Progress in Aqua Farming and Marine Biology
ISSN: 2640-6764

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Research Article *Volume 4 Issue 1*

Assessment of Drinking Water Quality in Ramakrishnapuram Village, Kothakota, Mandal, Wanaparthy District, Telangana State (India)

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Received Date: July 01, 2024; **Published Date:** July 16, 2024

Abstract

Present study aimed to analyse and compare the drinking water quality with WHO standard of Ramakrishna puram village, Kothakota Mandal, Drinking water samples collected various parts of village. All the drinking water samples were subjected to analysis of physico chemical parameters. The obtained results compared with WHO standards. Findings reveal that drinking water quality of the village were deteriorating, most of the parameters found difference is limit almost all drinking water samples in study area found unfit for drinking purpose. It is suggesting that the evaluation of water quality parameters as well as water quality management practices should be carried out periodically to protect water resources. The awareness campaign of waterborne diseases and importance of safe water for human health should be commenced by Rural water supply and sanitation (RWS) department.

Keywords: Water Samples; Parameters; WHO Standards; Periodically; RWS

Abbreviation

RWS: Rural Water Supply and Sanitation.

Introduction

Three fourth of the earth surface covered by water resources, Water is very important to life. Water quality is critical factor affecting human health and welfare studies showed that about 1.2 billion people are facing physical water shortage, one quarter of the world's population is facing economic water shortage (WHO), in total 62% of the world population will face physical or economic water scarcity by 2030. The problem is backward socio economic development resulting in one of lowest standard of living, poor environmental conditions and low level of social services. Water quality is very important and other degraded due to agriculture, industrial and human activities. Even though the natural environmental processes provide by means of removing populations from water, there are definite units. It is up to the people to provide security to protect and maintain the quality of water. Drinking water with good quality is very important to improve the life of people and prevent from diseases. About 80% contaminations of Indian water resources, according

to estimates by WHO is caused by inhabited refuse. Water system management issues could have a substantial impact on the supply of drinking water. Industrial waste is the main basis of water contamination. Wastewater from various industries is disposed of in the water without being properly treated. W. H. O. [1] Water is essential to all forms of life. A man on an average consumes about two liters of water every day. Approximately 97.2% water lies in Oceans as salt water, while 2.15% in frozen ice form and the remaining 0.65% remains as freshwater either on surface water or as ground water (Dhonde and Kulkarni, 2012). Available freshwater resources are limited [2-8]. The demand for freshwater have continued to increase with the rapid growths of population, agriculture and industry. As a result the freshwater reserve depletes day by day too. Deviations from WHO standards were found in the all the samples of Boravelly, Pallepadu and Jallapur villages of Manopad mandal. The water sample collected from S2 location (Boravelly over head storage tank) was found very poor in quality and also it has 2.15 mg/lit of fluoride content [7-9].

Ref.:- [WHO, USEPA, Indian Standard, National Primary Drinking Water Regulations, Drinking Water Contaminants US EPA]

Study Area

Ramakrishnapuram is the traditional village in the Kothakota Mandal, Wanaparthy district, Telangana state. In this village, the natural resources availability is very high but facing very unsafe water and also lack of awareness in farmer community. Available present water bodies are also under contamination. Hence the present study has been under taken to determine the physico chemical characteristics of drinking water in selected parts of Ramakrishnapuram village.

Materials and Methods

pH Meter, TDS meter, and Digital thermometer.

Determination of pH

Apparatus: The apparatus used is packet size pH meter, A Glass Beaker.

Procedure: 100ml of the sample was poured into a clean Glass beaker and the electrode of the PH meter was inserted into the water sample and allowed to stay in it until the reading on the screen was stable. The observed value was taken as the PH of the sample. The steps were repeated for two more samples and the mean was taken (Figure 1).

Figure 1: pH / EC meter.

Determination of Total Dissolved Solids (TDS)

Apparatus: Apparatus used is total dissolved solid meter and glass beaker [TDS-3 (TDS / TEMP)].

Procedure: 100 ml of the sample was poured in to a clean breaker and the electrode of the TDS-meter was inserted in to the water sample and allowed to stay in it until the reading on the screen was stale. The observed value was taken as the

TDS of the sample. The steps were repeated for two more samples and the mean was taken.

Determination of Temperature

Apparatus: The apparatus used include TDS/TEMP meter a clean glass beaker and cotton wool.

Procedure: 100 ml of the sample was poured into a clean glass beaker and the electrode of the TDS/TEMP meter was inserted and change the option for Temp. then press temp. button into the water sample and allowed to stay in it until the reading on the screen was stable. The observed value was taken as the Temp of the sample.

The steps were repeated of two more sample and the mean was taken.

Results and Discussion

The sampling places are referred as stations and golded as S1 to S15. The stations are represented as Big Masjid Bore Well (S1): Upper primary school Tap water (S2), M. Nandidini's house water drinking (S3): Md. Afsar (S4): S.Ganesh (S5): Sridevi, Anganwadi Teacher (S6): Small Masjid Bore Well (S7): Md. Sameera (S8): Cherukuddhin (S9): Rekula Buchanna (S10): Swapna, Anganwadi Aaya (S11): Nirmalamma, Anganwadi Teacher (S12): Nikhitha, V.V.(Ss13): Nagesh (S14): AND Manisha A.H. S15): are houses of Ramakrishna puram village people, water sample were collected from various houses in the village. The samples were collected in 250 ml glass gales which were previously washed. During sampling extra case was taken. All the samples were found odourless, colourless: After sampling onsite analysis was done for temperature, PH and TDs due to their unsteadiness in nature (Table 1).

Name of the House Holder	PH (-log[H+])	TDS mg/Lt	Temperature OC
Bore Well Big Masjid (S1)	5.7	567	28
Upper primary school (S2)	5.8	347	21
M.Nandhini (S3)	5.9	480	20
Md.Afsar (S4)	5.8	477	15
S.Ganesh (S5)	5.5	358	17
Sridevi. An.T (S6)	6	306	19
Small Masjid (S7)	5.7	531	18
Md.Sameera (S8)	5.9	442	20
Cherukuddin (S9)	5.3	443	21
Rekula Buchanna (S10)	5.4	451	22
Swapna (S10)	5.4	451	19
Nirmalamma (S12) (Filter water)	6.3	55	16
Nikitha (S13)	5.8	456	15
Nagesh (S14)	6	355	19
Manisha (S15)	5.4	487	18

Table 1: PH and TDs.

PH of Drinking water

The PH of water is refers to the measure of by damages ions concentration in water. It ranges from 0 to 14. In general, water with a PH of 7 is considered natural, while lower of it referred acidic and a PH greater than 7 known as basic. According to WHO standards PH of water should be 6.5 to 8.5. It is noticed that water with low PH is tend to be toxic and with high degree of PH is tend to be toxic and with high degree of PH it is turned into bitter taste.

In this study samples were found 5.3 to 6.3 which are slight acidic. The highest PH value 6.3 observed at Nirmalamma (S12), Anganwadi teacher taken Filter water from water of supply of Kothakota. Whereas the lowest value ie. 5.3 found at Cherukuddin (S9). All the drinking water samples were found out of the limits prescribed by WHO (Figure 2).

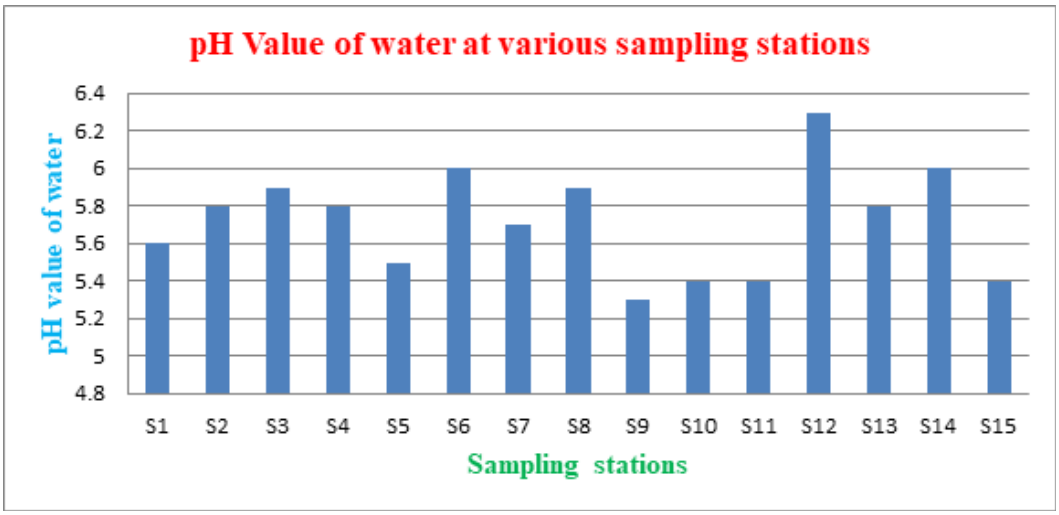

Figure 2: PH values of the drinking water samples in Ramakrishnapuram village.

Total Dissolved Solids (TDS)

Water has the ability to dissolve a wide range of inorganic and some organic minerals or salt such as potassium, calcium, sodium, bicarbonates, chloride, magnesium, sulphates etc. These minerals produced un-wanted taste and diluted colour in appearance of water. There is no agreement have been developed on negative or positive effects of water that exceeds. The WHO stand and limit of 500 ppm. Total dissolved solids (TDS) in drinking waste water etc: Therefore, TDS test is considered sign to determine the general quality of the water. The value of drinking water between 55 ppm to 567 ppm i.e, TDS of Nirmalamma taken Auto Filter water taken from Kothakota Filter water plan and Big Masjid Bore Well. In these study TDS found within the limits as prescribed by WHO and the Bore Well water is not in the limit of WHO (Figure 3).

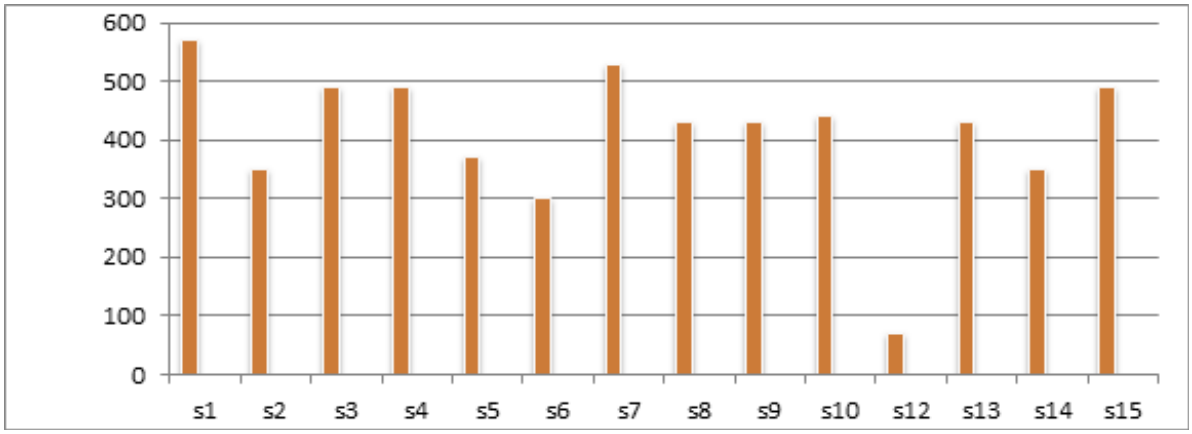

Figure 3: TDS values of drinking water samples in study area i.e., Ramakrishnapuram village.

Temperature of Water

In this study samples the highest Temmperature value 28°C observed at Big Masjid Bore Well (S1), whereas the lowest value i.e, 15°C found at S.Ganesh house (S4). All the drinking water samples were found highest excel the limit as prescribed by WHO (12 to 25°C) (Figure 4, Tables 2 & 3).

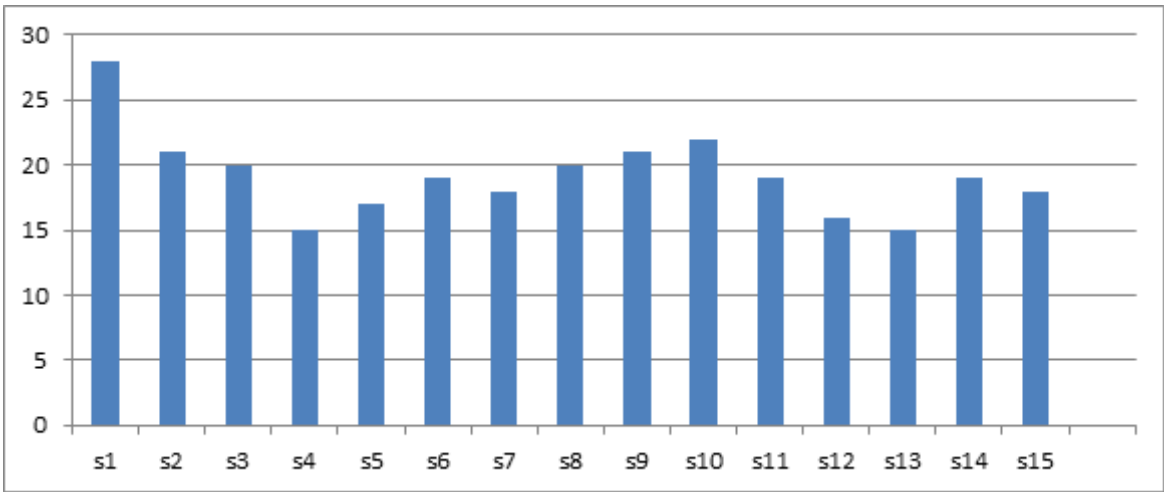

Figure 4: Temperature of drinking water samples in study area i.e., Ramakrishna puram in 0C.

SL.No.	Parameter	Units	Average value
1	PH	-	5.7
2	Total DISOLVE Solid (TDS)	Mg/L	428
3	Temperature	0C	28.7 oC

Table 2: Average Result for the Drinking Water Quality Parameters Analysed.

Parameter	Recommended units set by WHO	Result	Assessment
pH	6.5 to 8.5	5.7±0.5	Un suitable
TDS (mg/L)	500	428±5	Suitable
Temperature ^{o}C	Oct-22	28.7±002	Unsuitable

Table 3: Assessment of the Result.

- Throughout the study duration, the physical chemical parameters within the reservoir exhibited noticeable fluctuations and seasonal variations. Examination of these parameters indicated that the physical-chemical characteristics of the freshwater reservoir consistently fell within acceptable limits, making the water suitable for both irrigation and aquaculture purposes [2].
- Idol immersion during festivals can have negative impacts on water quality. Materials like plaster of Paris, chemicals, and non-biodegradable items used in idols can lead to water pollution, harming aquatic life and affecting overall ecosystem balance. Additionally, the ritual substances used can contribute to nutrient imbalances, further degrading water quality [3].
- Some of the samples have total dissolved solids, pH, alkalinity, total hardness, magnesium, calcium and dissolved oxygen values exceeding the permissible limits as prescribed by Indian standards. We noticed parameters such as electrical conductivity, chloride, nitrate and biological oxygen demand values are within permissible limits. The competed WQI indicates that the water quality is poor and not totally safe for human consumption due to presence of high level of pollutants. The water is not used for public consumption and rerceartion due to lack of water purification. This study showed that the water quality of Chandlodia Lake remain as it is than it will destroyed the ecosystem of the lake. The government bodu such as AUDA, AMC and other civic organisation should take the action against releasing of domestic waste directly into the lake or installed a water purification system [4] Figure 5.

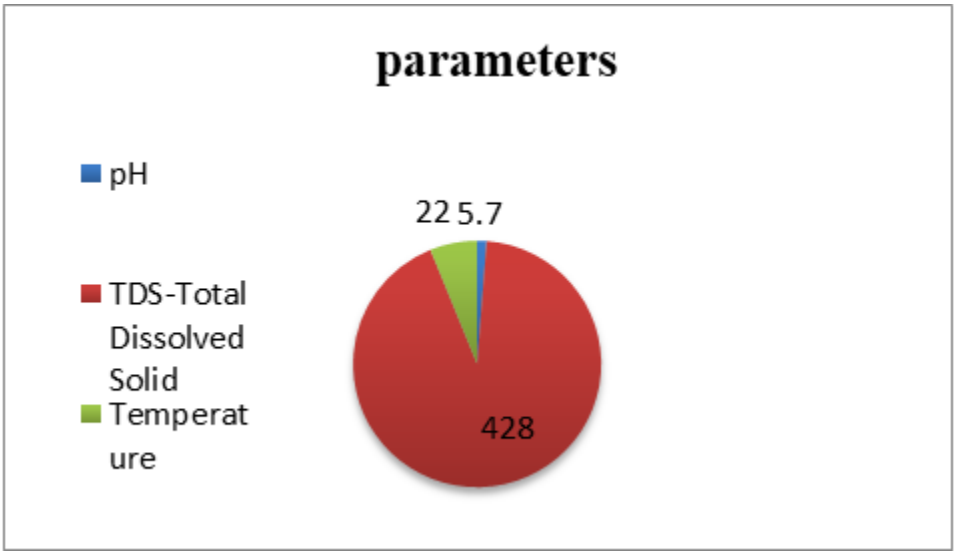

Figure 5: Parameters.

Conclusion

After physio chemical analysis of 15 drinking water samples of Ramakrishnapuram village, the analysis values of different parameter were found excess in limit indicating poor drinking water quality which are unfit for drinking and may effect on human health. In order to rescue precious human lives from water related diseases current study suggest that regular monitoring of drinking water quality should be practiced. Concerned government (Gram panchayat) should installed water purification plants to provide safe drinking water. Sewer drains should kept away from water supply drains to avoid waste water reaching in ground water. Sanitary conditions should be improved on urgent basis. The awareness campaign of waterborne diseases and importance of safe water for human health should be commenced by Rural water supply and Sanitation (RWS) department.

The result revealed that there was significant seasonal variation in some physicochemical parameters and most of the parameters were in the normal range and indicates better quality of lake water [10-15]. The statistical analysis of the experimentally estimated water quality parameters on water samples yielded the range of variation, mean, standard deviation and coefficient of variation. Since the correlation coefficient gives the interrelationship between parameters, correlation coefficients were calculated. Results of correlation analysis show that EC shares strong and positive correlation with Total hardness, Magnesium, Total alkalinity, TDS, Chloride, Sulphate, Sodium and SAR [16-23].

Research Gap for Future

In view of the overall findings of this study, the Ramakrishnapuram village drinking water has average value of PH is 5.7 means acidic in nature. TDS is 428 mg/L is suitable, temperature is 28.7°C is unsuitable.

- The water is in acidic nature.
- The temperature is slightly high.

The minerals is the water salty. Quantity of the value of TDS in slightly high. We have to do further research to decrease the temperature and TDS Values. And also increase PH value i.e., alkaline water. For this we are going to innovate, Five Pots Bamboo charcoal water purifier to overcome above said problems.

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