A Study on Physico – Chemical Parameters of Water in Avanigadda Panchayat

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Abstract— Water is one of the abundantly available substances in nature and also called " Elixir of Life". Water plays a vital role in the wealth of a nation, particularly like India, which is predominantly an agrarian economy. The importance of water for the existence of life need not be over emphasized. Quality of water is an important criterion for evaluating the suitability of water for drinking and irrigation. The ground water samples were collected and subjected for a comprehensive physico - chemical analysis. The following 10 parameters have been considered viz. pH, electrical conductivity, color, odour, appearance, Ammonia, Dissolved Oxygen, chloride, nitrate, Iron. Comparing the results with drinking water standards laid by WHO, it was found that some of the parameters were above the permissible limit and some were not. Moreover this study may help other regions in understanding the potential threats to their ground water resources.

Index Terms- pH, electrical conductivity, color, odour, appearance, Ammonia, Dissolved Oxygen, chloride, nitrate, Iron, Spectrophotometer, Conductometer.

I. INTRODUCTION

Avanigadda is the head quarters village of the picturesque Divi Island formed at the confluence of river Krishna and the Bay of Bengal in Krishna district of Andhra Pradesh which is around 90km from Vijayawada and 36 km from Machilipatnam. Campbell Aqueduct connects the island to the mainland and it is called the Lifeline of this island as it irrigates all the land in the area. A devastating cyclonic storm known as "Divi-Uppena" (1977) hit the place hard causing heavy loss of human life with a major blow to the economy of the area. This had hindered the development of the village.

The average rainfall of Avanigadda is 959mm. Major sources of water are ground water, rain water, and water from Krishna River.

II. MATERIALS AND METHODS

In the present work, we evaluated the physico – chemical parameters of water samples of ground water, tap water supplied by the panchayat and canal water collected in Avanigadda panchayat.

III. INSTRUMENTATION

Spectral and Absorbance measurements were made on SHIAMDZU double beam Spectrophotometer, UV-140 with matched 1 cm Quartz cells and pH measurements were carried over using SYSTRONICS pH meter -335 and SYSTRONICS conductivitymeter-304.

Physical Parameters: Physical parameters were evaluated and the results were tabulated in table.1

Table1: Results of Physical parameters of water samples collected.

Sample	Colour	Odour	Appearance	pH	Electrical Conductivity $\Omega^{-1}cm^{-1}$
Seetaya Lanka village(Canal water)	Colourless	Odourless	Cloudy with solid particles	6.3	115
Seetaya Lanka village (Borewell water)	Colourless	Odourless	Transparent	6.6	100

Govt.Degree College Campus (Borewell water)	Colourless	Odourless	Transparent	6.5	94
Canal water near RTC Complex	Green	Unpleasant	Non Transparent with solid particles	6.3	70
Tap water	Colourless	Odourless	Transparent	6.7	114
Machavaram village (Canal water)	Green	Odourless	Transparent	5.3	166
Machavaram village (Borewell water)	Colourless	Odourless	Transparent	5.6	155

Chemical Parameters:

1. Ammonia levels of the samples were spectrophotometrically studied using Nessler's Reagent taking Ammonium chloride standard.
2. Chloride levels of the samples were evaluated by Argentometric method.
3. Nitrate levels of the samples were evaluated spectrophotometrically using Sodium salicilate in presence of Sulphuric acid.
4. Iron levels of the samples were evaluated spectrophotometrically using 1, 10-Phenanthroline taking Ferrous Ammonium sulphate standard.
5. D.O levels of the samples were evaluated by Winkler's method and the results were tabulated in table.2.

Table 2: Results of Chemical parameters of water samples collected.

Sample	Ammonia	Chloride	Nitrate	Iron	Dissolved Oxygen
Seetaya Lanka village (Canal water)	0.047	163.77	0.065	0.019	0.449
Seetaya Lanka village (Borewell water)	LDL	369.88	0.959	0.021	0.901
Govt.Degree College Campus (Borewell water)	0.119	479.85	0.022	0.022	0.901
Canal water near RTC Complex	0.119	784.75	0.006	0.054	0.750
Tap water	LDL	144.95	0.021	0.017	0.750
Machavaram village (Canal water)	0.513	194.93	0.055	0.016	0.600
Machavaram village (Borewell water)	0.731	254.92	0.061	0.019	0.600

IV. RESULTS AND DISCUSSION

It was found that the bore-well water in the college campus was found to be colourless, Canal water collected near RTC Complex was green in colour due to the presence of algae and with unpleasant smell, due to the decay of organic and inorganic material in the canal. Rests of the samples were colourless and odourless. pH values of all the samples were in the range of 6.3 to 6.7 indicating they were slightly acidic. The electrical conductivity of canal and tap water was found to be very high indicating presence of large amounts of electrolytes.

CONCLUSION

According to WHO, nearly 80% of all diseases in human beings are caused due to water. The water quality parameters of the various areas of Avanigadda in Krishna district were studied. Results indicate that the Canal water is contaminated with high amounts of chemicals and is not suitable for drinking without proper purification and treatment. Canal water near RTC complex contain high amount of nitrate levels and is not suitable for drinking and hence proper purification method to remove nitrate ions must be implemented to use it for drinking . Remaining samples under the study does not contain high amount of harmful chemicals, so they are suitable for drinking. Purification of drinking water in the area under study should be augmented by the proper environment management plan to ensure better health of the people.

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