

EFFECT OF INDUSTRIAL EFFLUENTS ON GROUND WATER SOURCES IN AND AROUND BAIKAMPADY

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Abstract

Ground water is the main source for domestic, industrial and agricultural use in Baikampady area. The importance of the hydrogeochemical analysis underlies the fact that chemistry of the ground water can directly be related with the source of water, climate and geology of region. Water sample are collected from various aquifers during fixed interval. The water samples have been tested to check the suitability of water for drinking, irrigation and industrial purpose. All the water samples are falling within the permissible range prescribed by BIS, WHO and ICMR.

I. INTRODUCTION

Ground water is one of the earth's most important resources for human life. Natural ground water is generally free from contamination and is usually the better alternatives to surface water which is mostly contaminated by anthropogenic activities. The quality of groundwater depends on a large number of individual hydrological physical, chemical and biological factors. Generally higher proportions of dissolved constituents are found in groundwater than in surface water because of greater interaction of ground water with various materials in geological strata.

The ground water system is as complex as it is influenced by many factors in a particular site Rainfall, land form, soil, lithology, sea water intrusion and other anthropogenic activities are some of the factors determining the ground water quality. Maintaining ground water quality is the most critical issue in and it necessitates understanding and management of groundwater chemical composition of ground water in coastal areas differs broadly depending on diverse geohydrology, hydrometeorology, topography, drainage and other artificial conditions imposed.

II. STUDY AREA

The study area is being one of the major cities on the coast of Karnataka gaining economic importance due to urbanization and industrialization. The study area for our project consists of industries etc. Baikampady is located at 12.93176N 74.7944464E. There is significant rainfall in most months of the year. The average annual temperature in Mangalore is 27.0 C. the rainfall average 3783 mm. As per provisional reports of census India, population in 2011 is 488,968; of which male and female are 242,512 and 246,456 respectively. In addition to this open well and bore wells are also the main source of drinking water.

III. OBJECTIVES

- Impact of industrial wastewater on Ground water sources
- Evaluating the effects of effluents on ground water.
- Hydrogeological features of the study area.

IV. GEOLOGY OF AREA

Dakshina kannada is a marine district located in the south-western part of Karnataka adjoining the Arabian sea. The geographical area is 4770 Sq. Km extending between 12030'00" and 13011'0" north latitude and 74035'0" and 75033'30" east longitude.

The average rainfall of the district 3789.9 mm and is received mainly during the south west monsoon season extending from June to September. About 85% of the annual rainfall occurs during the monsoon month. Post-monsoon yields 8% and the balance of annual rainfall from December to march.

In the western parts of the district i.e. along the western Ghats, the weather is comparatively cooler than in the western coastal areas. In the district, all the taluk headquarters are having I.M.D rain gauge station.

As per the Ground Water Resource Estimation, the annual ground water availability is 31279 Ham; the existing gross groundwater draft for all uses is 20645 Ham; after allocating a resource of 4625 Ham for future industrial and domestic uses, the net groundwater availability for future irrigation development is 9962 Ham.

Ground water quality is generally good and potable and the specific conductivity of ground water in the district varies from 72-140 micromhos/cm at 250C. As per water sample analysis data of NHS 2003-2004, EC ranges maximum up to 310micro mhos/cm at 250C at Thalapady station.

V. METHODOLOGY

The present Study was conducted at the laboratory for the analysis of water quality parameters. Water samples were collected two cycles in the whole study and the quality of water is measured by means of physical, chemical characteristics and strength parameters are pH, Total Solids, Total Hardness, Turbidity, Dissolved Oxygen, Residual Chlorin, Chlorides, Nitrate, Iron and Sulphate.

VI. RESULTS AND DISCUSSIONS

The present study is carried out to find the physiochemical characteristics of Baikampady industrial area. We collected 12 water samples from various in and around the study area, testing various physical and chemical properties. We referred the BIS for the compression of results obtained from tests.

Table 1. Cycle I Test Results

Test	Samples					
	1	2	3	4	5	6
pH	6.3	7.3	7.1	6.9	6.6	6.8
TH	172	1131	144	152	389	72
TS	0.4	4.4	0.3	1	0.1	1.4
Turbidity	2	25.9	0.01	3.9	2.5	0.1
Chlorides	0	33.9	85.1	75.1	16.5	0
DO	1.24	11.4	9.5	8.07	1.2	11.4
Chlorin	0	0	0	0	0	0
Iron	7.05	9.25	0.6	4.8	0.75	0.45
Nitrate	0.84	0.002	0.002	0.5	0.8	0.006
Sulphate	6.1	7.8	0.75	5.8	6.25	0.57

Table 2. Cycle I Test Results

Test	Samples					
	7	8	9	10	11	12
pH	6.8	6.7	6.5	6.6	6.7	6.7
TH	-	-	-	-	-	-
TS	24.8	52.5	39.4	113.9	79.9	32.7
Turbidity	3	0.2	0.3	0.6	0.5	0.4
Chlorides	-	-	-	-	-	-
DO	3.06	3.05	-	-	-	-
Chlorin	-	-	-	-	-	-

Iron	0.45	0.35	0.35	0.45	0.1	0.6
Nitrate	0.006	0.55	0.55	0.006	0.0006	0.0006
Sulphate	1.9	1.8	1.9	1.8	2.2	2.1

Table 3. Cycle II Test Results

Test	Samples					
	1	2	3	4	5	6
pH	6.4	6.5	6.2	6.1	6.3	6.9
TH	169	1038	156	162	393	88
TS	35.5	90	45	41	15	20
Turbidity	2.9	2.7	1	3.7	3.1	0.2
Chloride	36.8	0	34.0	84.3	75.1	16.2
DO	10.18	11.91	8.97	9.01	1.56	10.98
Chlorin	-	-	-	-	-	-
Iron	7.01	9.22	0.63	5.2	0.74	0.35
Nitrate	0.81	0.001	0.001	0.63	0.79	0.0007
Sulphate	6.3	7.5	0.81	5.93	6.22	0.59

Table 4. Cycle II Test Results

Test	Samples					
	7	8	9	10	11	12
pH	6.6	6.5	6.5	6.9	6.7	6.7
TH	-	-	-	-	-	-
TS	27.8	59.9	43.2	120.3	73.2	29.8
Turbidity	0.1	0.3	0.3	1.1	0.8	0.4
Chlorides	-	-	-	-	-	-
DO	2.9	3.13	-	-	-	-
Chlorin	-	-	-	-	-	-
Iron	0.37	0.35	0.35	0.52	0.1	0.6
Nitrate	0.0006	0.61	0.063	0.007	0.006	0.05
Sulphate	1.3	1.71	1.99	1.91	2.31	2

It is observed that the water quality varied spatially and temporarily

- pH concentration is in desirable limit i.e. 6 to 8.5.
- The values of Total hardness are within the desirable limit for sample except sample 2 (near Kaveri Ice factory)
- The values of Total dissolved Solids are within the desirable limits for both the cycles.
- The values of Turbidity are within the desirable limit for sample 1 and 3 to 12. But the total hardness of sample 2 (near Kaveri ice factory) exceeds the limit.
- The values of Chlorides are within the desirable limits for both the cycles.
- The dissolved Oxygen content is high in ground water sources for both cycles.
- Iron content in sample 11 and 12 is within the desirable limit. In samples 1 to 10 it exceeds the limit.
- The values of Nitrate content are within the desirable limits for both the cycles.
- The values of Sulphate content are within the desirable limits for both the cycles.

VII. CONCLUSIONS

Among all of the sampling sites, the value of different parameters varies in very low numbers. On the basis of various parameters studied it was concluded that the water quality in Baikampady Industrial area is satisfactory. The study establishes that effluents are the prime sources of pollution. The analysis report clearly indicates that the water after treatment can be reused in industry itself. If proper alternative arrangements like effluent treatment before discharge are not made then the situation may be alarming to the inhabitants in the study area and to near buy areas as well. Hence regular monitoring and strict law

enforcement is needed to develop a strategy to manage the environmental hazards due to these elements and to improve environmental protection groundwater as these are water banks for future.

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