

Physico-Chemical Parameters of Ground-Water

Ayesha Durrani

Dr. Rafiq Zakaria College for Women, Dr. Rafiq Zakaria Campus II,
Navkhanda, Jubilee Park, Aurangabad – 431001 (M.S) India

Abstract: Physico-chemical analyses of bore-well water were studied. The study was made in the month of May-2011. Six samples were collected for analysis. The parameters studied were DO, COD, BOD, TDS, sulphate, total hardness etc. The parameters were analyzed and compared with WHO standards.

Key words: Ground Water • TDS • Physico-chemical • BOD

INTRODUCTION

Water is very important for living beings. Main source of water is rain. After rainy season, source of water is ground, which is available for many purposes such as domestic, industrial and agricultural. The natural quality of ground water tends to be degraded by human activities [1].

As water play an important role in the biological activities of universe. Without water no life on earth. Unfortunately, water resources are getting polluted and getting unfit for use [2]. Use of polluted water itself takes about 25000 peoples all over the world every day [3].

Ground water is believed to be comparatively much clean than the surface water. Over use of ground water for drinking, irrigation and domestic purposes has resulted in rapid depletion of water. Pollution of ground water aquifers has made many of these wells unfit for consumption [4].

The scope of the present study is with the intension to find out ground water quality in the month of May when water level is low.

MATERIALS AND METHODS

Six water samples were collected from bore-well water (4:0 to 5:0 pm at different depths) Aurangabad, India in cleaned borosilicate bottles washed with acetone in the month of May-2011.

The temperature of water was measured in equip-tronic meter by standard method. Borosilicate glass wares, distilled water and Sd-fine reagents were used.

The chloride ions were generally determined by titration of the water sample with standard solution of AgNO_3 using potassium chromate as an indicator. Sulphate was estimated by UV – Visible spectrometer. Total hardness was determined by complex metric titrations with EDTA using EBT as an indicator. Turbidity was measured by turbidity meter. Other parameters were also measured by standard methods [5].

RESULTS AND DISCUSSION

Ground water is the most important source of water for drinking, irrigation and industrial purposes. Main source of water is rain. After rainy season, sufficient quantity of ground water is available. But before rain in the month of May usually water is insufficient for drinking and domestic, irrigation etc purpose.

The chemical quality of water is a factor which is of paramount importance. Suitability of ground water for irrigation purposes depends upon the conductivity & hardness of water [6].

For present study six different samples of ground water were collected for analysis [7].

The low p^{H} -values may cause corrosion in containers & pipelines, while high may produce sediment, deposit and difficulties in chlorination for disinfections of water [8]. But in the given samples the values of p^{H} are 7-8.1 which are in permissible limits

The values of alkalinity of water samples were in the range of 138 – 150 mg/L which are slightly higher. The alkalinity is caused by the presence of carbonate & bicarbonates. The samples were taken during month – May before rain. It causes bitter taste to water.

Results of water samples collected from different areas of Aurangabad in May – 2011

Parameters	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆
Temperature	27	26	26	27	28	28
p ^H	7.9	7.0	7.3	7.8	7.2	8.1
Alkalinity mg/L	139	142	150	140	138	139
Conductivity (ms)	0.59	0.89	0.63	0.81	0.36	0.80
DO	3.13	3.80	2.40	6.10	5.39	4.61
COD	48.1	61.9	56.3	46.3	51.9	49.6
BOD	2.40	3.30	5.80	4.19	5.10	2.59
Chlorides mg/L	49	60	53	69	63	58
Nitrates mg/L	5.53	10.10	7.79	9.87	11.35	8.81
Sulphates mg/L	110.1	112.7	210.3	216.3	219.8	220.8
Phosphates mg/L	0.13	0.11	0.49	0.55	0.16	0.61
Sodium	15.6	30.6	19.0	35.9	40.0	25.3
Calcium	75.0	100.0	89.1	90.6	97.3	110.8
Magnesium	29.1	35.6	19.6	15.9	17.8	26.3

A1 = Harsool, A2 = Garkheda,

A3 = MIDC, A4 = Cidco,

A5 = Jubilee Park, A6 = Shahgunj

Hardness of water is due to the calcium and magnesium, strontium & silicate etc [9]. Hardness was found to be within limits.

Chloride content in fresh water is generally influenced by evaporation and precipitation [9]. Chloride in drinking water is relatively harmless however high chloride contents in water bodies are harmful for metallic pipes and agricultural crops.

Nitrate is the highest oxidisable from the nitrogen. In the six samples the NO₃⁻ content are within. The NO₃⁻ in water over 100 mg/L causes blue baby disease, particularly in infants' up to 6 months of age. Nitrate forms nitrosamine in stomach which causes gastric cancer.

Sulphate has less effect on the taste of water as compared to the presence of chloride. The sulphate ion is one of the major anion occurring in natural water. The sulphate values from 15 to 75 mg/L are the permissible limits. Higher values of sulphate may cause intestinal disorder. The given samples had sulphate values.

In the present investigation DO range was found to be in the range of 2.4 to 6.2 which is low as compared to standard value.

The BOD measures the amount of oxygen used by micro-organisms during aerobic decomposition of organic pollutants which is comparatively low for the ground water. For present work the BOD values were low compared to the standard value.

The COD values were found to be higher than permissible limit.

From the above observations, there is less possibility of hazard in using the investigated ground water. Some parameters like pH, Temperature, COD and DO were within the permissible limit but others were not. But the possibility that after rain the water quality will improve because these samples were collected in the month of May.

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