PHYSICO-CHEMICAL ANALYSIS OF GROUND WATER (KANBIWAD WARD) IN MUNICIPAL AREA OF BHAVNAGAR (GUJARAT)

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ABSTRACT

Physico-chemical characteristics of Kanbiwad ward in Bhavnagar were studied. The study was made in the month of April 2008. Seven sampling points were selected for the study. The parameters studied were temperature, pH, chloride, sulphate, total hardness, total alkalinity, turbidity, and TDS.

Key words: Physico-chemical, Water quality, TDS, Bhavnagar.

INTRODUCTION

"Water is life". This line gives importance of water. Main source of water is rain. After rainy season, sources of water are surface water and ground water only. Ground water is the most important source of water supply for drinking, irrigation and industrial purposes. The natural quality of ground water tends to be degraded by human activities. Water is polluted in all the surface of earth and Kanbiwad is no exception to this phenomenon.

Among the various means of pollution of ground water reservoirs, the main causes for the pollution of water are city drainage, domestic waste, industrial waste etc. All metabolic and physiological activities and life processes of aquatic organisms are generally influenced by such polluted water and hence, it is essential to study physico-chemical characteristics of water.

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EXPERIMENTAL

Water samples were collected in cleaned borosilicate bottles washed with acetone in month of March at selected sampling sites see Fig. 1 (H_1, H_2, H_3, H_4, H_5, H_6, H_7) between 10.00 a.m. to 11.15 a.m. at different depths and brought to the laboratory of Industrial Chemistry for study of characteristics of water. Different procedures were used as reported in the literature[1-8].

Temperature of the water was measured in Equip-tronics digital auto temperature meter. Borosilicate glass wares, distilled water and E-Merck reagents were used throughout the testing. pH values of water samples under investigation were measured using Equip-tronics pH meter, Type No. 611. The pH was standardized by buffer solutions of 4.0 pH and 9.2 pH by E-Merck buffer tablet.

The chloride ions were generally determined by titrating the water samples against a standard solution of $AgNO_3$ using potassium chromate as an indicator. Sulphate was estimated by UV-visible Spectrometer, type-II. Total hardness was determined by complexometric titration with EDTA using eriochrome black-T as an indicator. Total alkalinity of the water was determined by titrating with N/50 H_2SO_4 using phenolphthalein and methyl orange as indicators.
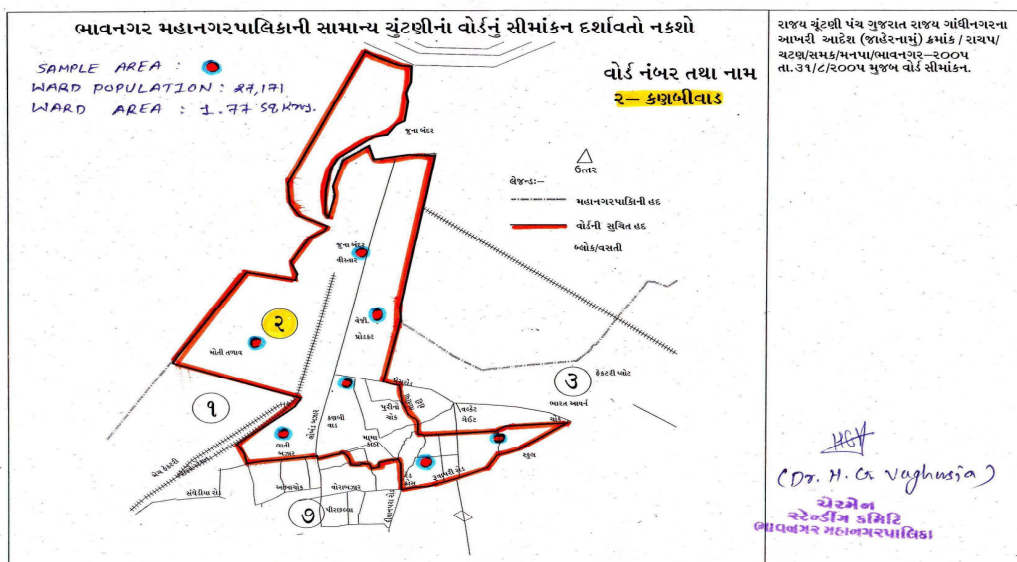

Fig. 1 : Different locations of water samples in Kanbiwad ward, Bhavnagar.

Turbidity was measured by digital turbidity meter, Type No. 611. TDS was estimated by digital TDS meter, Type No. 703.

RESULTS AND DISCUSSION

The pH of the water indicates the degree of deterioration of water quality. The desirable pH range necessary for drinking water is from 7.0 to 8.5. The pH value of water sample in the study area ranged from 7.3 to 8.7. This shows that pH of water sample was slightly alkaline.

The concentration of chlorine in the sample was found to 311 to 361 mg/L. High chloride contents have poisonous effects on plants, animals and human beings. The concentration of sulphate was found to be 188 to 277 mg/L.

Table 1 : Characterization of sarovar water

Properties	H_1	H_2	H_3	H_4	H_5	H_6	H_7
Temp. (^{0}C)	29	29	29	29	28	28	28
pH	7.4	7.3	7.7	8.4	8.3	8.0	8.7
Chloride (mg/L)	354	319	335	330	361	337	311
Sulphate (mg/L)	219	188	277	259	212	205	215
Total hardness (mg/L)	290	226	302	255	270	230	320
Total alkalinity (mg/L)	249	409	368	386	414	256	596
Turbidity (NTU)	178	139	133	150	143	124	154
TDS (mg/L)	772	750	875	863	892	801	704

H_1 = Juna Bandar, H_2 = Near Moti Talav, H_3 = Bakul Vegetable, H_4 = Near Press, H_5 = Laati Bazaar, H_6 = Near Red Cross, H_7 = Near Municipal School.

Total hardness was found in the sample water ranges of 226 to 302 mg/L, which shows that water is safe for drinking purpose. The desirable limit for total alkalinity is 200 mg/L. The values of total alkalinity of water samples varied from 249 to 409 mg/L.

Turbidity is one of the common forms of pollution. This prevents growth of the aquatic plants by reducing rate of their photosynthesis. This becomes obstacle for self purification of water. Turbidity in sample water was found between 133 to 178 NTU. The

value of TDS was found in the water samples between 704 to 892 mg/L.

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