

A Comparative study of Microbial Assessment and physicochemical Analysis of Sewage water of Durg District (CG).India

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Abstract: *In this study we find out the microbial assessment and physicochemical analysis of sewage water of some selected area in Durg city. These samples were compared with the standard desirable limit of the parameter in sewage water as prescribed by different agencies. The water quality parameters were selected are Temperature, Ph, Acidity, Alkalinity, Hardness, phenol, DO, COD, BOD and Total coliform. After the study significant level of variation was found.*

Key words - *Microbial Assessment, Physicochemical Analysis, Sewage water.*

I. Introduction

Water is an important element for human being and it provides a wonderful chemical medium in which all biological and biochemical processes occur. It dissolves various nutrients, distributes them to cells and removes waste products. About 70% of the human body is composed of water. The sewage water is easily polluted either by contamination or by indirect rain were pollutants from bank of water body. There are various sources of water, which are used by man for different purpose. If any undesirable elements are mixed in this water that time water became polluted. The sewage water is easily polluted either by contamination or by indirect rain were pollutants from bank of water body. Durg district is an important part of Chhattisgarh state it is famous for Bhilai Steel Plant, we have selected some area viz. Subhashnagar, Sindhiyanagar, Shankar nagar, Mohan nagar, Shikshaknagar, Katul board, Ganjpara, Borsi, Civil line, Malviyanagar. The rives, lakes and reservoirs are highly susceptible for pollution due to natural and man made activities (industrial, domestic, agriculture etc.). Sewage is the liquid waste or waste arising manly from domestic residential, institutional, commercial and industrial sources.

1.1 Composition of Sewage:

The actual composition of sewage depends on the source from which it comes. In general, about 97-99% of sewage is composed of water while the rest (1-3%) is solid. The most important organic, inorganic compounds, and living organisms found in waste water are listed below.

1.1.1 Organic- Carbohydrates, fats, protiens, amino acids, and urea, besides the products of their degradation.

1.1.2 Inorganic- Sand, mud, mineral ash, mineral salts, lead, arsenic, mercury and cyanides.

1.1.3 Living organism- Bacteria, viruses, algae, fungi and protozoa some details on pathogenic.

1.2 TYPES OF SEWAGE: The sewage mainly consists of solids, organism and inorganic compounds of nitrogen and phosphorus, chlorides, grease and volatile organic compounds.

II. Materials And Methods

For analysis of sewage Water sample were collected from different areas of Durg district and analyzed for physicochemical, bacteriological quality and chemical characteristics by the methods of WHO and APHA AWWA 1985.

The media used for bacteriological analysis of water include Nutrient Agar medium (NAM), Potato Dextrose Agar (PDA), Lactose Broth Medium (LB), Brilliant Green Lactose Bile Broth, Eosine Methylene Blue Agar (EMB). All media were prepared with respect to given instructions and directions. Micro-organisms were identified by using morphological and biochemical method (Berge's manual).

III. Result And Discussion

The physiochemical properties of water sample are shown in table 1.1. The temperature ranges from 28°C - 34°C while PH ranges from 7.1-7.9. The acidity varies 24.59-36.45mg/l while alkalinity varies 10.84-409.2mg/l. The total hardness observed was between 206.8-798.8mg/l, whereas calcium varies from 156-941.2 and magnesium varies 192.4-(-590.8). The phenol ranges from the range of DO varies between 0.4-56.4, the COD varies 68.8-280, the range of BOD varies 0.03-1.97. MPN varies within 2-43.

3.1 Physio-chemical characteristics- The physico-chemical quality of sewage water totally depends on the geological condition of the soil and ground water pollution of the area. The physico-chemical parameters of the ground water of different location in durg district are shown in table 1.1 which shows that .-

3.1.1 Temperature- Ranged of temperature is between 28°C to 34°C. The minimum temperature value of sewage water recorded from sample site A10 was 28°C while the maximum value observe from sample site A7 was 34°C.

3.1.2 pH- Ranged of PH is between 7.1 to 7.9. The minimum pH value of sewage water recorded from sample site A5, A6 was 7.1 while the maximum value observe from sample site A9 was 7.9.

3.1.3 Acidity- Range of acidity is between 24.59 to 36.45 mg/l. The minimum acidity value of sewage water recorded from sample site A8 was 24.59mg/l while the maximum value observe from sample site A10 was 36.45mg/l.

3.1.4 Alkalinity- Range of alkalinity is between 10.84 to 409.2 mg/l. The minimum alkalinity value of sewage water recorded from sample site A1 was 10.84mg/l while the maximum value observe from sample site A10 was 409.2mg/l.

BIS has set on desirable level of alkalinity in sewage water to be 200mg/l and permissible value has been prescribe to be 600mg/l while according to WHO (1993) it is to be 120mg/l. Pondhe et.al

3.1.5 Total hardness- The total hardness value of sewage water is from 206.8 to 798.8 mg/l. The minimum hardness value of sewage water recorded from sample site A2 was 206.8mg/l while the maximum value observe from sample site A6 was 798.8mg/l.

The standard permissible limit of total hardness value of sewage water has set by BIS-10500 (1991) to be 600mg/l and according to WHO (1993) to be 500mg/l.

3.1.6 Calcium –The calcium value of sewage water is ranged between 156 to 941.2 mg/l. The minimum calcium value of sewage water recorded from sample site A2 was 156mg/l while the maximum value observe from sample site A3 was 941.2mg/l

3.1.7 Magnesium- The magnesium value of sewage water is ranged between -590.8 to 192.4 mg/l. The minimum magnesium value of sewage water recorded from sample site A3 was -590.8mg/l while the maximum value observe from sample site A6 was 192.4mg/l

3.1.8 Phenol- The phenol ranged between 0.1 to 0.8 mg/l. The minimum phenol value of sewage water recorded from sample site A2, A4 was 0.1mg/l while the maximum value observe from sample site A10 was 0.8mg/l.

3.1.9 DO- The range of DO is between 0.4 to 6.4 mg/l. The minimum DO value of sewage water recorded from sample site A1 was 0.44mg/l while the maximum value observe from sample site A8 was 5.6mg/l.

3.1.10 COD- The range of COD is between 68.8 to 280 mg/l. The minimum COD value of sewage water recorded from sample site A6 was 68.8mg/l while the maximum value observe from sample site A2 was 280mg/l.

3.1.11 BOD- Ranged of BOD is between 0.03 to 1.97 mg/l. The minimum BOD value of sewage water recorded from sample site A2, A4, A7, A8 was 0.4mg/l while the maximum value observe from sample site A8 was 6.4mg/l.

3.1.12 Total coliform-The range of MPN is between 2 to 43. The minimum total coliform value of sewage water recorded from sample site A2, A8 was 2MPN/100ml while the maximum value observe from sample site A6 was 43MPN/100ml. The desirable limit of MPN of coliform is 0 MPN/100ml in sewage water recommended by WHO.

IV. Conclusion

After the study of different physiochemical parameters of sewage water, many variations have been found which is due to the environmental condition , geographical area of the region , soil texture of the area and the misuses of the local persons of that area.

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TABLE 1.1: Physiochemical characteristics of sampled site of Durg Dist.

S. N	PARAMETERS	Subhash nagar (A1)	Sindhyanagar (A2)	Shankar nagar (A3)	Mohan nagar (A4)	Shikshaknagar (A5)	Katul board (A6)	Ganj para (A7)	Borsi (A8)	Civil line (A9)	Malviya nagar (A10)
1	Temperature	33°C	31°C	30°C	32°C	32°C	29°C	34°C	33°C	33°C	28°C
2	PH	7.6	7.4	7.3	7.4	7.1	7.1	7.4	7.3	7.9	7.8
3	Acidity	34.26	26.46	28.6	25.76	30.50	35.7	34.7	24.59	30.12	36.45
4	Alkalinity	10.84	16.72	28.4	64.47	66.37	77.07	23.26	36.15	66.89	409.2
5	Hardness	302.4	206.8	350.4	781.6	332.8	798.8	332	401.2	368	409.2
6	Ca	204	156	941.2	626.4	312	606.4	165.2	329.2	356	347
7	Mg	98.4	50.8	-590.8	155.2	10.8	192.4	60	72	12	62.2
8	Phenol	0.2	0.1	0.4	0.1	0.4	0.2	0.5	0.5	0.1	0.8
9	DO	0.4	4.4	4	4.4	4.4	6	4.8	6.4	4	4.4
10	COD	232	280	144	208	99.2	68.8	126.4	153.6	166.4	184
11	BOD	1.97	0.03	0.07	0.03	0.04	0.07	0.03	0.03	0.06	0.76
12	MPN	7	2	20	7	20	43	20	2	7	11



