



*J. Chem. Pharm. Res.*, 2010, 2(4):174-177

ISSN No: 0975-7384  
CODEN(USA): JCPRC5

---

## **Comparative Study of Physico-Chemical and Microbial Parameters on Lotic And Ground-Waters In Selected Outlying Areas Of Central Gujarat**

**Arvnabh Mishra\*, Vasishtha D. Bhatt<sup>1</sup>, Nirav Sevak, Pinal Shah, Kirit Patel and Chaitanya Patel**

*Department of IGBT, Ashok & Rita Patel Institute of Integrated study & Research in Biotechnology and Allied Sciences (ARIBAS); New VVNagar, Anand; Gujarat.*

<sup>1</sup>*Department of Chemistry, N.V.Patel College of Pure and Applied Sciences (NVPAS) VVNagar*

---

### **ABSTRACT**

*The present paper discusses a comparative account on physico-chemical and a microbial characteristic of lotic and ground water samples from major rivers (Mahi and Sabarmati) adjacent to Anand Town, and the educational townships of New Vallabh Vidyanagar (ARIBAS), respectively. The water samples were collected in phosphate free bottle and examined for various physico-chemical parameters such as pH, Total Dissolved Solids (TDS), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Total Hardness (TH) and Electric Conductivity (EC). Besides, the Most Probable Number (MPN) count of coliform and Total Plate Count (TPC) test were performed to check the potability of water samples by user-driven community of surrounding inhabitants. The results for respective parameters were compared for lotic and ground-waters for their suitability for drinking, irrigation and domestic purposes.*

**Keywords:** DO, COD, EC, BOD, TDS, MPN count.

---

### **INTRODUCTION**

Water plays a vital role in human life. The consequence of urbanization and industrialization leads to spoil the water. For agricultural purposes ground water is explored in rural areas especially in those areas where other sources of water like dam and river or the canal is not available. During last decade, this is observed that the ground water get polluted drastically because of increased human activities[1, 2, 3]. Consequently number of cases of water borne

diseases has encountered which is a cause of health hazards[3, 4]. So basic monitoring on water quality has been necessitated to observe the demand and pollution level of ground water[5, 6, 7]. The quality of water is described according to their physico-chemical and micro-biological characteristics. For effective maintenance of water quality through appropriate control measures, continuous monitoring of large number of quality parameters is essential[3].

The present study deals with study of physico-chemical and microbial parameters on lotic and ground-waters in selected outlying areas of central gujarat. The analyzed data were compared with standard values recommended by WHO[8].

### EXPERIMENTAL SECTION

Water samples were collected from the location were Sabarmati river at Gandhinagar, Mahisagar river at Vasad, Ground water of Vallabh Vidyanagar, and drinking water from the college campus itself. All the samples were collected in sterilized and phosphate free bottle. The procedures for the analysis followed "standard Methods of Analysis of Water and Waste water[9, 10]. All the chemicals used were of AR grade and the entire instruments used were of limit of precise accuracy.

### RESULT AND DISCUSSION

The physical, chemical and bacteriological parameters[11, 12] exhibited considerable variations from sample to sample. All the measurements were carried out in the vicinity of temperature 30°C.

It was observed that pH levels of taken samples lie under the WHO standards.

The WHO has suggested a limiting value of 500mg/L of TDS for potable water. Lotic water contains less TDS while ground water has high TDS values.

#### **Ground water>Drinking water>Mahisagar>Sabarmati**

Ca and Mg level in ground water was 850mg/L and 119.56 respectively which was very much high in compare to the WHO standards for potable water. Reason may be that flowing water precipitate out the Ca and Mg ions by react with atmospheric CO<sub>2</sub> and settle down. So their range was lower than ground water and drinking water.

#### **Ground water>Drinking water>Mahisagar>Sabarmati**

MPN values and Total Plate Count of river water sample was high because this water has direct contact with air, while ground water itself was naturally purified water and drinking water was processed water from ground water so contains least number of MPN and TPC values.

#### **Sabarmati>Mahisagar>Ground water>Drinking water**

**Table: Physico-chemical and microbial parameters on lotic and ground-waters.**

SR NO	PARAMETER	WHO PARAMETER	SABARMATI	MAHISAGAR	GROUND WATER	DRINKING WATER
1.	pH	6.5-9.5	6.21	7.3	7.8	7.6
2.	EC	-	147	114	250	205
3.	TDS(mg/L)	500-1000	340	480	1375	680
3.	DO	-	9.4	6.67	3.64	0.93
5.	BOD	1.3	23.05	14.15	7.2	1.24
6.	COD	-	45	14	450	120
7.	TH (mg/L)	-	270	210	1340	680
8.	Ca hardness (mg/L)	75-200	86	150	850	450
9.	Fluride (mg/L)	1.5	0.75	-	-	-
10.	Mg hardness (mg/L)	30-150	44.89	60	119.56	56.12
11.	Cl hardness (mg/L)	250	105	80	222	17.5
12.	MPN count (coliform/100ml)	-	>1600	920	110	54
13.	TPC	-	>300 (TMTC)	>300 (TMTC)	250-280 CFU/ml	120-150 CFU/ml

### CONCLUSION

The present investigations has led us to conclude that the quality of water samples subjected to study was acceptable from majority of physico-chemical parameters while as per the bacteriological standards, the water needs to be treated before using it in domestic applications by various means. Ground water contains high amount of various ions, salts etc. so if we were using such type of water as potable water then it leads to various water-borne diseases.

### Acknowledgements:

The authors express thanks to Dr. Pradip S. Patel, Director, ARIBAS; for his encouragement and for providing necessary facilities to carry out the research.

### REFERENCE

- [1] Elizabeth K M & Premnath Naik L, *Poll.res.*, **2005**, 24(2), 337-340.

- 
- [2] Vijender Singh, *Res. J.chem & ENV*, **2006**, 10(3), 62-66
- [3] Arunabh Mishra and Vasishta Bhatt *E-.J.Chem.*, **2008**, 5(3) 487-492
- [4] Mayur C Shah, Prateek Shilpkar and Sangita Sharma, *Asian J Chem.* **2007**, 19(5), 3449-3454.
- [5] Mitali Sarkar, Abarna Banerjee, Partha Pritam Parameters and Sumit Chakraborty, *J.Indian Chem.Soc.*, **2006**, 83, 1023-1027.
- [6] Rao S.M and Mamatha P, *Curr.Sci.* **2004**, 87, 942.
- [7] Mayur C Shah. Prateek Shilpkar and Sangita Sharma. *Asian J Chem.* **2007**, 19(5), 3449-3454.
- [8] World Health Organization, Guidelines for drinking water quality-I, Recommendations. 2<sup>nd</sup> Ed. Geneva WHO. **1993**.
- [9] Standard Methods for the Examination of Water and Waste Water, 20<sup>th</sup> Ed., APHA, AWWA, WEF. Washington DC, **1998**.
- [10] Vogel A.I. A text book of Quantitative Inorganic Analysis Including Elementary Instrumental Analysis 4<sup>th</sup> Ed. The English Language Book Society and Langman. Co (a) **1978**. P 837 (b) P 328-32 (c) 504-506 (d) 499-500 (e) 830-831.
- [11] Trivedy R K and Goel P K, Chemical and Biological Methods for Water Pollution Studies, Environmental Publication, India, **1986**.
- [12] Bhandari N S and Pande R K, Solute Dynamics of River Sarju in the Central Himalayas. India, In Ecology of the Mountain Waters, Bhatt S.D. and Pande R.K. Ashish Pub. New Delhi. **1991**, 104-124.