

# Qualitative Analysis of Ground Water of Palanpur Region, N. Gujarat

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## ABSTRACT

The ground water we are using mainly for drinking purpose contains various numbers of impurities which are most necessary to be analyzed before water is used for any purpose. This analysis has been undertaken to determine the quality of ground water of Palanpur region of banaskantha dist. The analysis has been done with respect to pH, EC, TDS,  $Ca^{+2}$ ,  $Mg^{+2}$ , bicarbonate, carbonate, chloride. 20 samples of borewell water has been collected from the different areas around Palanpur region (Banaskantha Dist. North Guj.). The samples were collected between December 1 to December 10

**Parameters:** Ph, Electricconductivity, TDS,  $Ca^{+2}$ ,  $Mg^{+2}$ ,  $CO_3^{-2}$ ,  $HCO_3^-$ ,  $Cl^-$

## I. INTRODUCTION

The present study shows the conc. of  $Mg^{+2}$ ,  $Ca^{+2}$ ,  $CO_3^{-2}$ ,  $HCO_3^-$ ,  $Cl^-$ , pH, EC, TDS of the ground water of palanpur region.

### Banaskantha District

Sample No.	Location	Date of collection	TDS (at250C) ppm	pH (at 250C)	EC $\mu s$	$Cl^-$ mg/l	$CO_3^{-2}$ mg/l	$HCO_3^-$ mg/l	$Ca^{+2}$ mg/l	$Mg^{+2}$ mg/l
1	Sadarpur(180ft)	03/12/2012	489.2	6.94	926.2	3.28	NIL	39.6	1.80	3.56
2	Lunva	03/12/2012	586.1	6.85	1113	5.28	NIL	39.2	2.92	4.60
3	Koitapura	03/12/2012	422.6	6.98	799.6	3.12	NIL	47.6	1.36	2.68
4	Nani bazaar	05/12/2012	219.9	7.52	420.2	2.56	NIL	26.0	1.36	1.92
5	Sastrinagar	05/12/2012	813.5	6.63	1534	7.68	NIL	48.4	3.52	5.68
6	Mansarovar	05/12/2012	531.5	6.69	1016	4.48	NIL	37.2	1.80	3.60
7	Patel farm	03/12/2012	535.4	6.64	1016	5.40	NIL	29.2	3.40	4.60
8	Sadarpur(150ft)	03/12/2012	432.9	6.88	822.9	3.68	NIL	31.2	2.64	3.92
9	Madhupura	10/12/2012	430.7	6.97	820.6	4.72	NIL	30.4	2.92	4.08
10	Gobri road	12/12/2012	674.0	6.75	1282	7.28	NIL	30.0	3.60	5.64
11	Nandigram	14/12/2012	557.4	6.70	1099	3.26	NIL	39.2	3.76	5.68
12	V.R.Vidyalay	14/12/2012	597.6	6.82	1165	5.04	NIL	27.6	3.72	5.80
13	Laxmantekari	08/12/2012	670.8	6.66	1306	4.88	NIL	38.4	3.60	5.72
14	Ambica nagar	08/12/2012	1045	6.44	2079	9.84	NIL	32.4	5.36	8.24

15	Bhagvati nagar	08/12/2012	791.4	6.59	1541	4.20	NIL	31.6	2.68	4.24
16	Market yard (pln)	08/12/2012	598.2	6.53	1159	6.04	NIL	30.0	3.56	5.64
17	Sakti nagar	08/12/2012	584.7	6.60	1135	3.84	NIL	36.8	1.40	2.20
18	Laxmipura	12/12/2012	873.7	6.46	1702	9.52	NIL	24.8	5.40	7.42
19	Ganeshpura	12/12/2012	410.9	6.79	804.3	3.48	NIL	33.2	2.36	4.16
20	Parpada highway	12/12/2012	420.0	6.87	816.5	1.52	NIL	23.2	1.86	3.44

## II. RESULTS AND DISCUSSION

All the samples of water were Collected in clean polythene bottles and they were sent for analysis in the laboratory.

The different tests were carried out by various methods as follows:

### **pH:**

pH is measured by pH tester 20.

The pH value range between 6.4 to 7.6. The lowest value observed at Ambica nagar area and the highest in Shastri nagar. The pH of all samples lies in the range prescribed by (BIS).

### **E.C:**

E.C is measured by E.C TDS Analyzer ATC PROB CM-183.

Electric conductivity is a very useful parameter to calculate the purity of water.

Maximum EC is recorded at Ambica nagar area(2079 iS) and the minimum at Shasti nagar (420.2 iS).

The result shows that 16 samples range within the permissible range of 1500 iS /cm. Only 4 samples range higher than permissible level of ICMR standards.

The high conductivity is due to industrial and domestic pollution of subsurface water (Ravi Chandran, 1991).

### **T.D.S:**

TDS is measured by E.C TDS Analyzer ATC PROB CM-183

The study shows that the TDS values of all the samples lies between the permissible range of ICMR, that is 500-1500 ppm.

### **Chloride:**

Chloride is Analyzed by titration method.

The observation shows that only 4 samples have Cl- higher than the permissible level of 7.0 mg/l. The highest concentration of chloride is at Ambica nagar and the lowest at parpada village.

High concentration of chloride in ground water can be attribute to lack of underground drainage system and bad maintenance of environment around the source. The higher concentration can cause corrosion and pitting of iron pipes.

### **Calcium:**

Calcium is Analyzed by titration method.

The study shows that the range of calcium lies between 1.40 mg/l to 5.36 mg/l.

The highest conc. is at Ambica nagar(5.36 mg/l) and the lowest conc.at shakti nagar(1.40mg/l).

The highest desirable limit for Ca is 75 mg/l (WHO, 1984; park & park, 1980). It is under permissible limit. Calcium as such hazardous effect on human health. Infact it is one of the important nutrient required by the organisms.

### **Magnesium:**

Magnesium is Analyzed by titration method. The highest conc. of magnesium is at Ambica nagar

(8.24mg/l ) and the lowest is at Shastri nagar (1.92 mg/l). The tolerance range of magnesium is 30-100 mg/l according to Indian Standards.

### **Alkalinity (CO<sub>3</sub>-2, HCO<sub>3</sub>-):**

Alkalinity is Analyzed by titration method. The phenolphthalein alkalinity of all the samples is zero but the total alkalinity was found between 23.20 - 47.6 mg/l. The ISI range of total alkalinity is between 50-200 mg/l. alkalinity is itself not harmful to human being (Pandey & Sharma, 1999).

High value of alkalinity imparts a bitter taste to water.

### III. CONCLUSION

Different parameters of water samples of study area do not exceed standard and maximum permissible limit except sample no. 14 Ambica nagar area as shown in the table. Ground water of palanpur region is not highly contaminated and can be used for domestic purpose. But water of some areas needs to be treated with some purification techniques.

#### H<sub>2</sub>O Tells us:

The following steps should be taken in some areas to prevent the pollution of underground water to improve its quality. Suitable waste disposal sites should be selected to handle the solid and liquid waste. Over exploitation of ground water should be checked by adopting alternative measures like rain water harvesting and educating the people to use water judiciously.

### IV. REFERENCES

- [1]. APHA, AWWA and WPCE 1989. standard Methods for the examination of water and waste water, 17th Ed., American Public Health Association Washington D.C.
- [2]. Vogel's Textbook of Quantitative chemical Analysis (5th Ed.) by Vogel A.I.ELBS.
- [3]. APSFSL, 1988, Andhra Pradesh State Forensic Science laboratories Annual Report.
- [4]. Assessment of the Water Quality in Rajganpur industrial complex-2: Metallic parameters 2001 by Mahuyadas Gupta Adak and Purohit K. M. Poll, Res. 20(4), 575-581.
- [5]. Fresenius, W., Quenntin E. K. and Schneider, W., 1988, Water Analysis in a practical guide to physico-chemical and Microbiological Water Examination and Quality Assurance. Springier Verlag. (p.804), Berlin-Heidelberg.
- [6]. Thresh I. C., Suckling E. Y., and Beale J. E., 1944. The Examination of Water and Water Supplies, London.
- [7]. ISI 1991, Indian Standards Tolerance Limits for Inland surface Water : Subject of pollution, Indian standard instruction IS 10500.
- [8]. Mohapatra, U. K. and Singh, B. C., 1998. Inorganic Anions in Drinking Water collected from different sources in the old capital city of Cuttack, Ind.J. of Enc.Prot.18(7): 532-535.
- [9]. Park's textbook of Preventive and Social Medicine 1997 by K. Park.
- [10]. WHO 1984. The Guideline for Drinking Water Quality (Vol-1). Recommendation, World Health Organization, Geneva.