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European Journal of Experimental Biology, 2011, 1 (1):97-102

ISSN 2248 –9215

Studies in Determination of Some Parameters of Ground water of Wadali Talao, Amravati, Maharashtra in India

G.B. Pethe, T.R. Lawankar, A.A. Sogasane, N.E. Dawale, D.T. Mahajan and M.L. Narwade*

Department of Chemistry, Vidyabharati Mahavidyalaya, Amravati (M.S.) India

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ABSTRACT

Wadali Talao of Amravati city was chosen as the sample sites. The analysis of various physico-chemical parameters such as color, taste, odour, transparency, hydrogen ion concentration (pH), electrical Conductivity, total alkalinity, dissolved Oxygen, chloride, total hardness, total magnesium, total calcium, total dissolved solid, fluoride, iron, biochemical oxygen demand (hereafter BOD), chemical oxygen demand (hereafter COD) and dilution factor was carried out by using various standard methods reported in the literature. This study will be helpful for the society and government policies.

Keywords*:* Ground Water, Physico-chemical parameters, Wadali Talao, Amravati, Maharashtra, India.

INTRODUCTION

Water is essential natural resources for sustaining life and environment that we have always thought to be available in abundance and free gift of nature. The water for the consumption of human beings comes in different forms and from different sources. The numbers of problems worldwide related with the lack of clean and fresh water are well known: 1.2 billion people lack access to safe and clean drinking water, 2.6 billion have little or no sanitation, and millions of people die annually, 3,900 children a day, from diseases transmitted through unsafe water or human faeces [1]. The causal association between water quality and the occurrence of waterborne diseases has long been demonstrated [2–4]. Although the implementation of treated municipal water systems in the 20th century led to a great decrease in waterborne disease, the burden of infectious waterborne disease is still considerable and reported numbers of cases [5]. Intestinal parasitic infections and diarrheal diseases caused by waterborne bacteria and enteric

viruses have become a chief cause of malnutrition owing to the poor digestion of the food eaten by people sickened by water [6, 7]. Clearly, the consumption of pathogen-free water implies a less occurrence in the incidence of waterborne diseases, such as hepatitis A. However, a large proportion of water transferable diseases, in populations in which these diseases are endemic, are due to the limited amount of water available for domestic consumption and personal hygiene [8, 9].

A study of water quality conditions of Wadali Talao in Amravati city was carried out to assess the risks to human health. The investigation was based on survey of Talao and laboratory tests on water samples obtained from Talao.

Importance of Ground water

People's lives and live hood depend on water; demand for cleans water increases continuously in line with world population growth. People in many areas of the world lack the fresh, drinkable water essential to their survival if they are proper, more secure and lowest water supplies are needed.

Maintaining secure water supplies for drinking, industry and agriculture would be impossible without ground water the largest and most reliable of all fresh water resources water resources in many areas most drinking ground water.

Water conditions are of great importance for drinking water supplies, agricultural irrigation waste disposal and other ecological Issues [10, 11].

Present work deals with the study of determination of many parameters of the water samples of Wadali talao fluctuation in Amravati district. Considerable research work has been done in literatures but the determination of then pollutants and other parameters of water samples of Wadali talao was still lacking. Therefore the present project work was carried out by selecting ten water samples of Wadali talao in Amravati district. Following are main objectives of present work.

1. To study the pollutants in water sample.
2. To study the pH values of water samples.
3. To study the electrical conductance of water samples.
4. To study alkalinity from water samples.
5. To study C.O.D, BOD, DO and dilution factor from water samples.

Study Area

Vidarbha is the North-East part of Maharashtra Amravati is one of the nine districts of Vidarbha. It is important town of Vidarabha. There is hardly any work of Hydrobiological study of water reservoirs and river from Amravati district.

The name Amravati has been derived from the historical temple of Ambadevi situated here. This city has been a big cotton trade centre of Vidarbha and also a premier educational place for the people of the region.

"Wadali talao" is one of the most famous and beautiful place in Amravati City. This is a beautiful and wonderful place.

It was established at 1942 and it also wonderful and beautiful tourist place started from 1974. This area is near about is 15 hectare there is big garden. It is about 10 Acre areas.

There is wonderful talao having 18 foot depth, tourist also enjoyed by boating. There are various types of birds and also natural beauty.

MATERIALS AND METHODS

Reagents and solutions

Most of the chemicals were procured from Loba Chemie Pvt. Ltd., Mumbai and rests were purchased from Ranbaxy Fine Chemicals Ltd., New Delhi. All reagents were of analytical grade and were used as received without further purification. Metal ion (1 mg/mL) solutions were prepared by dissolving analytical-grade salts in double-distilled water (DDW) with the addition of hydrochloric acid and further diluted daily prior to use.

All solutions were prepared from DDW. Standard lab ware and glassware were acid-washed and rinsed with Double distill water.

Apparatus

Equip-Tronics pH meter model no. EQ 610 with glass and calomel electrode assembly was used to determine the pH. Equip-Tronics digi tal conductivity meter, model no. EQ-660, and conductivity cell was employed to determine the conductivity values.

Water sample collection method

Samples for analysis were collected in polyethylene bottles using the standard procedure in accordance with the standard method reported [12]. In all cases plastic containers were cleaned several times, first with dilute nitric acid and then with distilled water before their use. At site sampling bottles were rinsed with ambient water before storage of samples. These samples were filtered using membrane filter paper (0.45µm pore size) and then analyzed. The bottles are labeled while sampling. The usual general precautions were taken to avoid contamination.

Procedure

Chemical parameters

All the chemical parameters, (hydrogen ion concentration [pH], electrical conductivity, total alkalinity, dissolved oxygen, chloride, total hardness, total magnesium, total calcium, total dissolved solid, fluoride, iron, biochemical oxygen demand [BOD], chemical oxygen demand [COD]), dilution factor of water samples were studied in accordance with the standard procedures [13-19].

RESULTS AND DISCUSSION

Study of physical parameters

The study of water analysis was carried out with respect to ten different locations in talao where the crowd is more. The study of physical properties did not lead to any definite conclusion. From color and the appearance of water it just appeared that water may be suitable for drinking purpose. No turbidity found in all water samples. The taste of water samples in case of all the sources was as usual. So the organic contamination may be negligible.

Study of chemical parameters

The pH of water for all the samples from different sources was just alkaline (Table 1.). The basicity of the water for all the sources might be due to contamination of alkaline earth ions. The electrical conductance for all the samples was found very low (Table 1.), as it was the well processed and purified water. The alkalinity of the water indicates the basic nature. A number of bases like carbonates, hydroxides, borates, phosphates contribute to the alkalinity. It was clear from results (Table 1.) that, the water from all the sources is basic or slightly alkaline which might be due to the contribution of carbonates and hydroxides of alkali metals or alkaline earth available in water. Oxygen dissolved in the water is an important index of physical & biological process going on in the water. The values observed for dissolved oxygen was found to be comparatively more than the values reported by WHO [13] for the drinking water (Table 1.). As there is no possibility in all the sources of the presence of the bio-organisms so, the consumption of oxygen in water was particularly reduced. Amount of the chloride estimated in the water from all the sources were found to be in the range of 113 to 226 mg/L (Table 1.), which were well within the limits given by WHO [13].

Table1. Physico-Chemical parameters of water samples

S. No.	Parameter	Unit	Location									
			1	2	3	4	5	6	7	8	9	10
1.	P^H	--	7.80	7.84	8.01	7.85	7.70	7.90	7.83	7.81	8.0	8.3
2.	Electrical Conductivity	µmhos	210.753	306.967	311.548	224.498	238.243	251.988	348.201	284.059	270.031	256.569
3.	Alkalinity	mg/L	24	24	36	42	48	52	40	58	50	56
4.	Dissolved Oxygen	mg/L	20.43	21.43	22.65	23.46	22.25	23.87	24.68	25.28	24.47	21.44
5.	Chloride	mg/L	113.4	127	156.0	148.9	191.4	205.6	212.7	226.9	198.5	219.8
6.	Hardness	mg/L	82	80	110	106	122	120	104	102	118	84
7.	Total Magnesium	mg/L	48	40	40	64	72	64	56	48	40	40
8.	Total Calcium	mg/L	34	40	70	42	50	56	48	54	44	78
9.	Total dissolved solids	mg/L	0.787	0.780	0.869	0.690	1.190	1.118	0.890	0.990	0.845	1.220
10.	Fluoride	ppm	0.6	0.7	0.7	0.6	0.8	0.65	0.7	0.85	0.75	0.7
11.	Iron	ppm	0.6	0.4	0.7	0.8	1.0	0.9	0.8	0.7	0.6	0.7
12.	C.O.D.	mg/L	5	4	4	4	3	2	3	4	3	2
13.	B.O.D.	mg/L	0.809	1.012	0.607	0.607	0.607	0.81	2.428	1.619	1.215	1.012
14.	Dilution Factor	mg/L	4.048	3.625	4.452	3.644	4.452	4.046	3.644	4.452	3.642	4.858

Total hardness of water is due to the presence of calcium and magnesium ions in the water. The observed values for all the sources indicated that they were in the range of optimum conditions and water was suitable for drinking purpose (Table 1.). Total dissolved solids, fluoride and iron are within the permissible limits (Table 1.). The magnesium content for all the sources are found to be less than the desirable values (Table 1.). BOD (biochemical oxygen demand) indicates the consumption of oxygen by the micro-organism in aerobic degradation of the dissolved organic matter in water. The values observed for BOD of all the samples from all the different sources were all within the permissible range (Table 1). COD (chemical oxygen demand) is the measure of oxygen consumed during the oxidation of oxidizable organic matter present in the water by strong oxidizing agent. As the values of COD were comparatively less indicating that the water was not suitable for the growth of micro-organisms (Table 1.).

CONCLUSION

The study of various physico-chemical parameters such as color, taste, odour, transparency, hydrogen ion concentration (pH), electrical Conductivity, total alkalinity, dissolved Oxygen, chloride, total hardness, total magnesium, total calcium, total dissolved solid, fluoride, iron, biochemical oxygen demand (hereafter BOD), chemical oxygen demand (hereafter COD), was carried out by using various standard methods reported in the literature. Specific representative ten restaurants of Amravati city were chosen as the sample sites. From the study it was clear that the water of all these restaurants is suitable for drinking purpose with respect to the studied physico-chemical parameters.

Acknowledgements
Authors gratefully acknowledge Principal and Head, Department of Chemistry, Vidyabharati Mahavidyalaya, Amravati -444 602, India for providing the necessary laboratory facilities.

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