

Pre-Monsoon Sewage Analysis in Gadhinglaj City

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Abstract: Waste water & its characteristics is an important factor in pollution of surface waste. Generation of waste water depends on the factors like population, industries, standard of living of people, availability of water etc. This study has made a sincere attempt to characterize the sewage in Gadhinglaj city. The study involves sample collection, testing of sewage & findings are interpreted in the paper, some survey work regarding use of water & sewage treatment is made with a questionnaire. The Physical, Chemical, Biological parameters are tested in the laboratory which are helpful in suggesting the treatment. The study identifies the characteristics of the sewage obtained in the city, present facilities of treatment & their effectiveness, As well as find out relevant problems of present system, & suggest some suitable treatments for waste water, some recommendations & feasible solutions are suggested in the paper which are useful for improvement of the system. The characteristic of sewage is to be checked for all the seasons and the change is been studied to design the proposed STP for a period of 20 years.

Keywords: wastewater treatment, Gadhinglaj, Physiochemical analysis of waste water, sewage characteristics

1. Introduction

Increased industrialisation & population in 20th century has triggered off many of the environmental & social issues one of those issues is waste water & its treatment. There is direct relation between population & sewage generation, this large amount of sewage if mixed in rivers & other surface water sources then it contaminate the original source, such water may be harmful to human being, & it can spread various water born diseases. In recent years the pollution of river water due to untreated sewage is found to be serious matter, Also It has found that the primary cause behind degradation of water resources is the discharge from cities & towns. (CPCB

Report Nov 2005)

At present the capacity to treat wastewater in India is much deficit than the amount of generation. Also the attentiveness is not given to operation & maintenance of existing sewage treatment plants. As per the study of CPCB 45 among 115 STPs are failed to achieve prescribed standards. (CPCB Report Nov 2005)

The proper treatment of sewage needs well designed sewage plants & before that the analysis of characteristics should be done and accordingly treatment units are to be decided. So in this study a chemical, physical, & biological analysis of sewage is carried out and results are used to provide a suitable treatment for sewage from the city.

Gadhinglaj is much known sub district place from Maharashtra state. The population of the city as per census 2011 is 27,185 in 2011. Because of availability of good medical, educational, & market facilities the population of the city is growing fast. Also the development of new colonies around the city is significantly more; by reason of the well market place & education facilities the floating population is also considerable. These development factors are causing pressure on municipal council that result in inadequate management of sewage from the city.

Fundamentally sewage can be characterised in three categories as Physical, Chemical, Biological characteristics. So in this study Characteristics like temperature, colour, odour, total, solids, organic matter, Ph, Chlorides, BOD, etc has been tested in the laboratory & corresponding observations are interpreted in the result section. From these characteristics the required treatment for sewage can be finalised.

Study Area

Gadhinglaj lies at southwest corner of Maharashtra (16° 10' N, 74° 20' E; p. 8,546). It is well known taluka headquarter from Kolhapur district which is governed by municipal council over there. The population is 27,185 (by census 2011). & the total area is about 17.97 km²

2. Materials & Methods

To identify the sewage characteristics, samples are collected from the city. Firstly total study area is divided in 4 zones (zone 1, to zone 4) & then samples of sewage from these zones were collected from various locations as mentioned below & these samples are tested in the lab as per standard procedures & result are interpreted comparing with Standard CPCB values (The Environment (protection) rule, 1986 Schedule-VI). The secondary information required was collected from Municipal council. Also some physical observations are made through field survey.

The 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 Nalla



3. Results & Discussion

The samples of sewage from Gadhinglaj city were collected & tested in laboratory. The results obtained are compared with the CPCB standards, (The Environment (protection) rule, 1986 Schedule-VI). The final results obtained are as follows & the findings are presented in table No 01

3.1 Physical Characteristics

- The colour of sewage at stations A, B, D, F, G is “slightly Grey” however samples at stations C, E, H, I are shows blackish colour & the relatively unpleasent odour of sewage is noticed.
- The temperature of sewage is depends on the season & climate, here the observed average sewage temperature at the point of discharge is 29⁰ C which is within permissible the limits.

3.2 Chemical Characteristics

- The PH values of sewage ranges from 3.1 to 9.3. The samples at station B, D, G are within standard limits but station F & H shows excessive acidity However station A, C, E, I Shows excess alkalinity. The average value of PH Comes out to be 7.42
- Total solids ranges from 300 -3100 mg/lit. Station A & Station F Shows great presence of total solids, which exceeds the limit of suspended solids with values 1200 mg/lit & 1100 mg /lit respectively.

- Total hardness ranges from 57-220 mg/lit. Station E & F shows more hard water, total hardness at these station is 210 & 220 respectively.
- As per CPCB standard the value of oil & grease should not exceed the limit of 20 mg/ lit for public sewer but station E & H exceeds these standard values.

BOD:

As per CPCB standards the values of five days BOD at 200C should be below 350 for public sewer, higher values of BOD indicate more load of organic matter. The stations B, E, F, I exceeds the required standards, higher BOD values implies that there is more organic load in sewage, more specifically stations B, E, F & I are having great load with BOD values 430.40, 380.20, 477.36, 466.60 & 444.60 respectively. The average values at all station is found to be 375.42

4. Conclusion

With above analysis we can conclude that the values of various parameters from different locations around city exceed the standard required values. Few stations shows excessive acidity where few shows excess alkalinity. The values of BOD at all stations are considerably high, which shows higher amount of presence of organic matter. Also the oil & grease amount at some stations is found to be significant. With these findings it can be say that the sewage from the city shows heterogeneous characteristics & also not meeting some standard values given by CPCB, Therefore it is essentially to provide primary & secondary treatments before releasing sewage into river or land.

5. Recommendations

- For removal of suspended solids the treatments in its like screening, grit removal & sedimentation are required. There are very few and small industries around the city hence the sewage contains biodegradable organic matter, which can be removed by activated sludge process, stabilization ponds or anaerobic reactors etc.
- For pathogenic organisms the removal methods like disinfection with chemical products, maturation ponds, land disposal, membranes can be used.
- As the development of city is high & sewage an characteristics are heterogeneous thus the city needs Efficient sewage treatment plant for waste water management.

6. Appendix

(Ab= Absent)

01	Temperature °C, Max	Shall not exceed 5 ⁰ C above the receiving water temperature.	45 ⁰ C at the point of discharge	290C At the point of discharge.										290C
02	colour	--	--	The color of sewage “slightly Grey” at stations A, B, D, F, & It found to be blackish at stations C, E, H, I										Grey & Blackish
03	Odour	--	--	Oily & relatively unpleasent odour										--
04	pH Value	5.5 to 9.0	5.5 to 9.0	9.3	8.2	9.3	8.0	9.2	3.3	7.3	3.1	9.1	7.42	
05	Total solids	--	--	3100	1250	750	410	800	2100	300	1100	1200	1223.33	
06	Suspended solids mg/l,	Max.100	600	1200	500	450	190	200	1100	400	300	200	504.44	

07	Total Hardness	--	--	180	184	152	74	210	220	166	57	165	156.44
08	Chloride (as Cl), mg/l, Max	1000	1000	310	360	370	530	510	390	280	350	480	397.77
09	Total residual chlorine, mg/l, Max.	1.0	--	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab
10	Oil and grease mg/l Max.	10	20	12	10	12	22	25	18	17	28	12	17.11
11	BOD 5 days 20oC	30	350	382.35	430.40	330.50	295.40	380.20	477.36	255.35	360.70	466.60	375.42

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