

# A REVIEW PAPER ON CHARACTERIZATION OF DOMESTIC WASTEWATER FROM NALLAH

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**Abstract:** Domestic wastewater is mainly composed of 99.9% of water together with relatively small concentrations of suspended and dissolved organic and inorganic solids. Wastewater and its characteristics is an important factor to recognize surface water pollution. Periodical monitoring of water quality is necessary in the area of industrial establishments, so that appropriate steps may be taken for water resource management practices. In the present study, an attempt has been made to review the characteristics of the sewage collected from different locations in India.

**Keywords:** Vertical flow constructed wetland (VFCW), Domestic wastewater, Characteristics of nallah wastewater.

## 1. INTRODUCTION:

Domestic wastewater is generated from residential, institutional, commercial and industrial establishments. Sewage may also include storm water runoff. Sewage is the major source of water pollution in India, especially in and around large urban centres. There is a wide gap between the demand and supply of water. Sewage is mainly composed of 99.9% of water together with relatively small concentrations of suspended and dissolved organic and inorganic solids. Dissolved solids formed the main part of total solids concentrations. Organic substances present in sewage are carbohydrates, lignin, fats, protein and their decomposed products, soaps as well as various natural and synthetic organic chemicals from the process industries. Sewage also contains the inorganic substances from domestic and industrial sources, including a number of potentially toxic elements such as cadmium, chromium, copper, lead, zinc and iron. Domestic waste water also contains a good number of pathogenic microbes. The rising contamination sources in urban systems results in chemical pressures often manifested as elevated pollution load, which in turn have damaging impacts on human health.

## 2. LITERATURE REVIEW:

### 2.1. KOLHAPUR

Kolhapur city is located on the bank of perennial river Panchaganga, which originates in the Western Ghats. Topographically, there are four major natural drainage basins carrying run off to the river Panchganga which are Jayanti nallah, Dudhali nallah, Line bazaar nallah and Bapat Camp nallah. The nullahs basins are divided by spurs forming a natural drainage area carrying sewage to the river. Areas under drainage basins are Jayanti nullah basin - 2357 hector, Dudhali nallah basin-1650 hector, Line Bazar nallah basin 1004 hector and Bapat Camp nallah basin - 1671 hector. Panchganga River receives huge quantity of domestic sewage, industrial waste with higher physico-chemical characteristics. River is polluted due to the discharge of domestic sewage and industrial effluent through nallahs. The estimated municipal wastewater is to the tune of 90 million liters per day (MLD) which reaches the river Panchaganga through two natural nallahs, namely Jayanti nallah and Dudhali nallah.

Mr. S. B. Manglekar et al., (2014) studied seasonal variations (summer, Monsoon and winter) water quality of four nullahs are tabulated as:

Sr. No.	Parameters Seasons	Jayanti nallah			Dudhali nallah			Line Bazar nallah			Bapat Camp nallah		
		Summer	Monsoon	Winter	Summer	Monsoon	Winter	Summer	Monsoon	Winter	Summer	Monsoon	Winter
1.	pH	8.00	7.80	8.10	7.90	7.70	8.00	7.80	7.60	8.00	7.80	7.70	7.90
2.	Temperature (°C)	26.00	25.02	26.58	25.38	24.58	25.56	24.98	24.20	25.06	24.98	24.34	25.02
3.	Turbidity (NTU)	31.26	31.02	33.36	31.34	30.06	32.52	30.78	29.44	31.60	30.66	29.28	31.40
4.	D.O (mg/lit)	0.96	1.16	0.50	1.12	1.32	0.66	1.18	1.52	0.72	1.22	1.56	0.78
5.	TDS (mg/lit)	2076	880.40	2748.60	1938	788.20	2580.4	1788	711.8	2496.6	1740.0	682.00	2371.20
6.	Alkalinity (mg/lit)	241.60	164.60	330.20	198.80	139.40	282.40	178.80	128.0	226.80	162.80	120.40	221.40
7.	Hardness (mg/lit)	765.80	617.60	844.20	702.80	579.40	750.40	660.60	554.4	711.60	630.40	538.60	647.60
8.	Chloride (mg/lit)	174.60	133.00	190.20	132.20	108.20	170.00	120.60	98.80	158.60	108.80	86.00	145.20
9.	BOD (mg/lit)	629.60	542.00	877.40	578.00	515.60	778.20	550.00	472.4	694.00	503.80	509.20	643.60
10.	COD (mg/lit)	926.00	681.20	1321.00	844.20	627.00	1257.6	798.60	565.6	1099.8	749.00	537.00	1052.40
11.	MPN per100 ml	>2400	>2400	>2400	>2400	>2400	>2400	>2400	>2400	>2400	>2400	>2400	>2400

## 2.2. BHUBNESHWAR

Aditya Dash (2013) Bhubaneswar, the capital of Odisha is known as the "Temple City of India". It is situated between Latitude- 20°12, N to 20°25, N and Longitude 85°44, E to 85°55, E. The city has a population of 6, 57,477 as per 2001 census. It is estimated that, 182 MLD of water is daily supplied to the city, out of which 145.6 MLD sewage is generated which is 80% of the total water supplied. There are about 10 open drains in the city of Bhubaneswar discharging wastewater. Municipal waste water samples were collected from three different locations and brought to the laboratory for analysis of various physico-chemical parameters. Sampling points at Jharpata, Kesari Nagar and Goutam Nagar are referred as S1, S2 and S3 respectively and there physico- chemical characteristics are as follows:

### For S1 nallah

Parameters	Range	Mean
1.Colour	Light Black	Light Black
2.Odour	Unpleasant	Unpleasant
3.pH	6.3-6.6	6.45
4.TS S mg/L	241-250	245.75
5.TDS mg/L	625-631	628.3
6.Turbidity (NTU)	85-94	89.5
7.Chloride (as Cl)	685-693.5	689.1

8.Oil and Grease mg/L	1.7-3	2.175
9.TKN(mg/L)	7.9-9.16	8.615
10.Total Hardness mg/L	326-333	329.7
11.Biochemical Oxygen Demand	136-142	139
12.Chemical Oxygen Demand mg/L	307-313	310.3
13.Alkalinity mg/L	71-76	73.5
14.Sodium (as Na) mg/L	77-82	79
15.Potassium( as K) mg/L	19-26	22.8
16.Sulphates (as SO <sub>3</sub> ) mg/L	222-230.4	227.1
17.Sulphide(as S) mg/L	0.9-1.1	1.11
18.Phosphate (as P) mg/L	2.4-2.8	2.625
19.Iron (as Fe) mg/L	2-2.4	2.225
20.Copper (as Cu) mg/L	0.033-0.038	0.036
21.Zinc (as Zn) mg/L	0.07-0.08	0.07

**For S2 nallah:**

Parameters	Range	Mean
1.Colour	Light Black	Light Black
2.Odour	Unpleasant	Unpleasant
3.pH	7.2-7.4	7.28
4.TS S mg/L	338-345	342.25
5.TDS mg/L	738-741	739.5
6.Turbidity (NTU)	80-83	81.5
7.Chloride (as Cl)	415.8-417.4	416.4
8.Oil and Grease mg/L	3.5-4.0	3.775
9.Total Kjeldahl Nitrogen(mg/L)	7.85-8.2	8.012
10.Total Hardness mg/L	275-280	277.5
11.Biochemical Oxygen Demand	105-120	114.5
12.Chemical Oxygen Demand mg/L	256-272	266.3
13.Alkalinity mg/L	55-62	58.75
14.Sodium (as Na) mg/L	75-79	77
15.Potassium( as K) mg/L	24-27	25.6
16.Sulphates (as SO <sub>3</sub> ) mg/L	212.7-215	213.7
17.Sulphide(as S) mg/L	1.1-1.15	1.128
18.Phosphate (as P) mg/L	1.7-2.1	1.892
19.Iron (as Fe) mg/L	2.4-2.5	2.442

**For S3 nallah:**

Parameters	Range	Mean
1.Colour	Light Black	Light Black
2.Odour	Unpleasant	Unpleasant
3.pH	7.15-7.2	7.17

4.TS S mg/L	282-287	285
5.TDS mg/L	789-794	791.3
6.Turbidity (NTU)	61-67	64.25
7.Chloride (as Cl)	384-391.2	388.3
8.Oil and Grease mg/L	1.8-3.0	2.5
9.Total Kjeldahl Nitrogen mg/L	7.1-7.3	7.212
10.Total Hardness mg/L	283.5-286.7	285
11.Biochemical Oxygen Demand	101-114	108
12.Chemical Oxygen Demand mg/L	278-292	283.5
13.Alkalinity mg/L	60-66	62.75
14.Sodium (as Na) mg/L	76-81	78.75
15.Potassium( as K) mg/L	15-20	17.5
16.Sulphates (as SO <sub>3</sub> ) mg/L	195-207.4	202.8
17.Sulphide(as S) mg/L	0.76-1.12	0.933
18.Phosphate (as P) mg/L	1.56-2.2	1.827
19.Iron (as Fe) mg/L	1.5-1.7	1.6
20.Copper (as Cu) mg/L	0.015-0.019	0.017
21.Zinc (as Zn) mg/L	0.04-0.06	0.05

### 2.3. AMRAVATI:

Borkar and Mahatme (2013) studied the initial characteristics of Amba Nala Amravati. For initial analysis purpose four locations were chosen as Rukhamini Nagar, Asiad Colony, Prashant Nagar and H. V. P. M.

Parameter	Rukhamini Nagar	Asiad Colony	Prashant Nagar	H.V. P. M.
pH	7.54	7.56	7.62	7.63
Conductivity(ds/m)	146	149	148	148
Calcium(mg/l)	26	28	27	26
Magnesium(mg/l)	34	37	36	36
Chloride(mg/l)	64	67	65	67
Sulphate(mg/l)	19	17	19	19
Nitrate(mg/l)	4.4	4.8	4.7	4.5
Phosphate(mg/l)	0.14	0.136	0.138	0.135

### 2.4. GADHINGLAJ:

Gadhinglaj lies at (16° 10' N, 74° 20' E; p. 8,546) corner of Maharashtra. It is well known taluka headquarter from Kolhapur district which is governed by municipal council over there. The population is 27,185 17.97 km<sup>2</sup>.The details of sampling locations are as follows:

A: Near to BSNL Office, B: Near Gadhinglaj High school C: Meat Market. D: Point of contamination. E: Smashan. F: Near Maratha Mandir theatre G: Without contamination H:-small Industrial area. I: Gijavane Nallah.

The stations A, B, E, F, H, I exceeds the required standards.

Sr. No.	Parameter	A	B	C	D	E	F	G	H	I	Avg.
1	Temperature °C, Max	29°C At the point of discharge									
2	colour	Slightly grey at all stations									
3	Odour	Oily, relatively unpleasant odour									
4	pH Value	9.1	8.4	8.9	7.9	9.1	3.8	7.8	3.1	9.3	7.48
5	Total solids	3000	1220	800	400	800	2200	200	1000	1200	1202.22
6	Suspended	1400	400	400	200	200	1000	400	200	200	488.88
7	Total Hardness	188	184	148	72	202	220	164	52	164	154.88
8	Chloride (as Cl), mg/l, Max	300	360	370	540	500	390	275	350	480	396.11
9	Total residual chlorine, mg/l	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab
10	Oil and grease	10	12	12	18	25	15	17	27	12	16.44

### 3. CONCLUSION:

In the present study, it was observed that, out of the various parameters studied from different locations exceed the standard required values. Pollution of waterways with toxic substances and excessive nutrients, as well as destructive land use practices in areas surrounding freshwater ecosystems, lead to deterioration of water quality. There is also need of public education and awareness to decentralise treatment of sewage at household and apartment level which can be useful to reduce pollution of river. Due to non-availability of the adequate land and full-fledged treatment facilities, large quantity of agricultural, municipal and industrial wastewater enters into river Panchaganga through various drains and nallahs which deteriorate the quality of river water.

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