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STUDIES ON GROUND WATER QUALITY AROUND KURKUMBH INDUSTRIAL AREA, DAUND, PUNE DISTRICT

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ABSTRACT

In the present study an attempt has been made to find the quality of ground water, around Kurkumbh industrial area. The water quality parameters viz pH , electrical conductivity (EC), sodium (Na), potassium (K), Calcium (Ca), magnesium (Mg), chloride (Cl), sulphate (SO_4), carbonate (CO_3), bicarbonate (HCO_3), fluoride (F), total hardness (TH), total dissolved solids (TDS), SAR and RSC were analyzed. The result shows that the ground water from some sampling sites are within permissible limit according to WHO.

Keywords: *Groundwater; Industrial area; Quality of water*

INTRODUCTION

Ground water is about 20% of the world resources of fresh water and used in large amount for industry, irrigation and domestic activity. In recent days ground water is deteriorating at alarming rate due to increased industrial activity in rural area of Maharashtra state. The chemical and pharmaceuticals industries generally located out side the city area and discharge their effluent on the ground along low lying area or in river water[1]. Ground water is an indispensable commodity in the very limited quality to man and other living beings. Most of the Indian towns and cities do not have access to safe drinking water. Naturally ground water recharged through rain water. Ground water areas that are recharged at higher rate generally more vulnerable to pollution. The ground water can pollute by landfills, septic tank, livestock yards, petroleum tanks, fertilizers and pesticides. The quality of vital concern for mankind since it is directly linked with human welfare. Polluted water is the culprit in all such cases. The major source of water pollution is domestic waste from urban and rural areas and industrial waste which is discharge into natural water bodies. Rapid industrialization has resulted with growing contamination of air, water and soil thus affecting its quality. Chemical industries also have concern with in respect of disposal hazardous waste[2].

Since water is essential for every living organism on earth. The type of water reserves and their utility needs to explore. The fresh water present in the from of ground water has been depleting rapidly in several parts of the world including India. Water has been used for manufacturing processes and out of total consumption industries generates 80% water as waste water. It creates water pollution hence major source of water pollution is industrial effluent. These entire factors get percolated into ground water through rain water causes ground water pollution. The composition of different kinds of micronutrient and heavy metal like zinc, iron, copper, manganese, lead, nickel, cadmium, mercury, chromium etc. are changes which get affect on soil fertility and ultimately on quality of ground water. It is essential to monitor such type of pollution and major pollutant levels. The Kurkumbh MIDC area is located in Daund Tahesil of Pune district Maharashtra in survey of India topological sheet number 47-J/11. In this industrial area 143 chemicals and pharmaceuticals industries are situated which generate lot of industrial effluent and discharge it in ground as well as river water. Which is leads to the ground water pollution around area. In present investigation a attempt was made to investigate the quality of water around Kurkumbh Industrial area (Daund) of Pune district in Maharashtra. This study

is in continuation of oue earlier work of monitoring of water quality effluents and treatment to reduce TON[3-12].

EXPERIMENTAL

The water samples were collected by observing necessary precaution. Ten sampling sites were selected for collection of ground water samples from study area. Samples were collected in polythene bottles and brought in to the laboratory for analysis. The control dynamic pH meter, Elico digital conductivity meter (CM180), Elico (model CL- 22D) Flame photometer, Synstronic digital Nephelometer (model 132) and Elico Spectrophotometer (model SL- 159) were used for determination of Physico-chemical parameters. Physicochemical analysis of water samples were carried out using standard methods given literature [13].

RESULTS AND DISCUSSIONS

The results of analysis were reported in table 1. The average pH value ranges between 7.75 to 9.00. The observed variation may be due to leaching of effluent and excessive use of fertilizers in local agricultural operation. The electrical conductivity of ground water from study area was ranging in between 300 to 8410 micromohs/cm. where as permissible limit ranging between 250 to 750 micromohs/cm for domestic use. The electrical conductivity values at sites 1, 2, 5, 8, 10, 11, 12, 13 14, 16, 17, 18 19 and 20 are higher than permissible limit. The dissolved solids varies from 185 to 4100 were as permissible limit range is in between 280 to 832 which are higher than permissible limit. The total hardness varies from 45 to 830 mg/l which may be due to the presence of calcium and magnesium. The calcium and magnesium was found under permissible limit the high value of magnesium is at sites 10 and 12 indicates that the ground water was polluted because of industrial effluent. The chloride content in study area has shown variation from 28 to 3283 mg/l. The higher value of chloride suggests leaching of effluent from industrial effluent into the ground water [14]. The site numbered 1, 2, 10, 11,12,13,14, 16, 18, 19 are shows higher value of chloride which are higher than permissible limit of 200 mg/l according to WHO. The alkalinity value varies from 25 to 120 mg/l and these are increased by contamination of ground water by industrial effluent [15]. The potassium ranged between 0.55 to 11.50 mg/l which are below the permissible limit. The sulphate varies ranges from 106 to 222 mg/l this may be due to discharge of effluent and fertilizers[16]. The high value of sodium, calcium and magnesium with increased hardness of water. The fluoride value varies from 0.6 to 4.0 mg/l which are in conferential with permissible limit. A SAR and RSC value ranges between 0.60 to 85 epm. These indexes suggest water is suitable for irrigation.

CONCLUSION

1. Some of parameters tested under investigation are out of limit according to WHO.
2. Sampling stations show pollution of ground water and not suitable for irrigation as well as domestic use.
3. It is recommended that effluents from industries will be properly treated before discharge.

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Table-1: Physico-Chemical Variation in Ground Water around Kurkumbh Industrial area

Sites NO.	**EC**	**pH**	**Na+**	**K+**	**Ca++**	**Mg++**	**Cl^-**	**SO_4^{--}**	**CO_3^{--}**	**HCO_3^-**	**F^-**	**TH**	**TDS**	**SAR**	**RSC**
1	3110	7.97	600	0.70	13	72	620	106	75	290	1.7	350	925	0.60	2.70
2	1530	8.00	195	4.25	10	73	300	125	78	195	0.7	325	825	8.01	-
3	684	8.20	110	3.70	11	15	45	150	50	250	Tr	135	1205	4.65	-
4	600	7.90	105	0.63	17	25	30	ND	55	235	Tr	101	305	24.19	3.75
5	890	840	185	2.40	11	15	70	170	75	245	Tr	45	3305	13.70	5.40
6	100	8.15	95	1.15	40	55	150	168	20	175	0.6	350	2100	22.40	-
7	300	8.20	16	0.75	20	15	28	205	55	135	1.2	140	4100	6.93	-
8	840	7.99	159	1.70	14	22	64	222	25	ND	1.6	95	1910	4.7	-
9	630	7.75	110	0.55	15	18	40	ND	35	160	1.0	100	191	3.9	3.99
10	5200	8.01	855	0.90	25	188	1700	ND	29	250	1.0	830	185	85.05	7.40
11	3620	8.15	780	5.91	14	45	800	ND	120	100	4.0	250	1000	ND	6.90
12	3410	8.20	750	2.00	14	45	695	ND	65	650	3.6	270	1950	12.80	5.10
13	8410	8.14	2550	8.86	13	168	3283	ND	25	525	1.0	730	450	4.90	4.00
14	3620	8.01	700	0.88	22	17	815	105	50	317	3.0	175	2000	5.30	7.15
15	690	8.05	113	9.75	20	30	50	165	40	450	1.6	100	589	13.70	0.20
16	1686	8.15	330	3.70	16	32	290	159	40	295	0.8	160	590	24.25	ND
17	1810	8.00	355	1.15	16	22	144	ND	100	409	2.5	250	480	18.29	ND
18	3400	8.04	690	6.63	18	30	700	ND	40	550	2.0	250	185	1.93	ND
19	3100	8.20	625	2.45	14	50	700	ND	50	270	2.5	144	385	40.83	9.70
20	770	9.00	70	11.5	18	51	80	ND	25	268	1.6	140	ND	22.50	7.30

Note- All values expressed in mg/l except pH, EC, SAR and RSC.

ND- Not Detected, Tr- Very Trace

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