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RESEARCH ARTICLE

CHARACTERISTICS STUDY OF WASTEWATER IN GADHINGLAJ

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ABSTRACT

Wastewater and its characteristics is an important factor to recognize surface water pollution, This study has made a sincere attempt to characterize the sewage in Gadhinglaj city. The study involves sample collection, testing of sewage and findings are interpreted in the paper, The physical, chemical, parameters like Temperature, PH, BOD, Suspended solids etc are tested in the laboratory and these parameters are compared with CPCB standard requirement, It is found that some values of BOD, PH, Suspended solids exceeds the required standards of CPCB. The values of parameters at 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 organic loading. From these testing's it can say that the sewage from city is heterogeneous and many of the selected sampling stations exceeds the permissible values. Therefore the primary and secondary treatment for the sewage is needed. On basis of findings some recommendations and suggestions are provided in the paper which is useful for treatment of sewage.

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INTRODUCTION

Increase in industrialisation and population is responsible for increasing the amount of water used and successive generation of waste water in cities and towns. The primary cause behind pollution and degradation of water resources is the discharge from cities and towns. (CPCB Report Nov 2005) The existing capacity to treat wastewater in India is considerably shortfall than the amount of generation. Also the attention is not given to operation and maintenance of existing STP's As a result of this 45 among 115 STPs studied by CPCB are failed to achieve prescribed standards (CPCB Report Nov 2005). The treatment of sewage is largely depends on the quality and quantity of waste water; that means the type of treatment is decides on the basis of characteristics of waste water. Gadhinglaj is well known sub district place from Maharashtra state. The population of the city is 27,185 in 2011. Due to availability of good educational, medical and market facilities the population of the city is increasing rapidly. Also the development along the boundary of city is significantly more; also due to the well market place and education facilities the floating population is also considerable. These things are adding extra pressure on municipal council that results in inadequate management of sewage from the city. Basically wastewater can be characterised in three categories as Physical, Chemical, Biological characteristics. So for provision of appropriate treatment and to understand the quality of sewage the analysis of the sewage is been done.

Characteristics like temperature, colour, odour, total, solids, organic matter, Ph, Chlorides, BOD, etc has been tested in the laboratory and corresponding observations are interpreted in the result section.

Study area

Gadhinglaj lies at (16° 10' N, 74° 20' E; p. 8,546) southwest 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 and the total area is about 17.97 km².

MATERIALS AND METHODS

For appropriate collection of samples the total study area is divided in 4 zones (zone 1, zone2 likewise) and then samples of sewage from these zones were collected from various locations as mentioned below and these samples are tested in the laboratory as per standard procedures and The findings are interpreted comparing with Standard CPCB values(The Environment (protection) rule, 1986 Schedule-VI). The secondary information needed was collected from Municipal council Gadhinglaj. Also some physical observations are made through field survey.

The details of sampling locations are as follows.

A: - Near to BSNL Office.
B:-Near Gadhinglaj High school.

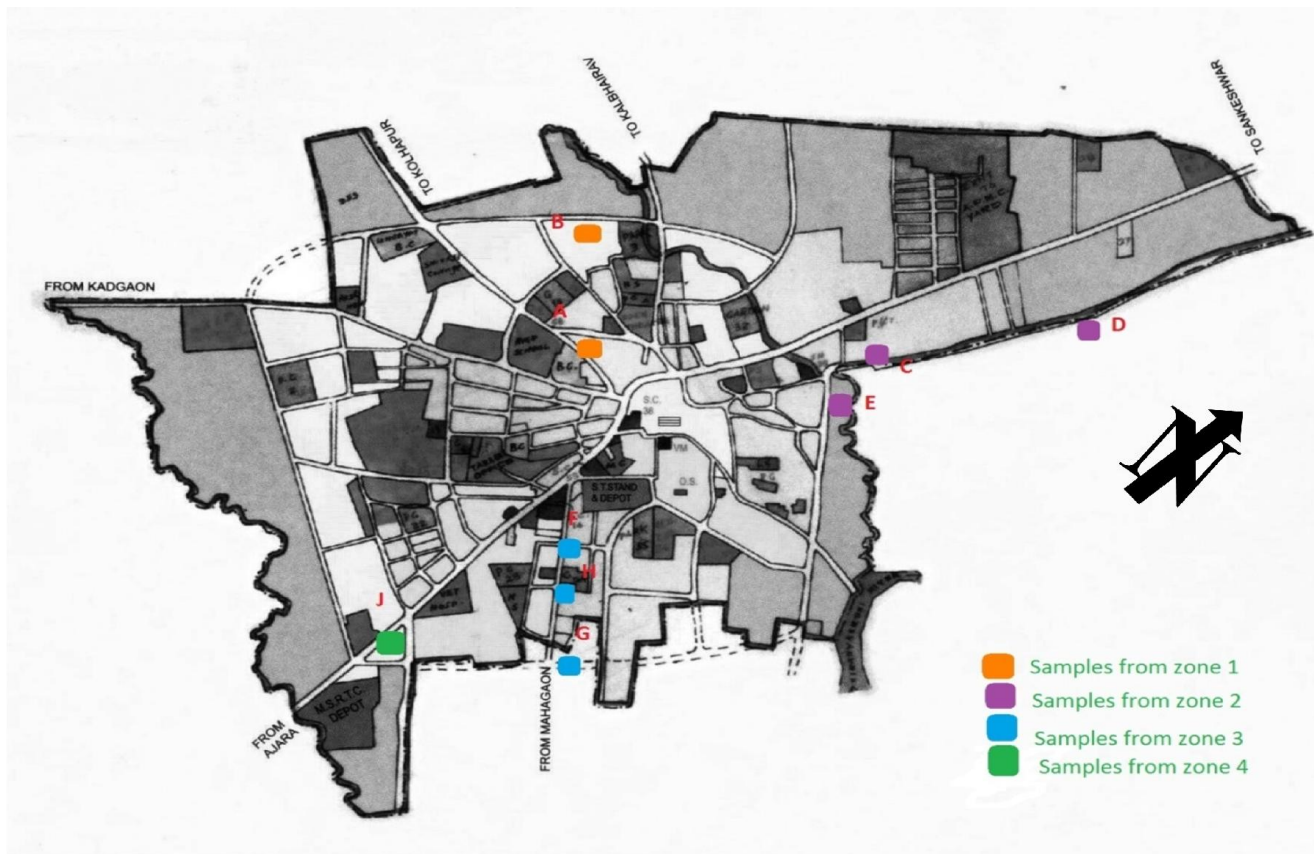
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- C:-Meat Market.
- D:-Point of contamination.
- E:-Smashan.
- F:-Near Maratha Mandir theatre
- G:- Without contamination
- H:-small Industrial area.
- I:- Gijavane Nalla

Physical Characteristics

- The color of sewage at all station is “slightly Grey” which is sign of fresh sewage; however the relatively unpleasant odour of sewage is noticed.



RESULTS AND DISCUSSION

The samples of sewage from Gadhinglaj city were collected and 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 and the findings are presented in Table 1.

- The temperature of sewage is moreover depends on the season and climate, here the observed sewage temperature at the point of discharge is 29⁰ C which is within the permissible limits.

Table 1. Table showing the observed values of various parameters at different stations

S.No.	Parameter	Standards Inland surface water	Public Sewers	A	B	C	D	E	F	G	H	I	average
01	Temperature oC, Max	Shall not exceed 5 ⁰ C above the receiving water temperature.	45 ⁰ C at the point of discharge				29 ⁰ C At the point of discharge.					29 ⁰ C	
02	colour	--	--				Slightly grey at all stations					grey	
03	Odour	--	--				Oily, relatively unpleasant odour					--	
04	pH Value	5.5 to 9.0	5.5 to 9.0	9.1	8.4	8.9	7.9	9.1	3.8	7.8	3.1	9.3	7.48
05	Total solids	--	--	3000	1220	800	400	800	2200	200	1000	1200	1202.22
06	Suspended solids mg/l,	Max.100	600	1400	400	400	200	200	1000	400	200	200	488.88
07	Total Hardness	--	--	188	184	148	72	202	220	164	52	164	154.88
08	Chloride (as Cl), mg/l, Max	1000	1000	300	360	370	540	500	390	275	350	480	396.11
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	10	12	12	18	25	15	17	27	12	16.44
11	BOD 5 days 20oC	30	350	375.35	435.40	335.50	290.51	367.20	477.36	250.30	380.80	444.60	373.00

Ab= Absent)

Chemical characteristics

- The PH values of sewage ranges from 3.1 to 9.3. The samples at station B,C,D,G are within standard limits but station F & H shows excessive acidity However station A,E, I Shows excess alkalinity. The average value of PH Comes out to be 7.48
- Total solids ranges from 200 -3000 mg/lit. Station B and Station F Shows great presence of total solids Also it is found that station A & F exceeds the limit of suspended solids with values 1400 mg/lit & 1000 mg /lit respectively.
- Total hardness ranges from 52-220 mg/lit. Station E & F shows more hard water, total hardness at these station is 202 & 220 respectively.
- As per CPCB standard the value of oil and 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 20°C should be below 350 for public sewer, higher values of BOD indicate more load of organic matter
- The stations A,B,E,F,H,I exceeds the required standards, higher BOD values implies that there is more organic load in sewage, more specifically stations B,F & I are having great load with BOD values 435.40,477.36 & 444.60 respectively.

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 and also not meeting some standard values given by CPCB, Therefore it is essentially to provide primary and secondary treatments before releasing into river or land.

Recommendation

- For removal of suspended solids the treatments in its like screening, grit removal and 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 growth of city is high and sewage characteristics are heterogeneous therefore the city required an efficient sewage treatment plant for waste water management.

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