abstract:

78 Water samples were collected to study the physical and chemical quality of water of main source of drinking water in Greater Visakhapatnam Municipal Corporation, Andhra Pradesh. The Values recommended by Indian Standard for Drinking Water (IS 10500:1991) were used for comparsion of observed values. The study indicates that the contamination problem in these villages is not alarming at present, but Vishakhapatnam being industrial town, ground water quality may deteriorate with passage of time, which needs periodical monitoring. The study area provides the local area baseline data which may be useful for the comparsion of future study. The concentrations of physical, chemical parameters and trace metals in groundwater samples were compared with the Bureau of Indian Standards (BIS) and World Health Organization (WHO), and observed that the water quality parameters were exceeding the permissible limits in the villages of P.M.Palem, Madura vada.

KEYWORDS:

Primary Health Centre, physical quality, chemical quality, drinking water.

INTRODUCTION

Much of the human sufferings, especially in the developing countries, can be traced to have shortage of safe and wholesome water supply. There can be no state of positive health and wellbeing without safe water6. The importance of water from only a quantity view point was recognized from the earliest days. The earliest recorded knowledge of water quality and its treatment are found in Sanskrit literature "Sushuri sanhita" compiled about 2000 B.C.8

Estimated 80% of all diseases and over one third of deaths in developing countries are caused by the consumption water, and on an average as much as one tenth of each person's productive time is sacrificed to water-related diseases.11,7

Increasing population growth, agriculture advancement, urbanization industrialization and also depleting the availability of potable water made water pollution a great problem. Many parts of the world face such a scarcity of water.5,1 Concentrations of all kinds of pollutants have an influence on the water quality and also determine the use of water. It is, therefore, necessary to monitor water quality and also determine the use of water. It is, therefore, necessary to monitor water quality, understand the chemical characteristics and provide a reliable assessment of water quality.5.9 .Nearly 74% of India's population live in villages and of this 86% have access for safe water.1 It may be noted that 80% of water needs of rural

Title: "PHYSICO-CHEMICAL QUALITY OF DRINKING WATER IN GREATER VISAKHAPATNAM MUNICIPAL CORPORATION ANDHRA PRADESH " , Source: Review of Research [2249-894X] Vijaya Kumar[1] and M. Umadevi[2] yr:2014 | vol:3 | iss:10

India are met by groundwater and 20% from surface water[3]

The physico-chemical analysis of groundwater of the villages of Rural Vishakhapatnam Primary Health Centre (PHC) was undertaken with a specific view to strengthen the local, regional and national water quality database.

OBJECTIVES:

The main objective is to study the physical and chemical quality of water of main source of drinking water in the villages of PHC rural Vishakhapatnam, which can serve as base line data for the future comparison.

STUDY AREA:

Visakhapatnam District is located in the central part of Andhra pradesh in India. The district has 15 administrative units (Rural Visakhapatnam) of which Visakhapatnam is one of them. It is geographically located on 17° 14' N and 18° 32' E, and elevation of above sea level. The distance between the Visakhapatnam district HQ and in surrounding rural areas is nearly 40km. Visakhapatnam has 43 mandals spread over in 11,161km2 area with a population of 4,288,113 (2011). The Scheduled Caste and Scheduled Tribe population respectively form of total population of Rural Vishakhapatnam. The soil of the area at places is black, yellowish, red and fertile with main crops grown are ground nut, cotton, bajra, gram. It has average annual rainfall of 975 mm. The average maximum (summer) and minimum (winter) temperature is 330C and 310C respectively. Villages, for drinking water depend on deep well draining water from about 25 feet above the first impervious layer. It has 2 Community Health Centres and 4 Primary Health Centres. Vishakhapatnam town has an industrial area which houses variety of industries including chemical industries[2].

Rural Vishakhapatnam Primary Health Centre caters to a population of Few villages and small habitations have a common water source. Water samples were collected from the main water source of each village by a standard recommended procedure10 during the month of June 2012 for assessing the physical and chemical quality. The samples were sent to public health laboratory of Surat Municipal Corporation for analysis.

OBSERVATIONS:

16 water samples were collected and their details are shown in Table 1. The results received from the Public Health Laboratory are analysed and presented in the Table 2 and described in following paragraphs. The values recommended by Indian Standard for Drinking Water (IS 10500:1991)4 are used for purpose of comparison of observed values.

(a)Physical quality assessment

Turbidity: out of 16 samples, only one sample of had turbidity.

Table 1: Water sampling locations, Population and water source

Village Name	Water sample No	Population	House hold	Water source
P.M.Palem	1	25,111	564	T/HP
Madhurawada	2	30,199	800	HP/W
Komadi	3	17,189	775	T/HP
M.V.P. Colony	4	20,170	2,054	T
China waltair	5	22,190	2,192	T/HP
East point colony	6	16,166	8033	T/HP
Pedda waltair	7	17,155	8577	T/HP
Issukathota	8	10,255	5127	T/TK
Adarsh nagar	9	15,305	7652	T/TK
Lawsons bay colony	10	24,477	12238	T/TK
Hanumatha waka	11	16,582	8291	T/TK
Harilova	12	15,777	7888	T/TK
Kancharapalem	13	25,599	12799	T/TK
Sripuram	14	22,499	11249	T/TK
Dwaraka Nagar	15	27,788	13894	T/TK
Surya bagh	16	26,878	13439	T/TK
Allipuram	17	23,322	11661	HP/TK

T: Tube Well, HP: Hand Pump, W: Well, TK: Tank

Table 2: Statistics of chemical parameters of water sample

Parameter	Sulphate	Chloride	TH	Alkalinity	TDS	pH
Mean	105.02	207.96	360	682.50	1300.3	7.28
Median	85.50	158.0	380	765.00	990	7.10
Std.Deviation	77.890	167.90	140	165.799	392.084	.3986
Minimum value	36	65	773	420	610	7.0
Maximum value	330	420	1000	990	1470	8.0

TH: Total Hardness, TDS: Total Dissolved Solids

Taste and odour: All water samples had agreeable taste and had no unpleasant odour.

P^H : p^H of all water samples was in the recommended range of 6.5 to 8.5. The mean value for p^H was 7.288 with standard Deviation of ±0.299.

(b)Chemical quality assessment

Chloride: The prescribed upper limit of Chloride in drinking water is 250 mg/L. In this study, the mean chloride level was 207.96 mg/L with S.D. of ±167.90, the range was 65 to 420 mg/L. Five samples had chloride level more than 250mg/L.

Total hardness: Soft water has corrosive action while hard water> 200 mg/L can cause scum formation and consumes more soap. Tolerance of the people to hardness varies from place to place. However, the prescribed upper limit is 300mg/L. In this study, five water samples had total hardness above the prescribed upper limit. The mean value for hardness was 240mg/L with S.D.of 140 mg/L, the value ranged from 773 to 930 mg/L.

Sulphate: The prescribed limit for sulphate in drinking water is 200mg/L. Only one sample had sulphate value of 330 mg/L.

Nitrite: In this study, three samples had nitrite.

Total Dissolved Solids (TDS): TDS level less than 600 mg/L is generally considered to be good. Water with TDS level less than 1000mg/L is usually acceptable to the consumers. In this study the mean TDS value was 1300.3 mg/L with S.D of 392.084 mg; the minimum and maximum values observed were 610 mg/L and 1470 mg/L. Seven samples (43.75%) had TDS value more than 1000 mg/L.

Alkalinity (as HCO3): Alkalinity neutralises acid and it protects water and its life from sudden change in P^H. It represents the HCO_3, CO_3 and OH salt of Calcium, Magnesium, Sodium and Potassium. The desirable limit of alkalinity is 100mg/L and the range is 30 to 400mg/L. In this study the mean alkalinity value was 682.50 mg/L with S.D. of 165.799 mg; the minimum and maximum values were 420 and 990 mg/L. Fourteen out of sixteen samples showed value more than 400 mg/L.

DISCUSSION

In the present study, the physical quality of water samples was in accordance with the norms recommended by BIS, except one water sample of Tavra and Timbi which was found turbid. Turbidity makes water unacceptable and diverts the consumers to less safe water source.

Since the Chloride content of water varies from place to place, it is necessary to determine the normal range of chloride in water in a given locality. Any excess over the range should arouse the suspicion of water contamination.6 Five samples had Chloride level more than 250mg/L.

Higher values of these parameters in water samples of certain villages indicate that water of these locations have poor quality. The role of industrial waste percolating through the soil and reaching the water course needs to be explored.

There is no conclusive evidence that hardness affects health. Some people may get digestive upset when they are not used to its use. On the other hand, cardiovascular diseases have been found to be more common in the areas with soft water. This has been attributed to Magnesium deficiency.[3]

Presence of sulphates in drinking water impairs taste; however, taste impairment is minimal and unnoticeable below 250mg/L.6 Nitrite being unstable compound is not found in drinking water. Its presence indicates contamination of recent origin.[4]

Bacteriological contamination of water attracts attention of local authority easily as its effects on consumers are rapid, visible and known. While chemical contamination of water takes long time to show its effect on consumers' health. The present concern about chemical pollutants in water relates is not so much as to their toxic effects on human health as to possible long term effects of low level exposure, which are often non-specific and difficult to detect.6

In many developing countries where water borne communicable diseases have been reduced or virtually disappeared, more attention is now being paid to control the chemical pollutants.6

The study indicates that the contamination problem in these villages is not alarming at present, but ground water quality may deteriorate with passage of time, which needs periodical monitoring. The study provides the local area baseline data which may be useful for the comparison of future study.

REFERENCES:

1.APHA (American Public Health Association) (1998). Standard method for examination of water and wastewater (20thed.). Wahington, DC: APHA.
2.Gupta M.C. and Mahajan B.K.: Text book of Preventive and Social Medicine: Jey Pee Brothers Publishers: New Delhi: 3rd edition 2003, page-41.
3. Indian Standard Drinking Water-Specification (1st Revision). IS 10500:1991(1993-01),edition 2.1
4.Park K: Text Book of Preventive and Social Medicine: Publisher Banarasidas Bhanot, Jabalpur; 2011, 21st edition; Chapter 13, pages 653-64.
5. Water supply engineering (2005).State Institute of Vocational Education (1st edition).Director of Intermediate Education.Govt of Andhra pradesh.
6.WHO (2004) International standards of drinking water. World Health Organization, Geneva.pp:55-79.
7.WHO (1958), International Standard of Drinking Water.