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A STUDY OF DRINKING WATER SAMPLES COLLECTED FROM DIFFERENT AREAS OF THE BHARUCH CITY

Abstract

Bharuch city is an important city in Gujarat. The largest industrial area in Asia is being located at Ankleshwar, close to Bharuch. So different kind of pollution, viz water pollution, air pollution, soil pollution have been created due to lack of knowledge, negligence and illiteracy. It is observed that the study of water quality is of enormous educational value for the quality of water. Hence it was thought interesting to study the physico-chemical parameters of water. The suitability of water for drinking water and other domestic purpose is studied by collecting samples from bore wells situated in various zones of Bharuch city (Gujarat). The different parameters were analyzed and compared with standard values prescribed by American Public Health Association (APHA) and World Health Organization (WHO).

[1] Introduction :

Bharuch city is situated on the banks of Narmada River. The largest industrial area in Asia is being located at Ankleshwar, close to Bharuch. But due to lack of knowledge, negligence and illiteracy, most of the citizens are not aware of the different kinds of pollution, viz water pollution, air pollution, soil pollution etc. So it was thought interesting to study its physico-chemical parameter (1-6) of water and monitoring of drinking water quality of Bharuch city. The parameters studied were pH, temperature, conductance, total alkanity, total hardness, calcium hardness, magnesium hardness, Total Dissolved solid (TDS) and Chemical Oxygen Demand (COD). These parameters were compared with standard values prescribed by APHA and WHO. The present work was done on 13-01-2009.

All the chemicals used during analysis were of Analytical grade. Glass bottles were used for the collection of water samples. Before sampling, the bottles were treated with dilute mineral acids for two days and they were washed with distilled water (not acidic to litmus) nearly one liter of sample water was collected in the morning.

[2] Experimental :

A mercury thermometer having least count of 0.1°C was used to measure temperature at the site itself. Equip-tronics digital pH-meter, Model no. EQ-610 with combined glass electrode assembly was used for measurement of pH. It was standardized frequently before use with standard KHP solution (pH = 4.0). Systronics direct reading conductivity meter 303 with conductivity cell was used for measurement of conductance. Conductivity meter was standardized by 0.005 M KCl solution (Conductivity = 654 µ.mho.cm-1). Total dissolved solid (TDS), total alkanity, total hardness, calcium hardness, magnesium hardness, COD were analysed titrimetrically. The physico-chemical parameters studied are given in table-I.

Sr. no.	Water Sample Location	pH	Temp.	Conductivity (µ.mho.cm-1)	TDS mg/l as CaCo3	Total Alkanity mg/l	Total Hardness mg/l	Calcium Hardness mg/l	Magnesium Hardness mg/l	COD mg/l
1	Manishanand Society (Shaktinath)	8.01	23.2ºC	232	1530	592	488	51.2	436.8	27.2
2	Narnarayan Banglows	7.32	23.8ºC	214	1720	384	644	54.4	99.6	44.8
3	Akshardham Society	8.03	24.0ºC	209	1150	720	248	6.4	241.6	43.2
4	Narayan Kunjvihar (extention)	7.99	23.3ºC	339	2140	464	724	72.0	652.0	46.4
5	Brugupur Society	8.07	24.2ºC	132	840	264	500	44.8	455.2	41.6
6	Narmada River	8.19	23.0ºC	71	650	288	380	68.4	341.6	51.2
7	Bharuch railway station	8.20	23.6ºC	183	1160	288	388	62.4	325.6	43.2
8	Dholikui Bazaar	8.44	23.8ºC	85	1160	264	384	59.2	324.8	43.2
9	Shree Jayendrapuri Arts and Science college, Bharuch (Tap water)	8.16	23.2ºC	384	2440	860	912	81.6	830.4	48.0
	REQUIREMENT									
	Desirable limit	6.5-8.5	-	300	500	200	300	75.0	30.0	4.0
	Permissible	No								

After using drinking water, above the desirable limit of various parameters an adversed effect is found , which is shown in table-II.

limit in the absence of alternate source	Relaxa-tion	-	-	2000	600	600	200	100	15

Table-II

Characteristics	Undesirable Effect out side the desirable limit
pH	Beyond this range the water will affect the mucos membrane and/or water apply system.
Dissolved Solid	Beyond this polatability decreases and may cause gastro intestinal irritation.
Calcium(Ca) Magnesium(Mg) Total Hardness	Encrustation in water supply structure and adverse effects on domestic use.
Total Alkalinity	Beyond this limit taste becomes unpleasant.

[3] RESULT AND DISCUSSION :

The present work aims to identify the status of drinking water quality of Bharuch city with special references to well water from various zones of Bharuch city. The pH value of all well water as of all drinking waters is an important index of acidity and alkalinity. pH below 6.2 starts corrosion. In present work pH ranged from 7.32 - 8.44. The specific conductivity was found from 71.0 to 384 µ.mho.cm-1 . The total alkalinity of water is due to salts of weak acids. In the present study total alkalinity ranging from 288 to 860 mg/l had been found. Total hardness ranged from 248.0 to 912.0 mg/l. Calcium and magnesium hardness ranged from 6.4 to 81.6 mg/l and 99.6 to 830.4 mg/l respectively. In present study COD ranged from 27.2 to 51.2 mg/l.

The chemical parameters indicate that in the present work total alkalinity, total hardness, calcium hardness, magnesium hardness and total dissolved solid and COD have higher value, which make it very harmful as drinking water for human beings.

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