Reserach Article

ANALYSIS OF SOIL AND WASTE WATER QUALITY USED FOR IRRIGATION OF HATED MALI WASTER WATERSHED AREA NEAR KUWARKHEDA VILLAGE NEAR JALGAON DISTRICT MAHARASHTRA, INDIA

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A R T I C L E   I N F O

A B S T R A C T

In the present study quality of water and soil were tested in Kuwarkheda watershed area in Jalgaon District. In this investigation four water samples and four soil samples of waste water were collected for analysis from the study area. In this area generally untreated waste water is used for irrigation. The objectives of present study are to analyze and study the water & soil quality of the study area and its impact on quality of soil around the study area. The results found after analysis indicates that Soil and water in the study area are polluted due to waste water and it can affect the health of local people. The value of Electrical Conductance, BOD, COD. Chloride, Sulphate, Phosphate, nitrate and Heavy Metals like iron, copper were found above the standard value.

INTRODUCTION

Now a day due to scarcity of water waste water from watershed is commonly used for irrigation purpose. Waste water has some fertile components but over use of such water in agricultural land changes Physical & Chemical properties of soil. Pollutants in waste water heavy metals, various ions and pathogens (1) which may affect ground water quality. Sol having good physical & chemical properties are useful for the growth of plants. (2)

Study area

Kuwarkheda is a village situated 12 Km. away from the Jalgaon city. The climate of this area is hot and dry. River Girna is flowing near to this. Profession of the people in this area is mainly farming. Study area is situated at the border of village Kuwarkheda. Soil in this area is dark black and thickness is 0.75 – 3.2 meters. The water absorbtion quality of the soil is good. Waste water stream (Hated mali nala) flows from study area.

METHODOLOGY

Sampling of soil was carried at the regular interval of the distance, near the waste water stream Hated mali nala. Samples of soil were collected from the agricultural land only by standard methods. All the samples were mixed to get homogenous mixture of the soil. Water samples were collected from the Hated mali nala at the regular distance0.5 Km. and analysed by the standard methods given by APHA

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and Goel & Trivdi. The parameters like PH, Electical conductance, specific gravity, moisture, WHC, total phosphate, sulphate, nitrate, calcium, magnesium, potassium, carbonate, bicarbonate, acidity, alkalinity ect. Were analyzed by standard methods given by saxena (1994)

RESULT AND DISCUSSION

The results of water analysis indicates that TS, TDS, TH, Calcium, magnesium, Sulfate, Phosphate, nitrate, etc. are higher than permissible limits. High value of chloride indicates human activity impact (3) Similarly BOD, COD value was also very high this also pollutes the water (4).

PH of water samples ranges between 8.00-8.55 Alkalinity between 638.5 -695.2 mg/L, TH ranges between 1139.81-1121.01 mg/L, TDS between 1898.00-2563.68 mg/L, TSS between 1235.01- 1643.91 mg/L, Calcium between 110.98-126.51 mg/L, Magnesium ranges between 71.22- 79.51 mg/L, Chloride ranges 287.63- 298.32 mg/L, Sulfate ranges 73.09-88.62 mg/L, phosphate ranges 14.14-19.64 mg/L, Nitrate ranges 1.12-1.61 mg/L, Sodium between 132.91-149.23 mg/L, Potassium between 41.67-48.53 mg/L, COD- 814.2-898.2 mg/L while BOD ranges 916.3- 953.08 mg/L.

Physico- Chemical values of waste water samples

Analysis of soil indicates that higher amount of sulfate, Phosphate, Chloride, carbonate, bicarbonate; calcium and magnesium are present in the soil due to direct use of this water. Thigh value of heavy metals like copper, nickel, zinc, iron, cadmium, lead and manganese were present in the soil samples which are harmful to human health(5).

Sr.no.	parameter	Unit	Sample no-1 W-1	Sample no-2 W-2	Sample no-3 W-3	Sample no-4 W-4
1	PH	-	8.0	8.55	8.32	8.29
2	EC	µScm^{-1}	4.09	4.10	4.11	4.08
3	Alkalinity	mg/L	638.5	639.9	681.3	695.2
4	TH	mg/L	1139.81	1121.01	1128.2	1130.6
5	TDS	mg/L	1898.00	1959.09	2039.04	2563.68
6	TSS	mg/L	1235.01	1394.00	1458.55	1643.91
7	Calcium	mg/L	121.94	110.98	118.65	126.51
8	Magnesium	mg/L	71.22	75.35	77.69	79.51
9	Chloride	mg/L	298.32	287.63	292.14	295.54
10	Sulfate	mg/L	84.90	73.09	88.62	86.81
11	Phosphate	mg/L	17.66	16.98	14.14	19.64
12	Nitrate	mg/L	1.12	1.49	1.45	1.61
13	Sodium	mg/L	138.6	149.23	132.91	133.69
14	Potassium	mg/L	45.21	48.53	44.44	41.67
15	COD	mg/L	814.2	890.4	876.2	898.2
16	BOD	mg/L	916.3	945.3	943.2	953.08

The souble salts and sodium level were found more than permissible limit due to which soil become saline and alkaline in nature.

Physico- Chemical values of soil samples

Sr.no.	Parameter	Unit	Sample no-1 S-1	Sample no-2 S-2	Sample no-3 S-3	Sample no-4 S-4
1	Bulk density	gm/cm^3	1.009	1.068	1.006	1.042
2	Specific gravity	gm/cm	1.04	1.13	1.05.	1.02
3	Moisture content	%	3.56	3.89	3.71	3.51
4	WHC	%	0.781	0.992	0.734	0.776
5	PH	-	7.6	8.04	8.08	7.91
6	EC	µScm-^{1}	0.201	0.250	0.199	0.203
7	Total Phosphate	mg/gm	170.33	177.02	162.51	168.65
8	Nitrate	mg/gm	8.9	11.95	7.9	8.6
9	Calcium	mg/gm	1.59	1.68	1.58	1.47
10	Magnesium	mg/gm	0.16	0.84	0.69	0.21
11	Sodium	mg/gm	18.6	30.54	21.45	29.34
12	Potassium	mg/gm	30.71	68.34	50.33	46.98
13	sulphate	mg/gm	12.05	22.33	20.99	25.89
14	Chloride	mg/gm	225.3	228.10	181.41	151.9
15	Ph.Acidity	mg/gm	304.0	364.0	301.0	298.0
16	Total acidity	mg/gm	345	668	341	339
17	Carbonate	mg/gm	110.8	220.6	120.3	124.6
18	Bicarbonate	mg/gm	224.2	442.1	230.6	231.6
19	Texture Slit	%	19	25	21	26
20	Send	%	50.60	49.65	51.34	50.33
21	Gravel	%	19.0	34.2	30.1	22.9

Average heavy metal value in soil samples

Sr.no.	Metal	Result in ppm
1	Copper	0.13
2	Nickel	0.27
3	Chromium	-
4	Zinc	0.15
5	Mercury	-
6	Iron	0.87
7	Cobalt	-
8	Cadmium	0.040
9	Manganese	0.31
10	Lead	1.02

Analysis of soil indicates that agricultural soil near to Hated mali nala hhave high parametric valvues of physical & chemical analysis. The level of Calcium Magnesium, sulphate, nitrate, sodium potassium, phosphate are increase in soil due to water pollution in nala waste water.

CONCLUSION

The results of analysis of waste water of nala and analysis of agriculture soil in this area indicates that pollution level is very high in this area which is harmful to human being. The high value of nearly all the parameters indicates that it is due to untreated use of waste water for irrigation purpose. Heavy metal concentration is also high in soil sample it changes soil quality. Soil and water pollution is due to human activity in the nala area. The use of such polluted water for irrigation purpose is not good for health as well as environment. It is necessary to treat this waste water before use.

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