International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Assessment of Bacteriological Quality of Drinking Water in Srikakulam District

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Abstract: ***Water is one of the indispensable resources for the continued existence of all living. Things including man, however in recent periodconsumption of drinking water contaminated with faecal originated pathogenic bacteria have increased which is responsible for the onset of water borne disease with outbreaks especially in developing countries. In the present study for a period of one year, 253 drinking water samples from different mandals in srikakulam district, Andhra Pradesh were assessed for the bacteriological quality and pot ability.***

Keywords: pot ability, indispensable sources, contaminated, bacteriological quality

1. Introduction

Water is the essential prerequisite of agriculture and industrial production, the source of food needed for the survival of life. Thus, life on earth is entirely and exclusively dependent on water. Even though water covers more than 70% of the earth; only 1% of the earth's water is available as a source of drinking and most part of it is in pollulated and contaminated form, Water-related diseases continue as a major health problem globally.Diseases caused by drinking of water contaminated by human or animal excretions, which contain pathogenic microorganisms. Include cholera, typhoid, amoebic and bacillary dysentery and other diarrhea diseases. An estimated 1.8 million deaths (4 million cases) in 2010 due to gastroenteritis (WHO) 88% due to unsafe water and poor sanitation. Current WHO bacteriological guidelines 4 for drinking-water recommend zero fecal coli forms per 100 ml of water. The majorities of the populations in developing countries are inadequately supplied with potable water and are thus bound to use water from sources like shallow wells and bore holes that have high potential of contamination and provide the unsafe water for domestic and drinking purposes (WHO, 2011).

The present study was aimed to investigate the bacteriological water quality changes of various potable sources in Srikakulam district.

2. Materials and Methods

2.1 Study area

Srikakulam is a north coastal town in Andhra Pradesh and district head quarter of Srikakulam district. Srikakulam is located at 18.42N .84.01E and spreads across an area of 2,254 sq mi. The district is skirted to a distance by Kandivalasagedda, Vamsadhara and Bahuda at certain stretches of their course white aline of heights of the great Eastern Ghats run from the north east. The district is bounded by Vizinagaram District in the South and west, the state of Orissa lies to the north of Srikakulam, while the Bay of Bengal is the eastern boundary of the district. The climate of Srikakulam district is more or less chacterized as humid .The highest temperature recorded in Srikakulam was 38.5°C (110°F) and in the winter as low as 19.6 have been recorded. Lot of rainfall is brought in the region by the south -west and north –eastmonsoon winds. The average rainfall in the district in the region is quite high. According to 2011 census, Srikakulam has a population of about 2,699,471 (rural area 83.84%, urban 16.16 %.)

Srikakulam has secured 369 rank in the sanitation ratings by MoUD(Ministry of Urban Development) in 2010.Prominently people in Srikakulam district uses open wells and hand pumps. According to recent AP health department statistics (2009 – 12), approximately there are 22317 ways of water resources in Srikakulam. Approximately 5172 open wells and 807 ponds which are unsafe to drink water., Overall work plan of this study is to find different sources of pollution, kind of pollution to drinking water and its microbiological study.Bacteriological analyses were performed according to the standard methods prescribed by APHA (1995) and AWWA (1995).

2.2 Sample Collection

A total of 253 samples water samples were collected randomly over a period of one year from April 2010 to March 2011, from different mandals in Srikakulam district.Water samples were collected in 200 ml capacity sterilized containers from various sources generally bore well supplies and Public water supplies by following standard water collection techniques.These water samples were transported to microbiology lab within two hours of collection.

2.3 Total Coliform Bacteria/fecal Coliform Bacteria

The MPN of total coliforms bacteria were determined by multiple tube fermentation technique prepared each of separate sets of 10 tubes of Lactose broth (LB). Inoculate each of the 10 tubes of 10 ml double strength LB with 10 ml of the undiluted water sample. These LB tubes along with inverted Durham tubes were incubated at 35 °C± 0.5 °C for 24 and 48 ± 2 hrs after inoculation. Tubes were examined for gas production at the end of 24/48 hrs incubation. Gas

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production was measured by gas displacement in the inverted vial and also effervescence produced when the tube was gently shaken. Positive tubes with gas formation and turbidity were sub-cultured into BGB (Brilliant Green Lactose bile broth and E.C. Broth having 10ml broth with inverted Durham tubes by means of 3 mm loop. All BGB tubes were incubated at 35 °C and E.C. Broth tubes at 44.5 °C for 48 hrs and examined for gas production. The number of coliforms per 100 ml of water was then calculated from the distribution of positive and negative tubes in the test by referring to MPN table. Presence of coliform bacteria is an indication that disease causing bacteria also may be present and that water is unsafe for drinking.

2.4 Results of Bacteriological Analysis of Drinking water

The Bacteriological analysis results are presented in Table 1.The highest coliform bacteria 17 MPN/100 ml was recorded in chilkapalem village of Etcherla mandal sample being bore water supply and the least coliform bacteria 7MPN/100 ml from Byrivanipeta village of Srikakulam mandal, sample being from bore well.

The values 8MPN/100 ml, 8 MPN/100 ml, 9 MPN/100 ml, 10 MPN/100 ml, 11MPN/100 ml, 12 MPN/100ml, 14 MPN/100 ml, and 15 MPN/100ml were detected in samples collected from Patrunivalasa village of Srikakulam mandal, Venkatapuram village of Laveru mandal, Ponnam village of Srikakulam mandal, Batteru village of Srikakulam mandal, Ponnada village of Etcherla mandal, Peddalingalavalasa village of Laveru mandal, Teppalavalasa village of village of Ransthalam mandal, and Yerravaram village of Ransthalam mandal.

Table 1: Bacteriological Analysis of Drinking water of different water sources

S No	*Lab Ref no*	*Mandal/ Village*	*Source*	*Coliform MPN/100ml*
1	019	Etcherla/chilkapalem	BW	17
2	021	Ransthalam/Yerravaram	PWS	15
3	012	Ransthalam/Teppalavalasa	BW	14
4	023	Laveru/Peddalingalavalasa	BW	12
5	018	Etcherla/ Ponnada	BW	11
6	019	Srikakulam/ Batteru	BW	10
7	018	Srikakulam/ Ponnam	RW	9
8	036	Laveru/ Venkatapuram	BW	8
9	012	Srikakulam/ Patrunivalasa	OW	8
10	021	Srikakulam/ Byrivanipeta	BW	7

BW= bore well, PWS =Public water supply, OW =other water, MPN= Most Probable Number

3. Discussion

It has been prearranged that the microbial density in potable drinking water should be zero in 100 ml of water sampled (WHO, 2003). The finding of microbes of faecal source in the current study revealed that the water was not secure and might serve up as a latent basis for the conduction of these microbes to persons who drink this water. Majority of the Bore well water studied were without protective covers and buckets used in taking water from all the Bore wells from all locations were left carelessly on the ground after fetching water and were not the wells they can seeps down and the sanitation around the bore well and public water supply were not maintained in proper way this conditions may pose potential health problems to those using the water from such unhygienic surroundings.

In this study it was scrutinized that the majority of bore wells were not accurately protected thus exposing them to pollute from human and animal wastes as well as surface runoff. Community health interventions to develop the water quality with chlorination, use of ceramic filter technology, boiling and as well as developing the whole hygiene inside the inhabited locality should be instituted. Developing hygiene has been revealed to have better impacts as it leads to improve the water quality at the source (Esrey, 1996.)

4. Acknowledgements

We wish to acknowledge the assistance of the families who allowed us access to the collection of the Various water samples.

5. Conclusion

Bacteriological quality of drinking water showed that contamination of the water was rising frighteningly and that it has shaped severe risk to human health and surroundings. These outcomes obviously indicate that the quality of the water\consumed in district Srikakulam is threat for spread of communicable diseases and additional healthiness issues. Contamination of these water sources will continue unless effort is put into pollution prevention. Pollution control strategies should include; Public health training, awareness of methods of transmission of pathogens, and organized waste disposal system, along with practical steps at Community and Government levels in addressing the issue must not be ignored.

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IJSR
ISSN (Online): 2319-7064