

TO STUDY ON QUALITY ANALYSIS OF WASTE WATER IN NORTHERN ZONE OF DAVANAGERE CITY

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Abstract – The quality analysis of wastewater is an important factor to find out the surface water pollution and ground water pollution. This study has made a sincere attempt to analyze the quality of sewage in North zone of Davanagere city. This study involves collection of sample, sewage testing and finding out the various parameter values. And the physical parameter and chemical parameters such as pH, BOD, chloride etc are tested in the laboratory. And these parameters are compared with CPCB standard values. Then it is found that some values of pH, BOD, chloride exceed the standards given by CPCB. The values of the parameters at few wards show exceeds acidity where few wards show excessive alkalinity. The BOD values at all wards are substantially high, suggesting higher organic loading. From these all above testing's it can say that the sewage from North zone of Davanagere city is heterogeneous and many of the selected sampling wards exceeds the permissible limits. Therefore the primary and secondary treatment for sewage is provided. From this analysis some suggestions are provided which is useful for sewage treatment.

Key Words: Wastewater quality, physical and chemical analysis of waste water, PH, BOD, CPCB.

1.0 INTRODUCTION

The Sewage/Waste water is essentially the community water supply after a variety of uses have fouled it up, From a generational resource point of view, wastewater can be defined as a combination of residential, corporations, institutions, commercials establishments as well as liquid water extracted from groundwater, surface waters and storm water. The wastewater collected from residential premises such as homes, schools and industrial premises is commonly referred to as "sewage/Community waste water". This contains about 99% water and 0.1% natural and is organic as it contains human waste, paper, vegetable, etc. In addition to the public wastewater, there are industrial wastewaters in the city. Many industrial wastes are also environmentally sensitive are also organic in nature and can be treated in the same way as sewage physico-chemically and/or by microorganisms (Topare et.al, 2011).

Residences, schools, hospitals and commercial and industrial areas produce waste. These can be treated in close proximity (in septic tanks, bio filters or in aerobic treatment programs), or collected through a municipal treatment plant through a network of pipes and pump stations.

A wastewater treatment plant is a facility where waste water is treated until it is disposed of into the atmosphere. The sequence and types of mechanical, chemical and biological properties that comprise the wastewater treatment plant. Usually wastewater can be characterised in three categories like physical, chemical, Biological characteristics. So for provision of appropriate treatment and to understand the quality of sewage the analysis of sewage is been done. The various parameters like temperature, color, odour, ph, BOD, chloride etc has been tested in the laboratory and the corresponding observations are interpreted in the result section.

1.1 Objectives of study

- Analysis of physical and chemical characteristics of wastewater in Northern zone of Davanagere city.
- To compare the wastewater quality property according to ward wise in north zone of Davanagere city.
- To analyse the effects of wastewater on vegetation and human beings.

1.2 Study area

Davanagere is a city in the centre of the southern Indian state of Karnataka. It is the seventh largest city in the state, having population 435,125 according to the 2011 census. Davanagere is partially covered with underground sewerage system. And it is divided into three major districts 1, 2, &3 and a smaller sub-district-1A. According to Municipality board, the Davanagere city consists of 45 wards, our project is to analyse wastewater quality of 21 wards in North zone of Davanagere city.

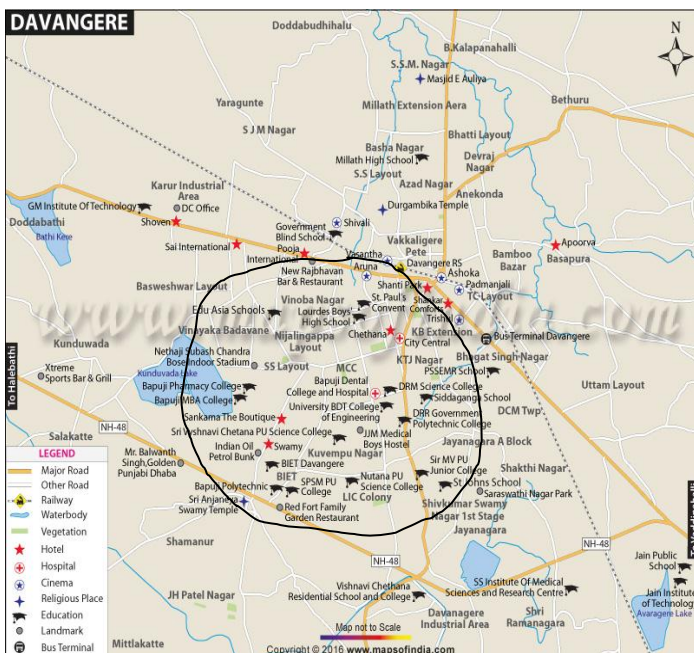


FIGURE 1: Comprehensive plan of sewerage system in Davanagere city

Key features

Name of the Place: Davanagere northern region

Global location: 14.478324, 75.908582

Water Supply Rate: 135lpcd

Sewage generation rate: 85% of water supply rate

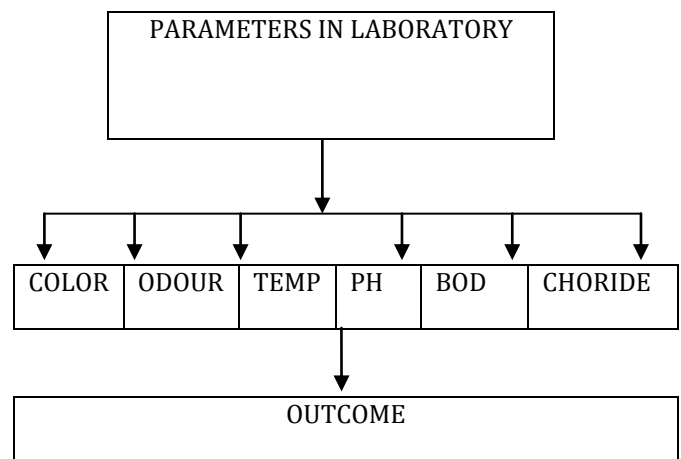
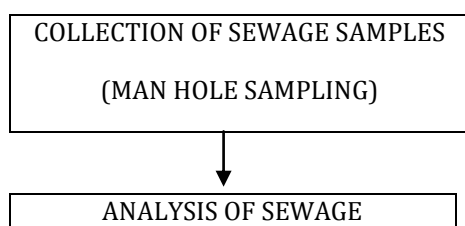
System of sewerage: Combined type

Average annual Rain fall data: 610mm

2.0 MATERIALS AND METHODOLOGY

Wastewater: The present study is undertaken to analyse the physico chemical parameters of waste water sample from different wards of north zone of Davanagere city. The **domestic waste water** sample will be collected from manhole from different wards of north zone of Davanagere city according to procedure. Domestic waste water is collected 40-45cm below the surface to avoid the collection surface impurities. The samples are planned to collect in 2litres polythene bottles.

METHODOLOGY



3.0 RESULTS AND DISCUSSIONS

The samples of wastewater from north zone of Davanagere city were collected and tested in laboratory. The results obtained are compared with CPCB standards, (the Environment protection rule, and 1986 schedule-4).the final results obtained are as follows and the findings are presented in below tables.

Ward no	color	Odour	Temp	pH	BOD	chlo ride
25	Grey	unpleasant	27 ^o C	6.03	370	367
26	Grey	unpleasant	27 ^o C	7.15	345.2	445
27	Grey	unpleasant	27 ^o C	6.85	375.25	467
28	Grey	unpleasant	27 ^o C	6.02	390	389
29	Grey	unpleasant	27 ^o C	5.95	340	399
30	Grey	unpleasant	27 ^o C	7.14	345	387
31	Grey	unpleasant	27 ^o C	6.84	385	402
32	Grey	unpleasant	27 ^o C	7.04	390	399
33	Grey	unpleasant	27 ^o C	6.96	367	389
34	Grey	unpleasant	27 ^o C	6.8	477.5	468
35	Grey	unpleasant	27 ^o C	5.98	380.9	530
36	Grey	unpleasant	27 ^o C	7.02	360	502
37	Grey	unpleasant	27 ^o C	6.95	345.00	378
38	Grey	unpleasant	27 ^o C	6.36	380	501
39	Grey	unpleasant	27 ^o C	7.18	290.5	467
40	Grey	unpleasant	27 ^o C	7.05	367	490
41	Grey	unpleasant	27 ^o C	6.24	356.56	345
42	Grey	unpleasant	27 ^o C	5.9	250.40	36
43	Grey	unpleasant	27 ^o C	6.85	445.40	298
44	Grey	unpleasant	27 ^o C	7.03	356.45	346
45	Grey	unpleasant	27 ^o C	6.83	357.56	290

Physical Characteristics

- Sewage color at all wards is “slightly grey” is a sign of fresh sewage;
- Sewage odour is very unpleasant.
- The wastewater temperature is mostly depends upon the season and climate, here we observed wastewater temperature at the point of discharge is 27^oC, and this temperature is

within the permissible limits. According to the CPCB standards, Temperature for inland surface water shall not exceed 5°C above the receiving water and public sewers temperature is 45°C at the point of discharge.

Chemical Characteristics

- pH is an extremely important parameter, as aquatic life is dominated by chemical changes in the aquatic environment. Therefore, pH is of primary importance in assessing waste water content. The average pH values for waste water samples collected from different wards vary between 5.9 to 7.18. The pH value less than 7 is referred to as acidity and pH value greater than 7 is referred to as alkalinity.
- According to the CPCB standards, Ph value for inland surface water and public sewers is 5.5 to 9.0
- Under CPCB guidelines, the five-day BOD values at 20°C should be below 350 for public sewer, higher values of BOD show more organic matter load. The ward number 34 and 43 exceeds the required standards given by CPCB, the BOD values 477.50 and 445.40 mg/L respectively. The minimum BOD value shown in the ward number 42 is 250.40 mg/L.
- The concentration of chloride in all investigative sites is below 250 mg/L within acceptable range at all seasons. The minimum value of chloride obtained is 298 mg/L and maximum value of chloride obtained is 530 mg/L. According to the CPCB standards, Chloride value for inland surface waters and public sewers is 1000 mg/l.

4.0 EFFECTS OF WASTE WATER

- **Water pollution:** Fresh water and seawater can contaminate waste water and are not safe for human consumption. Depending on the discharge that occurs, aquatic life can also be harmed.
- **Water scarcity:** water shortages in many parts of the world. Wastewater discharged from fields can enter underground tables and contaminate rivers and groundwater. If released into a body of fresh water, it can provide water sources that are not suitable for use.
- **Ecosystem Services:** All ecosystems are interconnected and ultimately dependent on water. Similarly, all water (surface and underground) is connected. This means that untreated wastewater can have a very bad effect. One common consequence of

wastewater is the introduction of freshwater sediments and seawater. If one part of the ecosystem is broken, it can disrupt the rest of its food chain.

- **Agriculture/Fisheries/ Tourism:** The effluents for irrigation can contain improper chemicals and high concentrations of nutrients needed by plants. This may be delayed and subject to withdrawal. Polluted water used for farming can also contain harmful substances and chemicals that dissolve them, animals can die, and there is a chance that people who eat such animals could also be harmed. In some areas, proper sewage is released directly into the sea. The contaminants contain pathogens and soluble chemicals that can disrupt fishing in the area. Such unpleasant odour and behavior do not encourage tourism in the area.
- **Health of urban and rural populations:** Wastewater is a major health problem, as it carries and carries a host of diseases and illnesses. It was estimated that 2.2 million people die each year (worldwide) from diarrhea. (WHO). At least 1.8 million children under the age of 5 die annually from water-related diseases or one every 20 seconds (WHO, 2008).

5.0 CONCLUSIONS

- With the above analysis/review, we can come to the conclusion that the values of various parameters of different wards in the North zone of Davanagere city surpass/exceeds that of standard values are expected.
- The values of BOD at all wards are considerably high, which shows the higher amount of organic matter is present.
- This is with those results it can be assumed that the towns/city sewage is heterogeneous features /characteristics & also does not meet certain standard values given by CPCB, because the growth of the city is high so city required an efficient sewage treatment plant for waste water management, therefore, primary & secondary treatments can be provided before releasing into river or land. Thereby protecting our future and sustainable business growth.

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