

# Assessment of groundwater pollution in the vicinity of Kurkumbh MIDC Kurkumbh, tal -Daund, Pune-district, Maharashtra, India

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## Manuscript Details

Available online on <http://www.irjse.in>  
ISSN: 2322-0015

Editor: Dr. Arvind Chavhan

## Cite this article as:

Langore Kalyan R and Bhujbal Ravindra C. Assessment of groundwater pollution in the vicinity of Kurkumbh MIDC Kurkumbh, tal - Daund, Pune-district, Maharashtra, India, *Int. Res. Journal of Science & Engineering*, January 2018 | Special Issue A3 | : 199-202.

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## ABSTRACT

The paper aim at determining the suitability of water near, Kurkumbh MIDC. The present work deals with assessment of variation of seasonal water Quality Index of selected location of village near Kurkumbh MIDC. In the present study, Ground water sample of in selected location of village were taken for investigation and analyzed for various parameters with regard to drinking water standards and assessed for their suitability for drinking water .After analysis it has been observed that ground water quality of location are not suitable for drinking propose .We can highlighting the major issues of drinking water availability and measure to be adopted due to growing industrialization and unhealthy human activity. Water samples were collected from twelve different sites covering borderline area of MIDC and neighboring village downstream to it. These samples were analyzed for various parameters such as pH, EC, TDS, total hardness, Ca/Mg hardness, total alkalinity, fluoride, nitrate, sulphate, D.O., BOD, COD using standard method. It was found that values of TDS, total hardness, total alkalinity and sulphate of the samples are out of the highest desirable limit or exceeded the permissible limit. Some samples are extremely hard and highly saline and absolutely unfit for consumption, domestic use and irrigation. Half of these twelve sites are moderately hard and saline for the study reveals no major changes in water quality during study period i.e. pre and post monsoon. This is because of industrial effluent, which is percolated through ground as well as mixed with water stream causing deterioration of water resources.

**Keywords:** Ground water, quality, Physico-chemical parameters, MIDC, irrigation, effluent.

## INTRODUCTION

The water is precious gift of nature to human being is going to be polluted day by day with increasing urbanization, although three fourth part of earth is being surrounded by water but a little portion of it can be used for drinking purposes. Study physico-chemical parameters of drinking water near Kurkumbh MIDC, Daund- taluka. Today human activities are constantly adding industrial, domestic and agricultural waste to ground water. Ground water contamination is reversible i.e. once it is contaminated. It is difficult to restore the original water quality. The problem has been further aggravated by the rapid increases in population there by increasing the demand of water supply for irrigation, human and industrial consumption. Surface water and ground water are the major source of drinking water in India. Water is prime natural resource and physiological necessity to mankind. Therefore drinking water must not carry harmful chemicals as well as biological contaminants for wellbeing some of chemicals like fluoride is arsenic calcium, lead, chromium and nitrate in drinking water over definite limit cause serious health problem.

Kurkumbh MIDC is Chemical Industrial Zone. There are no of pharmaceutical chemical, dye and oil industry. Waste water generated foam various industries is discharged directly on waste land; Nalas, Canals Roti ghat etc. Therefore surface water and ground water is contaminated by industrial and domestically nest. The ground water near Kurkumbh MIDC contaminated with heavy metals, persistent organic pollutants and nutrients. The chemicals like fluoride, arsenic, lead, petrochemicals, other heavy metal cause serious health effect. The impact of heavy metal in drinking water affects the public health to a great extent. They cause biochemical effect such as inhibition of enzymes, genetic damage, and hypertension. Proper management of water resources has become the need of the hour as this would ultimately lead to a cleaner and healthier environment.

## METHODOLOGY

### Sample Collection:

Water samples were collected in pre-cleaned sterilized polypropylene bottles with necessary precaution from different sites. Samples were collected in Pre and Post monsoon. Various physico-chemical parameters are analyzed as given in standard manual of water and waste water analysis. The main aim of the study is to investigate the physico-chemical characteristics of water samples near Kurkumbh MIDC, because most of these samples are located in the vicinity of the MIDC.

### Laboratory analysis:

The samples collected were characterized by different parameters such as  $P^H$ , conductivity, TDS, total alkalinity, total hardness, Calcium, Magnesium, fluoride, Nitrate, Sulphate, DO, BOD, COD etc. The temperature,  $P^H$  is recorded by  $P^H$  meter (Model No. EQ-610 Equiptronics), conductance is measured by conductivity bridge (Model No. EQ-660, Equiptronics). The other parameters are determined by using standard method available in literature [5].

## RESULTS AND DISCUSSION

The results of analysis were reported in table. The  $P^H$  value of the samples in the study area varied 7.34 – 8.30 during Study area. 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 850 to 1960 micromohs/cm. Whereas permissible limit ranging between 250 to 750 micromohs/cm for domestic use. The total dissolved solids (TDS) ranges from 544 – 10228 mg/l. Dissolved inorganic salts, small amounts of organic matter and gases contribute to TDS. The total hardness varies from 212 to 668 mg/l at study area. This 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 11 indicates that the ground water was polluted because of industrial effluent.

**Table 1:** Assessment of Ground Water June 2017

parameters	WS 1	WS 2	WS3	WS4	WS5	WS6	WS7	WS8	WS9	WS10	WS11	WS12
PH	7.70	7.60	7.85	8.30	7.90	7.85	7.87	7.90	7.27	7.34	8.22	7.50
Conductance	1030	1214	1014	1790	1380	1200	850	1025	1400	1960	1920	1850
TDS	1659	1777	1649	1145	1878	1768	544	1656	896	1254	10228	1184
Total Hardness	380	324	274	454	288	236	212	278	384	668	712	408
Calcium	88.9	84.36	64.13	120.2	66.5	65.7	58.1	63.3	100.2	135.4	157.9	118.6
Magnesium	38.9	28.26	27.77	37.5	29.7	17.5	16.0	29.2	32.6	80.4	77.4	27.2
Total alkalinity	200	296	256	364	240	264	344	316	224	340	352	288
Chloride	402.2	245.8	344	456.2	234	307.8	425	362	576	298	502.1	374.4
D.O.	2.82	2.54	4.20	2.54	3.25	2.90	5.30	4.85	3.50	3.98	2.95	2.58
BOD	5.75	6.70	8.95	5.50	6.50	6.23	9.55	7.84	7.35	10.45	13.45	12.55
COD	28.50	24.00	28.00	46.00	22.00	15.20	30.00	42.00	56.00	54.23	34.80	24.00
Sulphate	169.4	173.9	248	100	46	290	82	102	86	423	530	319
Fluoride	0.12	0.40	0.20	0.60	0.50	0.20	0.70	1.00	1.30	0.80	1.57	0.90
Nitrate	24.0	22.0	2.0	98.0	36.0	53.0	28.0	16.0	114.0	142.0	175.0	103.0

Excess alkalinity gives bitter taste to water and reacts with cations to forming precipitates, which can damage the pipes, valves, etc. Total alkalinity ranges from 200 mg/l to 364 mg/l during study period the maximum value (364 mg/l) was recorded in study area. The chloride content in study area has shown variation from 234 to 576. The higher value of chloride suggests leaching of effluent from industrial effluent into the ground water [14]. The site numbered 2,3,4,5,6,8,9 & 11 are shows higher value of chloride which are higher than permissible limit of 200 mg/l according to WHO. The extremely high concentration of chlorides as these sites are directly affected due to industrial discharge. Dissolved oxygen ranged from 2.54 to 5.50 mg/l. BOD and COD value indicated present organic matter due to industrial pollution. The sulphate varies ranges from 46 to 530 mg/l. The fluoride value varies from 0.12 to 1.57 mg/l. WHO standard suggested limit for fluoride as 1mg/l. But Ws 9 & Ws 11 show amount of fluoride crossing prescribed limit. The nitrate concentration in groundwater collected from the study area ranged between 2.0 to 175 mg/l. The concentration of nitrate above 45 mg/l in drinking water may cause child disease named as methamoglobinemia.

## CONCLUSION

On the basis of above discussion it may be conclude that Ground water is hard and highly contaminated with reference to all physico-chemical parameters studies almost all site near kurkumbh MIDC at daund Taluka. Analysis of sample it is observed that WS 10 and WS 11 are highly polluted. Other sites WS 1, WS 3 and WS 7 are can be used for domestic and irrigation purpose after proper treatments. Remaining are moderately polluted. All the parameters from study area show slight variations, no major changes are observed in water quality during study period. This is because of industrial effluents.

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

**Conflicts of interest:** The authors stated that no conflicts of interest.

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