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PHYSICO-CHEMICAL ANALYSIS OF GROUND WATER OF KRUSHNANAGAR (SOUTH) IN MUNICIPAL AREA OF BHAVNAGAR (GUJARAT)

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ABSTRACT

Physico-chemical characteristics of Krushnanagar (South) in Bhavnagar were studied. The study was made in the month of March 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 : Ground Water, TDS, Physico-chemical

INTRODUCTION

Water is quite important for living beings. No life can survive without water. Main source of water is rain. After rainy season, sources of water are surface water and ground water. 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 and the surface of earth and Krushnanagar (South) is not an 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 bottle washed with acetone in month of March at selected sampling sites; Fig. 1 (KS_1, KS_2, KS_3, KS_4, KS_5, KS_6, KS_7) between 4.00 p.m. to 5.00 p.m. at different depths and brought to the Laboratory of Industrial Chemistry for study of characteristics of water.

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 sample 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.

Turbidity was measured by digital turbidity meter, Type No. 611. TDS was estimated by digital TDS meter, Type No. 703. Different methods were used for this analysis[1-7].

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 7.2 to 8.9. This shows that pH of water sample was slightly alkaline.

The concentration of chlorine in the sample was found to 254 to 369 mg/L. High chloride contents have toxic effects on plants, animals and human beings. The concentration of sulphate was found to be from 207 to 289 mg/L.

Total hardness was found in the sample water in range of 212 to 390 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 268 to 436 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 122 to 278 NTU. The value of TDS was found in the sample water between 563 to 942 mg/L.

Table : Properties of ground water

Properties	KN_1	KN_2	KN_3	KN_4	KN_5	KN_6	KN_7
Temperature (^{0}C)	31	31	30	31	30	29	31
pH	7.9	7.2	7.9	8.6	8.0	8.2	8.9
Chloride (mg/L)	254	369	339	359	261	377	347
Sulphate (mg/L)	237	288	267	291	207	255	289
Total hardness (mg/L)	390	286	212	357	372	265	282
Total alkalinity (mg/L)	349	411	268	376	436	356	329
Turbidity (NTU)	278	239	123	152	243	122	254
TDS (mg/L)	872	755	835	563	942	725	674

KN_1= Meghani Circle, KN_2= Near Dimond Chock, KN_3= Near Munideri, KN_4= Subhashbridge, KN_5= Bhagavaneswar Temple, KN_6= Near Ghogha Circle, KN_7= T.V. Kendra.

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