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Water Quality Monitoring of Residential Area Affected by Solid Waste Landfill Site in Jaipur city

Sonika Saxena, Sreelaxmi Ramakrishnan, Deepak Soni, Krishna Kumar Meena, Sudipti Arora
Dr. B.LalInstitute of Biotechnology, Jaipur, Rajasthan, India
Dr. B.LalInstitute of Biotechnology, Jaipur, Rajasthan, India
Dr. B.LalInstitute of Biotechnology, Jaipur, Rajasthan, India
Rajasthan Technical University, Kota
Dr. B.LalInstitute of Biotechnology, Jaipur, Rajasthan, India
Industrial Area, Malviya Nagar Jaipur, Rajasthan, India

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Abstract:
Water is a chemical, transparent and colourless substance that is formed from one oxygen atom and two hydrogen atom. It is the main constituent of earth ecosystem as it is essential for all animals and plants. The water is distributed on earth in the form of rivers, lakes, oceans, ponds, groundwater and spring. Almost 71% of Earth's surface is covered by water, from which 96.5% of the planet crust water is found in seas and oceans, 1.7% in groundwater, 1.7% in glaciers and large water bodies, left 0.001% in the air as vapour. As there is only 1.7% of safe drinking water available in total and due to the variations in climatic change the surface water is not available throughout the year,so usage of groundwater has become common. This work was done in Dr. B. Lal Institute of Biotechnology, Jaipur, Rajasthan. The samples were collected from Langadiyawas, Jaipur, Rajasthan from five wells in the locality. The physico-chemical analysis along with biological analysis were done according to APHA () and Berge's manual for correlation study of quality of water for three months. Out of 5 wells it was found that the 3rd well water is totally affected with solid waste landfill, but the other are also affected and microorganisms such as Staphylococcus aureus, Micrococcus sp., Bacillus sp., Streptococcus sp. and Pseudomonas sp. were identified in thes amples in two seasons (pre and post monsoon). Hereby, we can deduce that the area is prone to the groundwater contamination due to the dumping site. Thus the need of the hours is to save water from being polluted by moving away the municipal solid waste dumping site from the area and develop proper engineered landfill site. Effective monitoring of groundwater quality is also important to safe guard the health of the public residing in the surrounding of the dumping site.

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INTRODUCTION

Groundwater is a globally important and valuable renewable resource for human life and economic development. It constitute a major portion of earth's water circulatory system know as hydrological cycle and occurs in permeable geologic formation know as aquifers i.e. formations having structure that can store and transmit water at rates fast enough to supply reasonable amount to wells. (Afolayan.2012). The amount of groundwater 800m from the ground surface is over 30 times the amount in all fresh lakes and reservoirs. Groundwater supplies are replenished, or recharged, by rain and snow melt that seeps down through the rocks from the land surface .Groundwater supplies 99% of drinking water for rural pollution. Agricultural sector is the greatest users of groundwater, around 64% of groundwater is used for the irrigation and it also place an important component in many industrial processes. It is a source of recharge for lakes, rivers, and wetland.

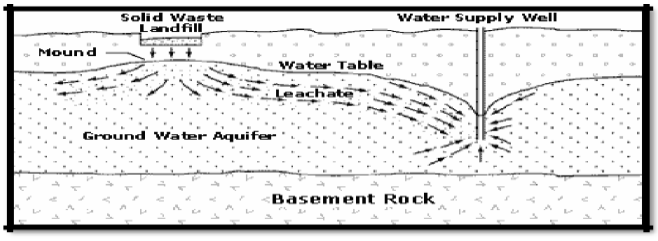

Fig 1: diagram of leachate percolation

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The quality of groundwater is a result all processes and reactions that have acted on the water from the moment it condensed in the atmosphere until it is discharged by a well. Therefore, the chemical composition of groundwater is related to the soluble products of rock weathering, decomposition, and change with respect to time and space. Geochemical studies provide a complete knowledge of the water resources of a hydrological regimen. Sampling and testing in an area with some good quality and poor quality water serves to differentiatearea and aquifers of varying quality and based on such study results, recommendations can be made regarding different uses of water in various area and aquifers.(Raghunath,2007)

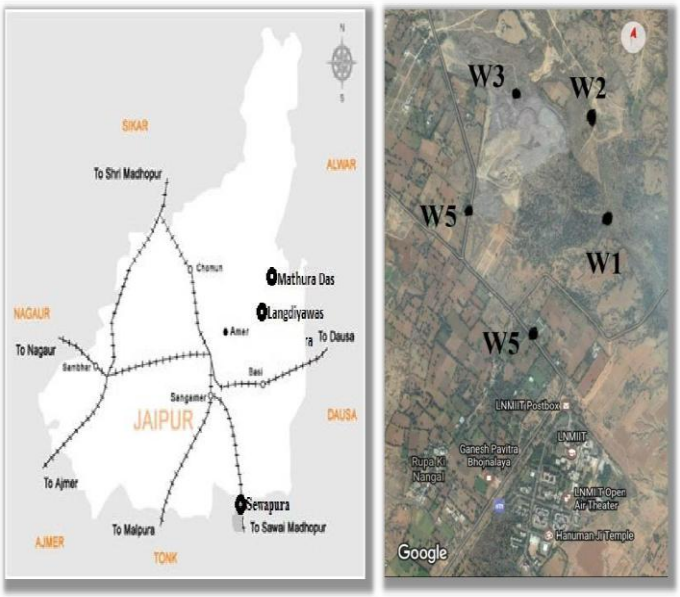
The intensity of industrialization and economic development have led to urbanization, which has resulted in over use of natural and man-made things that are converted into solid waste. It is reported that over 2.6 trillion pound of garbage is produced worldwide, out of which 46% is organic wastes and 27% is paper and plastic wastes and left 27% are other wastes. It is estimated that in next fifteen year 1.2 to 1.42 kg per person per day waste will be produced. These high production of waste have led to serious ecological, environmental and health complications.(sonika et el al 2019)

In India there are more number of dumping site as compared to closed or engineered landfill site. Even non engineered landfill sites are also rear in India. It is estimated that every day 91% of waste is dumped in the open which further get converted into dumping site.At present more than 60% of natural resources of India are converted into dumping sites which has resulted in contamination of all resource .Most importantly the access to safe drinking water has become an urgent necessity , as 30% of urban and 90% of rural India and worldwide populations still depend completely on untreated surface and groundwater resources. (Ashwani.2014)

Jaipur city is now becoming dumping site day by day due to which the health of the public residing in the vicinity of dumping site are affected. (bharti et al 2017) Keeping in this in view the present research study is proposed to estimate the levels of physical, chemical as well as bacterial contamination of ground water collected from the area around dumping site by carrying out physicochemical and microbial characterization to alert the concerned authorities about the issues and to initiate with remedial measures to control the contamination levels for safeguarding the public health.

MATERIALS AND METHODS

The study area selected is Landiya was presented in the diagram-1 which is located in the east direction of the city, 3 to 4km from the mathuradaspura the total area of this landfill site is 483 Bigha that is around 21 km. The details of sample code and sampling location are presented in table-1



Site no.	Site Location and their Description
W1	Tube well of Ramesh,in East- direction of Landfill site
W2	Tube well of KaluNath , within1.5 km , in south east of Landfill site
W3	Tube well of Bhavani Singh, within 1 km, in south of Landfill site
W4	Tube well of Lala Ram Meena, in West direction of Landfill site
W5	Tube well of Suraj Kumar Sharma,within 2 km

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, in North of landfill site

Physicochemical characterisation:

Containers made of polythene were used for sampling and preserved for further analysis according to standard procedures. The ground water sample was analyzed for physic-chemical parameters such as pH, temperature electrical conductitvity, turbidity, total dissolved solids (TDS), dissolved oxygen (DO), BOD, COD, Acidity, Alkalinity, Phosphate, Sulphate, Nitrate, Chloride, Tolat hardness, Ca++ hardness, Alkalinity, Fluoride and Lead.Theph, temperature, Electrical conductivity, TDS, Salinity, turbidity and DO were determined by Hanna instrument. Total Hardness, Alkalinity, Acidity, BOD, Chloride, Ca2+ Hardness and Magnesium Hardness were estimated by titrimetry. Sulphate, Phosphate, Nitrate and COD were estimated by Spectrophotometer. The ground water samples from 5 wells were anlayzed for physicochemical parameters and the analytical data is presebted below.

Biological analysis

Biological analysis was also carried out to find whether the sample contain any kind of coliform or not. Both total coliform test and fecal coliform test were done by MPN method.

Isolation of Microorganisms

Microorganisms were isolated by serial dilution method followed by spreading in nutrient agar plate. The plate were incubated for 24hrs at 37ºC. Later distinct colonies were pure cultured by streak plate method.

Morphological Identification

Colony morphology of the isolates was studied in order to distinguish them on the basis of their different form, edge, elevation, surface, color, etc.

Microscopic characterization

In characterization first step is staining, used to distinguish between different types of microbes based on their structure, shape, size and also helps to study their morphological and cellular characteristics. Gram staining for the selected isolates of pre-monsoon and post monsoon was performed by using standard staining procedure which differentiates bacterial species into gram-positive and gram negative based on the physical and chemical properties of their cell-wall.

Biochemical characterization

The microscopic characterization is followed by biochemical characterization in which isolates were further classified into different species by different biochemical test such as starch hydrolysis, MRVP test, Hemolysis, Indole test, Simmoncitrate,etc.

RESULT AND DISSCUSION

The present study was carried out to indicate the affect of dumping site on the groundwater monthlyand seasonally of five different sites near the dumping site in Jaipur city. The survivalofmicroorganism in water is highly influenced by many environmental factors such as temperature,salinity, pH, turbidity and supply of organic matter as nutrients (PommepuyM., 1992). Variousphysic-chemical parameters were characterized for investigating the quality of the groundwater, andwhen obtained data was compared with the standards set by BIS , it was found that they were not inthe permissible limits (Richa et al., 2012) indicating that the water was polluted.

Table1: Physico-chemical analysis of well1 from the month April to September

APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER

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SAMPLE	1	2	3	4	5	6	7	8	9	10	11	12	BIS
Ph	8	7.6	7.7	7.8	7.8	7.9	8.2	8	7.8	8.1	7.68	7.7	6.5-8.5
Temp.	29.8	22.1	28.9	30.2	25.7	28	30.1	29.1	30	30.2	29.7	28.3	-- -
EC	1855	2058	2038	2040	1714	1934	1648	1650	1655	1660	1985	1226	-- -
TDS	929	1028	1026	1020	857	1670	825	827	829	960	991	813	500 mg/lit
NACL%	3.6	4	3.9	4	3.4	3.8	3.2	4.1	5.2	5.1	3.9	2.4	-- -
DO	2.5	2.7	1.35	1.59	2.07	2	2.25	2.9	1.6	2	2.2	1.9	5ppm
BOD	178.26	198.2	122.22	120	122.2	69.76	170.58	108	75	91.66	87.5	84	30mg/lit
COD	466	594.6	336	300	333.33	209.8	480	324	236.66	299.8	266.7	254	250mg/ Lit

Table2: Physico-chemical analysis of well1 from the month April to September

SULPHATE	1.6	1.93	2.36	2.63	4.99	6.66	5.2	4.676	4.771	4.24	4.15	3.81	200mg/ Lit
NITRATE	3.241	2.81	1.02	0.802	1.033	1.459	1.717	1.227	3.99	4.11	4.04	3.75	45mg/lit
PHOSPHATE	1.8	10.88	0.91	0.889	1	1.08	2.11	1.8	1.114	1.22	1.54	2.22	----
CHLORIDE	667	724	525.4	445.88	570.84	536.76	610.6	523.506	523.506	518.7	520	538.4	250 mg/lit
T.HARDNESS	260	312	166.66	245.33	253.33	400	354.66	400	400	422.66	476	472	300 mg/lit
C+HARD.	100	106	112	145.6	79.8	277.25	121.8	138.6	138.6	135.8	42	201.6	200 mg/lit
Mg HARD.	160	206	54.66	99.73	173.53	122.75	232.86	261.4	261.4	286.86	424	270.4	200 mg/lit
ACIDITY	20	40	80	90	53.33	70	83.33	66.66	43.33	63	46.66	40	200mg/ Lit

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ALKALINITY	149.8	166.4	180	160	188	157.33	154.66	164	182.66	193.6	160	148	600mg/lit
FLORIDE	1.77	2.71	2.5	2.16	2.71	2.5	1.77	2.2	2.5	2.2	2.71	2.5	1.0-1.5mg/lit
TURBIDITY	1.3	2.1	2.5	1.8	2.1	2.5	1.3	1.2	1.8	1.8	1.2	2.5	1.0NTU
chromium	NA	NA	NA	NA	NA	NA	48.52	51.99	NA	NA	NA	NA	0.05
lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01

Table 2:Physico-chemical analysis of well1 from the month April to September

SAMPLE	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**BIS**
Ph	7.6	7.2	7.6	8	8	7.9	8.1	7.5	7.19	7.6	7.78	7.6	6.5-8.5
Temp.	29.9	22.6	28.7	29.9	26.1	28	30.3	31.1	30.3	30	29.2	28.5	--
EC	1652	1503	1250	1631	1646	1576	1356	1295	1304	1400	1562	1188	--
TDS	825	752	625	813	823	788	678	660	659	660	781	794	500 mg/lit
NACL%	3.2	2.9	2.8	3.2	3.2	3.1	2.7	2.8	2.6	2.7	3.1	2.3	--
DO	1.06	1.2	2.02	1.83	1.26	1.4	1.13	1.3	2.6	2.5	1.75	1.7	5ppm
BOD	14.34	11.9	11.6	26	36.6	11.62	35	40	50	10.8	24.6	26.66	30mg/lit
COD	80	65	60	96.66	102	56.6	105	122	133	54	87.33	90	250mg/lit
SULPHATE	2.409	1.07	0.21	1.25	3.68	1.87	1.63	1.552	1.571	1.809	4.15	0.66	200mg/lit
NITRATE	2.954	2.78	2.13	2.34	0.274	0.576	0.436	1.443	0.144	4.2	2.76	3.43	45mg/lit

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PHOSPHATE	2.4	0.45	1.08	1.57	1.2	1.14	2.54	1.542	0.942	0.97	1.14	2.11	----
CHLORIDE	384.7	383.4	383.4	313.34	479.01	442.09	518.548	458.186	463.866	466.7	488	518.7	250 mg/lit
T.HARDNESS	180	280	189.33	254.66	233.33	308	293.33	189	398.66	382.66	453.33	386.66	300 mg/lit
C+HARD.	20	100	36.4	102.2	12.2	100.8	130.2	147	147	135.8	92.4	369.6	200 mg/lit
Mg HARD.	160	80	152.93	152.46	221.13	207.2	163.13	42	251.66	246.86	360.93	17	200 mg/lit
ACIDITY	20	30	50	33.33	96.6	26.6	70	56.6	33.33	26.66	63.33	40	200mg/lit
ALKALINITY	140	151.3	148	150	134	130.66	120	118.666	156.66	137.33	120	116	600mg/lit
FLORIDE	2	2.02	2.2	2.03	2.02	2.2	2.02	2.2	2.03	2.02	2.2	2.2	1.0-1.5mg/lit
TURBIDITY	0.8	1.6	0.9	1	1.6	0.9	0.8	0.9	1	1.6	0.9	1.6	1.0NTU
chromium	NA	NA	NA	NA	NA	NA	13.86	27.73	NA	NA	NA	NA	0.05
lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01

Table3. Physico-chemical analysis of well 3 from the month April to September

	APRIL		**MAY**		**JUNE**		**JULY**		**AUGUST**		**SEPTEMBER**		
SAMPLE	1	2	3	4	5	6	7	8	9	10	11	12	BIS
Ph	7.3	7.2	7.5	7.56	7.4	7.4	7.8	7.51	7.14	8	7.11	7	6.5-8.5
Temp.	29.8	22	29.1	30.2	25.7	29.2	30.4	30	30.4	30	29.1	28.4	---
EC	5430	5620	2706	5840	5840	5730	2869	2523	2698	3098	5580	5400	---
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TDS	2720	2810	2553	2750	2920	2860	2800	2598	2349	2415	2790	2710	mg/lit
NACL%	10.6	11	5.3	10.8	11.4	11.2	10.9	7.8	5.3	5.2	10.9	10.5	---
DO	1.79	1.58	1.45	1.67	1.89	1.49	1.07	1.3	2.37	1.3	1.6	1.5	5ppm
BOD	130.4	248.2	171.1	186.66	140	156	135.3	140	248.2	199.66	256.11	263.33	30mg/lit
COD	623.33	536.6	533.6	560	420	356.66	406.6	420	536.66	599	764.733	789.99	250mg/lit
SULPHATE	1.04	1.46	2.01	2.6	2.47	1.43	1.64	4.161	5.114	5.219	9.6	9.8	200mg/lit
NITRATE	5.93	3.004	2.01	0.597	1.12	13.08	12.47	13.451	2.89	4.61	15.37	13.83	45mg/lit
PHOSPHATE	0.89	1.2	0.85	1.05	5.37	0.81	2.31	2	1	1.08	1.31	1.37	----
CHLORIDE	3351.2	3067.2	2783.3	2556	3102.7	3067.2	2654.548	2896.3	1.051	2905.33	1956	2347.7	250 mg/lit
T.HARDNESS	780	1260	704	974.66	824	513.33	502.66	526.33	1665.33	1520	1508	1012	300 mg/lit
C+HARD.	180	200	116.2	256.2	39.2	82.6	131.6	120.6	483	492.8	43.4	93.8	200 mg/lit
Mg HARD.	600	1060	587.8	718.46	784.8	430.73	371.06	405.73	1182.33	1027.2	1464.4	918.3	200 mg/lit
ACIDITY	45	35	54	36.66	33.33	21	66.66	76.66	73.33	60	56	71	200mg/lit
ALKALINITY	160	161.2	180	213	180	158.66	141.33	146.66	152	157.33	144	160	600mg/lit
FLORIDE	0.781	0.934	0.802	0.693	0.934	0.802	0.781	0.802	0.934	0.875	0.934	0.802	1.0-1.5mg/lit
TURBIDITY	8.3	11.6	16.55	16.65	11.6	16.55	8.3	11.6	16.7	16.7	11.6	16.55	1.0NTU
Chromium	NA	NA	NA	NA	NA	NA	27.73	34.66	NA	NA	NA	NA	0.05
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01

Table4: Physico-chemical analysis of well 4 from the month April to Septembe

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	APRIL			MAY	JUNE			JULY	AUGUST		SEPTEMBER		
SAMPLE	1	2	3	4	5	6	7	8	9	10	11	12BIS	
Ph	7.7	7.8	8	8.1	8	8.1	8.3	8	7.83	7.5	7.87	7.9	6.5-8.5
Temp.	30.1	27.4	28.8	30.1	26.2	29.1	30.2	29.2	30	31	29.2	29.6	---
EC	2298	3410	3430	3390	953	3450	3400	1356	1552	1652	3650	3180	---
TDS	1689	1710	1720	1700	1652	1730	1700	1500	1346	1400	1830	1590	500 mg/lit
NACL%	4.5	6.7	6.7	6.6	1.9	6.7	6.7	5.5	3	3.3	7.2	6.2	---
DO	2.4	2.256	2.5	2.8	2.16	2.4	1.78	2	1.56	1.6	2.4	2.7	5ppm
BOD	55.55	62.2	46.88	36.66	73.3	118.8	94.33	89	75	63.6	55.5	84	30mg/lit
COD	166.66	186.66	138.88	110	220	356.66	283.33	298	263.33	190	166.66	252	250mg/lit
SULPHATE	5.19	11.8	1.28	0.55	0.047	7.4	11.22	7.333	8.19	7.61	6.18	11.63	200mg/lit
NITRATE	3.11	2.89	1.03	0.716	0.726	1.405	0.99	0.866	0.861	3.94	2.76	3.35	45mg/lit
PHOSPHATE	1.6	1.05	9.4	1.4	0.85	1.34	2.62	2.171	1.2	1.22	1.37	1.48	----
CHLORIDE	269.8	1249.8	1136	1232.56	1192.8	1219.3	1672.76	1232.56	1232.56	1448.4	1.37	1050.8	250 mg/lit
T.HARDNESS	196	500	242.66	273.33	340	1600	536	534.66	1604	458.66	600	438.66	300 mg/lit
C+HARD.	24	100	29.4	113.4	33.6	56	105	151.2	142.8	159.6	35	105	200 mg/lit
Mg HARD.	172	400	213.26	159.93	306.4	1544	431	383.46	1461.2	299.06	565	333.66	200 mg/lit

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ACIDITY	30	50	31	25	26.6	28.33	26.66	25.66	26	27	75	50	200mg/ lit
ALKALINITY	160	181.2	182.2	236	192	182.6	178.6	176	181.3	181.3	120	137.33	600mg/ lit
FLORIDE	2.39	2.3	1.97	1.72	2.3	1.97	2.39	1.97	2.3	2.3	2.39	2.3	1.0-1.5mg/l
TURBIDITY	6.8	6.5	1	1.2	6.5	6	5.8	6.5	1.2	1.2	6.8	6.5	1.0NTU
Chromium	NA	NA	NA	NA	NA	27.73	34.66	NA	NA	NA	NA	NA	0.05
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01

Table5. Physico-chemical analysis of well 5 from the month April to September

	APRIL			**MAY**	**JUNE**			**JULY**	**AUGUST**			**R**	
SAMPLE	1	2	3	4	5	6	7	8	9	10	11	12	BIS
Ph	7.3	7.8	7.8	8.6	8	8.1	8.3	7.63	7.85	7.3	7.9	8	6.5-8.5
Temp.	30	28	28.7	30.1	26	29	30.4	30.1	30	30	29.1	29.4	--
EC	1942	1736	1680	1776	1967	2010	2040	1123	1268	1361	2994	2854	--
TDS	973	868	834	890	1520	1500	981	891	881	780	1497	1428	500 mg/lit
NACL%	3.8	3.4	3.3	3.5	3.8	5.9	6	3.7	2.1	2.4	5.9	5.6	--
DO	1.64	1.53	1.77	1.86	1.79	1.502	1.56	1.5	1.84	2	1.46	1.3	5ppm
BOD	166.75	198.2	144.4	100	108	123.3 396.6	172.2 516.6	184.3	87.5 233.3	89 237.3	190	240	30mg/ lit 250m

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COD	336.6	360	332	300.6	324	6	6	552.9	3	3	569	640.3	g/lit
SULPHATE	4.75	1	0.64	2.73	0.56	8.22	1.03	0.008	3.19	3.35	5.95	6.05	200mg/lit
NITRATE	3.16	2.79	2.03	2.73	1.206	3.63	0.208	3.33	3.43	6.11	5.29	5.38	45mg/lit
PHOSPHATE	1.88	1.37	9.8	1.17	2	1.25	1.2	5.485	1.314	1.37	1.4	1.4	--- -
CHLORIDE	355	758.8	653.2	586.93	719.46	1162.5	1465.75	1191.853	1191.8	1473.26	1126.3	1280.84	250 mg/lit
T.HARDNESS	240	200	241.33	258.66	334.84	520	650.6	548	548	508	628	541.33	300 mg/lit
C+HARD.	60	150	42	121.8	57.4	58.8	109.2	226.8	226.8	87.8	26.6	141.4	200 mg/lit
Mg HARD.	180	50	199.33	136.86	277.44	461.2	541.46	321.2	321.2	420.2	601.4	399.93	200 mg/lit
ACIDITY	20	30	20	30	20.6	36.66	56.66	50	73.33	86.66	61.6	39	200mg/lit
ALKALINITY	120	100	108	106	109.33	144	125.33	118.66	120	141.33	128	144	600mg/lit
FLORIDE	2.15	1.87	2.21	1	1.87	2.21	2.15	2.09	2.21	2.8	1.97	1.87	1.0-1.5mg/lit
TURBIDITY	1	1.4	2.3	2.5	1.4	2.3	1	1.8	1.4	1.4	2.5	1.4	1.0NTU
Chromium	NA	NA	NA	NA	NA	27.73	34.66	NA	NA	NA	NA	**NA**	0.05

The TC and FC value that were observed in the sample does not that very high variation only 1% of

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increase was there in coliform from April to September from 0%.

The bacterial species were isolated in two seasons - pre -monsoon and post monsoon . During pre-monsoon 21 isolates (gram positive) were isolated out which 38% were Micrococcus sp., 24% were Staphylococcus aureus, 19% were Streptococcus sp. and 19% were Bacillus sp.. During post monsoon 10 isolates (8gram positive and 2 gram negative) were isolated out which Micrococcus sp. And Staphylococcus aureus were 30% , 20% were Bacillus sp. and Pseudomonas sp. each. During both the season Micrococcus sp. were higher as compared to others.

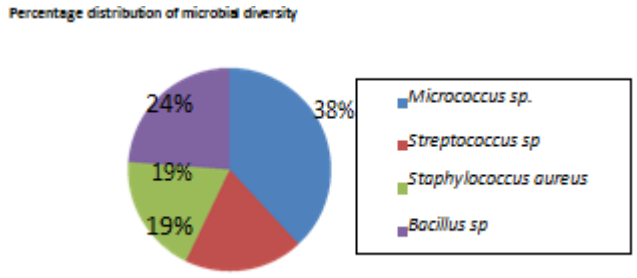

Fig3 :Graphical representation of percentage distribution of microbial diversity in pre monsoonin

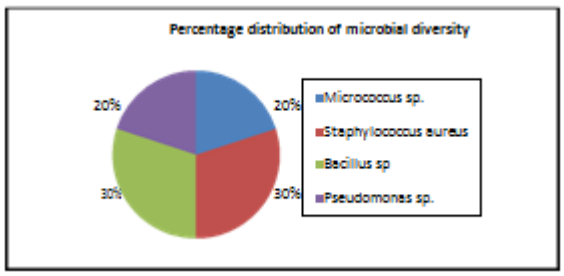

Fig 4 :Graphical representation of percentage distribution of microbial diversity in post monsoon

CONCLUSION

The increase in dumping sites results in poor quality of water and water of poor quality is a threat tothe health and wellbeing of the populace. The present study examines the physical, chemical,The physic-chemical parameter like TDS, BOD, COD, chloride, total hardness, magnesium hardness, fluoride and turbidity were crossing its limits in all well, while other parameters were within the limits. On comparing all six sampling from five wells in three months the maximum alteration in the quality of water was found in W3. The presence of coliform load were not efficient as only 1% increase was observed between April - September from 0%.

The microbial isolation and identification was done on seasonal bases that is pre-monsoon and post monsoon. Even though coliform load were very low but the microbial load were high in post monsoon than pre-monsoon, but different isolates obtain in per-mosoon than post monsoon. Microorganisms that were obtained from the pre-monsoon samples were Gram positive bacteria(micrococcus species , streptococcus species, staphylococcus species and Bacillus species), whereas In post monsoon samples there wereGramnegativebacteriaalongwithGrampositiveba cteria(Micrococcus species, Streptococcus species and Staphylococcus species, Bacillus speciesand Pseudomonas species Based on the study, concluded that the area was found prone to the groundwater contamination due to the dumping site. Thus the need of the hours to save water from being polluted by moving away the municipal solid waste dumping site from the area and develop proper engineered landfill site.Effective monitoring of groundwater quality is also important to safe guard the health of the public residing in the surrounding of the dumping site.

REFERENCES

1. Abu-RukahY,Al-Kofahi O. (2001).The assessment of the effect of landfill leachate on ground–water quality – a case study . J ournal of Arid Environments Aflolayan O.S., Ogundele F.O. and Ayo 50Omotayo, “comparative analysis of the effect of closed and operational landfill on groundwater quality 52in solous, Lagon Nigeria”, Journal of applied technology in environmental sanitation, vol2(l), pp.67-76,2012.
2. APHA, Standard Methods for examination of water and waste water 21st edition 2005 AmericanPublic Health Association Washington D.C., (2005).
3. Ashwani, K.T. and Abhay, K.S., 2014.Hydro

January - February 2020
ISSN: 0193 - 4120 Page No. 14609 - 14622

geochemical investigation and groundwater Qualityassessment of Pratapgarh district, Uttar Pradesh. Journal Geological Society of India, 83:329-343.

4. Atekwana EA, Rowe RS, Warkema DD, LegallFD(2004). The relationship of total dissolved solidmeasurements to bulk electrical conductivity in an aquifer contaminated with hydrocarbons. J. Appl. 6Geophys.56:281-294
5. Al-Fatlawi, A. L. A. A. H. U. S. A. E. E. N. Effects of Chlorine Dioxide and Some Water Quality Parameters on the Formation of THMS in Water Treatment Plants.
6. Baldi, M., Bertanza, G., Collivignarelli, C. and Conti, F.: 1993, Mathematical modelling ofleachate quantity and quality for an industrial sludge landfill, in: T. H. Christensen, R. Cossu andR.Stegmann (eds) Barrier Systems, Environmental Aspects, Upgrading and Remediation, Siting.
7. Bharti, saxenasonika, Sharma, baby, arorasudipti2017 : Physicochemical characterstics of textilewaste water by insitubioremedialapproach,International Journal on Environmental Sciences, 8(2)2017.
8. BIS(1991).Specification for drinking water, IS:10500:1991, Bureau of Indian Standards, New Delhi
9. Christensen, T.H., P. Kjeldsen, P.L. Bjerg, D.L. Jensen,J.B. Christensen, A. Baun, H.J. Albrechtsenand G.Heron, 2001. Biogeochemistry of landfill leachate plumes. Appl. Geochem., 16: 659-718.
10. 10.Chavan, B. L., & Zambare, N. S. (2014). Ground water quality assessment near municipal solid waste dumping site, Solapur, Maharashtra, India. Impact Int J Res Applied, Nat Soc Sci (IMPACT IJRANSS), 2(11), 73-8.
11. Dhere, M.A., Pawar, C.B., Pratapsingh, P.B. and Patil. D.A.(2008). Municipal solid waste disposal inPune city- An analysis of air and groundwater pollution. Current Science,95(6): 773-777.
12. EPTRI (1995). Status of solid waste disposal in Metropolis Hyderabad. Hyderabad, India:Environmental Protection Training and Research Institute (46 pp).
13. Fatta D, Papadopoulos A, Loizidou M (1999) Evaluation of groundwater and soil pollutionin a landfill area using electrical resistivity imaging survey. Environ Geochem Health 21:175–190
14. Flyhammar, P.: 1995, Leachate quality and environmental effects at active Swedishmunicipal landfill, in: R. Cossu, H. T. Christensen and R. Stegmann (eds) Regulations, EnvironmentalImpact and Aftercare.Proceedings Sardinia '95, Fifth International Landfill Symposium.Vol.III, Sardinia, Italy, pp. 549–557
15. Futta, D., Yoscos, C., Haralambous, K. J., &Loizidou, M.(1997). An assessment of the effect of landfill leachate on groundwater quality.Proceeding Sardinia 97.Sixth Int. landfill symposium S. Margherita di Pule, Gagliari Italy,13–17 October, pp. 181–187
16. Gopal D., Singh R.P. and Kapoor R.C. (1991), Ground water pollution by solid wastes –A case study. Pollution Research, Enviro Media, 10, 111–116.
17. Jain, C.K., A.Bandyopadhayay and Bhadra A., 2010. Assessment of groundwater quality for derinking purpose, District Naintal, Uttarakand, India. Environmental Monitoring and Assessment.166:663-676
18. .Jhamnani B, Singh SK (2009) Groundwater contamination due toBhalaswa landfill site in New Delhi. Int J Environ SciEng1(3):121–125
19. Kjeldsen, P., Bjerg, P., Rugge, K., Pedersen, J. K., Skov, B., Foverskov, A., Wurtz, S. And Christensen,T. H.: 1993, Assessing the variability in leachate migration from an old municipal landfill in: R.Cossu, H. T. Christensen and R. Stegmann (eds) Proceedings Sardinia 93, Fourth InternationalLandfill Symposium. Sardinia, Italy, pp. 1519–1531.
20. 2Kumar, M., Ramanathan, A. L., Rao, M. S., & Kumar, B.(2006). Identification andevaluation of hydro geochemical processes in the groundwater environment of Delhi,
21. Kumaraswamy N., Subramanyan B. and Kotaiah B. (2000), Movement of groundwaterpollution in and around a solid waste disposal site- a case study, Indian Journal of Environmental Protection, 20, 206–208.
22. Lee SM, Min KD, Woo NC, Kim YJ, Ahn C (2003) Statistical assessment of nitrate contamination in urban groundwater using GIS. Environ Geol 44:210–221

January - February 2020
ISSN: 0193 - 4120 Page No. 14609 - 14622

23. Lee, G.F. and A. Jones-Lee, 1993. Groundwater pollution by municipal landfills. Leachatecomposition,detection and water quality significance. Proceeding of the 4th International Landfill Symposium,Sardinia, Italy, pp: 1093-1103.
24. Meenakshi, Garg VK, Kavita, Renuka, Malik A (2004) Groundwater quality in some villagesof Haryana, India: focus on fluoride and fluorosis. J Hazard Mater 106(1):85–97. Doi:10.1016/j.jhazmat.2003.09.007
25. Mohan S, Gandhimathi R (2009) Solid waste characterisation and the assessment of the effect of dumping site leachate on groundwater quality: a case study. Int J Environ Waste Manag 3(1/2):65
26. Mor s, Ravindra k, Dahiya RP, Chandra A, 2006, Leachate Characterization and assessmentof groundwater pollution near municipal solid waste landfill site, Environ.Monit.Assess., 4, 325-334.
27. Nandwana et al., 3(8): August, 2014,International Journal of Engineering Science andResearch Technology.
28. Khwakaram, A. I. (2016). Effects of Fat, Oil and Grease (FOG) Discharge Pollutants on Water Quality of Qalyasan Stream, Tanjero River and Impact of Fat, Oil and Grease on Darbandikhan Reservoir in Sulaimani City-Kurdistan Region of Iraq-Iraq. International Journal of Environment, Ecology, Family and Urban Studies (IJEEFUS), 6(1).
29. Lee KK, Kim YY, Chang HW, Chung SY (1997) Hydrogeological studies on the mechanicalbehaviour of landfill gases and leachate of the Nanjido Landfill in Seoul Korea. Environ Geol31:185.
30. Nath, K. J. (1984) Metropolitan solid waste management in India. In J. R. Holmes (Ed.), 53Managing Solid Wastes in Developing Countries. New York: Wiley, 304.
31. Parameswari, M. Textile and Dye Industry Effluent, Sludge and Amendments on Dehydrogenase and Phosphatase Activity of Soil Under Sunflower Crop.
32. Patil C, NarayanakarS,Virupakshi A (2013) Assessment of Groundwater Quality AroundSolid Waste Landfill Area - A Case Study.International Journal of Innovative Research in Science,Engineering and Technology Vol. 2, Issue 7, July 2013
33. Pommepuy, M.; Guillaud, J.F.; Dupray, E.; Derrien, A.; Le Guyader, F.; Cormier, M.1992,Enteric bacteria survival factors. Water Sci. Technol. 25, 93–103.
34. Olaniya, M. S. and Saxena, K. L. 1977. Ground water pollution by open refuse dumps atJaipur. Indian Journal of Environmental Health 19(3), 176-188.
35. Ogundiran, O.O. and T.A. Afolabi, 2008. Assessment of the physicochemical parameters andheavy metal toxicity of leachates from municipal solid waste open dumpsite. Int. J. Environ. Sci.Tech., 5(2): 243-250.
36. Ravisankar, N., & Balakumar, S. Assessment of Groundwater Quality in Chidambaram Town, Cuddalore District, Tamilnadu State.
37. S»omczy1⁄2ska, B. and T. S»omczy1⁄2ski, 2004.Physico-chemical and toxicological characteristics of leachates from MSW landfills. Polish J. Environ.Stud., 13(6): 627-637.
38. Shittu, O.B.; Olaitan, J.O.; Amusa, T.S,2008,. Physico-Chemical and Bacteriological Analysis of Water Used forDrinking and Swimming Purpose. Afr. J. Biol. Res. 11, 285–290.
39. SubbaRao N, Surya Rao P (2009) Major ion chemistry ofgroundwater in a river basin: a study from India. Environ EarthSci. doi:10.1007/s12665-009-0389-6
40. Saxenasonika, mishraDhruv, Sharma Baby, AroraSudipti 2019: Bioremedial approach to degrade physicochemical characterstics by indigenous microbes in paper and pulp industry, International Journal of industrial engineering and technology,9 (1) ,55-62
41. Tengrui, L., A.F. Al-Harbawi, M.B. Lin, Z. Jun and X.U. Long, 2007. Characteristics of nitrogen removal from old landfill leachate by sequencing batch bio film reactor. Am. J. Appl. Sci., 4(4): 211-214.
42. Ugwu, S.A. and Nwosu, J.I,.Effect of waste dumps on groundwater in choba usingGeophysical method. Journal of Applied Sciences and Environmental Management.13(1):85-89.
43. USEPA, 2007. Municipal Solid Waste Generation, Recycling and Disposal in the

January - February 2020
ISSN: 0193 - 4120 Page No. 14609 - 14622

UnitedStates: Facts and Figures for 2006. EPA-530-F-07-030.http://www.epa.gov/osw//nonhaz/municipal/pubs/msw06.pdf

44. USEPA, 2008. Municipal solid waste in the United States.2007 Facts and Figures. EPA-530-R -08-010. http://www.epa.gov/osw//nonhaz/municipal/pubs/msw07-rpt.pdf
45. Vasanthi P, Kaliappan S, Srinivasaraghavan R, 2007, Impact of poor solid waste managementon groundwater, Environ.Monit.Assess., 143(1-3), 227 -238.
46. Yadav, G., & Pratap, B. Effect of Soil Thickness Over the Hard Rocks on the Response of Apparent Resistivity Obtained from Gradient Profiling Survey for Detection of Groundwater Saturated Fractures.