Assessment of wastewater from some selected locations in an around Faizpur area of Khandesh Region, MS, India

Harshad R. Kakade* and S. R. Thorat
School of Environmental and Earth Sciences, North Maharashtra University, Jalgaon, MS, India
harshad.kakade9@gmail.com

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Abstract

The present study was done for the investigation of Physico-chemical parameters of wastewater from different locations of Faizpur area of khandesh region. Standard procedures were adopted to calculate Physico-chemical properties in wastewater samples. The wastewater characteristics was analyzed for various water qualities like pH, TDS, TSS, Conductivity, Total Hardness, Salinity, etc. The results obtain from the study were compared with BIS standards to check their pollution level. Elements and their impacts on human health was discussed. Effect of wastewater shows that most of the parameters were much higher compare to the standards. Hence, the flow of these wastewater into the river cause a serious pollution problem in an around Faizpur area of Khandesh region. Wastewater should not be disposed into the nalla of Faizpur directly or be used as irrigation water for agriculture.

Keywords: Nalla wastewater, Physico-chemical parameters, Faizpur area, Khandesh region.

Introduction

Today environmental pollution by waste has developed as one of the most dangerous environmental problems. Sewage sludge is a main source to provide plant nutrients hence, its drawbacks can be seen in the form of gradual absorption of heavy metals in the soil work as a supply of nutrients for crop production due to the high content of organic matters. Many Indian villages and cities don’t have a safe water to drink. Rain water is the main source to recharge the ground water. Zadi river is located in the Faizpur area but this river gradually converted into a nalla. The wastewater that flows after use for domestic and other purposes is discharge in to this nalla. Sewage comprises water as the main constituent, while other constituent, also contain organic waste and chemical. Untreated sewage discharge is one of the main problems presently. The solid wastes and wastewaters are discharged into the water bodies and then ultimately pose a risk to human and routine functioning of ecosystem. Domestic sewage water with high organic matter dissolved solids and unwanted chemicals causes huge ground water problems. During the past decade, widespread reports of ground water contamination have increased public concern about drinking water quality. Sewage provides water and valuable plant nutrients; it leads to the potential accumulation of heavy metals in agricultural soils.

Present study was focused on the estimation of the Physical and chemical parameters of wastewater from some selected areas in an around Faizpur area of Khandesh region, Maharashtra. Research shows that almost all rivers are polluted in most of the stretches of Khandesh region by some or the other irrigation and aquatic life. Research work was ongoing for the progress of resourceful treatment technologies appropriate to people of Faizpur area.

Materials and methods

Area of study: The Jalgaon district is one of the main rivers of the river Zadi based on Latitude 21.162222 and Longitude 75.863236. Cane-sugar industry exists in an around Faizpur city and the sewage and the unused materials e.g. organic waste of this Faizpur area is responsible for humiliating the quality of river Zadi and converted into a Lendi nalla. All Physico-chemical parameters were assessed using

Procedure for Sampling: Nalla water was collected during February 2016 to January 2017, which cover entire Faizpur city. Graph 1-9 shows the physical and chemical parameters how it gets affect nearby area of the river. The quality of surface water changes with respect to season and is easily get contaminated. Samples were collected for determination, during February 2016 to January 2017. Samples were collected between morning 07.30to 10.30 in clean sampling cans, labeled and brought to the laboratory for estimation.

Sampling Methods: Sewage water sample was collected below the surface about 40-50 cm, to sidestep the collection of surface scums, oils etc. Each sample was collected separately in plastic cans to measure the Dissolved oxygen respectively.

Parameters: Almost09 water quality constraints were estimated to understand the contamination of the sewage: pH, Total solids, Conductivity, Total dissolved solids, Total hardness, Total suspended solids, Calcium hardness, Salinity, Chloride and Dissolved oxygen.
**Figure-1:** pH content of wastewater from selected sites.

**Figure-2:** Temperature content of wastewater from selected sites.

**Figure-3:** Conductivity (dSm$^{-1}$) content of wastewater from selected sites.
**Figure-4:** Salinity mg/l content of wastewater from selected sites.

**Figure-5:** Total Hardness content of wastewater from selected sites.

**Figure-6:** Chloride mg/l content of wastewater from selected sites.
Figure-7: TDS content of wastewater from selected sites.

Figure-8: TSS content of wastewater from selected sites.

Figure-9: DO mg/l content of wastewater from selected sites.
Results and discussion

The study carried out shows that the analysis of physical and chemical characteristics of some selected locations in an around Faizpur area of Khandesh region was based on Physico-chemical parameters e.g. pH, Temperature, Total Solids and Conductivity in combination with chemical features like Salinity, DO, Hardness and Chloride. All above parameters assessed with the help of APHA, 2000. We have selected six sampling sites in an around Faizpur area of Khandesh region i.e. Faizpur (S1), Savda (S2), Kochur (S3), Nimbhora (S4), Khirdi (S5) and Itva-nimbol (S6). The samples were collected from the depth of 2ft of each area.

**pH**: pH is an important parameter which determine the suitability of water for various determinations. In the present study pH ranged between 8.02 to 9.19 in many of the collections the pH continued accurately neutral. However, when the average values are considered the sewage water sample were observed to be slightly alkaline. The extreme pH value (9.19) was noted in the Kochur area at S3 site and minimum (7.68) at S2 site in Savda area. Extreme bio-chemical and chemical reactions are prejudiced by the pH. Jogi et. al.,3 have also made similar observations in their studies on different water bodies.

**Temperature**: Minor variation of temperature was recorded study carried out. The temperature ranges from 35.7°C to 36.5°C. The observed values of temperature were indicating the wastewater quality has surely affected by this parameter. Jayab et al10 and Salvehave et al11 detected similar study during summer, water temperature was high due to low water level, high temperature and clear atmosphere.

**Conductivity**: Observations shows that the electrical conductivity (EC) varies from station S1 to S6 i.e. 658.60 ± 0.300 to 1421.00 ± 0.500 dSm⁻¹. High electrical conductivity shows a larger quantity of dissolved mineral salts similar observation was also reported by Gaikwad et. al.,12 for river Tapi at Bhusawal (Jalgaon). Near about all sampling sites reported high electrical conductivity.

**Salinity**: The salinity concentration ranged from 343.200 ± 0.040 to 542.300 ± 0.230. The highest salinity concentration was recorded 542.300 ± 0.230 Khirdi area i.e. S5 sampling station while lowest 343.200 ± 0.040 in S2 at Savda sampling station. Concentration of salinity might be due to release of domestic waste covering high chloride absorption. The result obtained from this study were lower than the results reported by Krishnan et. al.13

**Total Hardness**: The rate of hardness varies from 1099.600 mg/l recorded at S2 sampling station Savda and the maximum hardness was recorded at S5 sampling station in Khirdi area i.e. 2303.070mg/l. Sheejan et. al.,16 stated total hardness was high during summer season than rainy and winter. During summer, high value of hardness can be credited to decrease in water volume and increase of evaporation rate of water.

**Chlorides**: Chloride is most important parameter in assessing the quality of water Chavan et. al.,11 believes advanced concentrations of chlorides indicate developed degree of organic contamination. In this study, the absorption of chloride varied between 282.600mg/l S2 site Savda area and 698.418 mg/l S5 site Khirdi area respectively. Chloride concentration in wastewater was found to be high by Chaudhari et. al.,12 and a similar observation has been made by Chavan et. al.13

**Total dissolved solids**: The total dissolved solids vary from 410.20mg/l to 1062.20mg/l. The extreme value 1062.20mg/l was noted at the site S5 Khirdi area. It might be due to heavy rainfall in the Khirdi area of Khandesh region.

**Total suspended solids**: Flucluation of TSS was recorded between S1 Faizpur area 1966 mg/l to S6 Nimboran area 566610 mg/l. It might be due to suspected material contains of silt, clay, fine particles of organic and inorganic matter, soluble organic complexes, plankton and other microscopic creatures.

**Dissolved Oxygen**: The concentration of DO regulates the distribution of flora and fauna. The present study shows that the concentration of dissolved oxygen was absent in the entire six sampling sites studied of Faizpur area of Khandesh region. This suggest that most of the releases are organic in nature and hence need oxygen for breakdown. High disintegration of organic substances in sewage, show high contamination load and decreases the dissolved oxygen.

These observations are in conformity with the observation of Sheejan and Thorat14 studies have been carried out in Khandesh region of Maharashtra. Few workers concentrated on the hydro biological studies in Maharashtra, India i.e. Studies on the rivers, lakes, ponds, etc. carried out15-20.

**Conclusion**

The quality of water is directly and indirectly concern to human health. The growing concentration of numerous organic and inorganic since the households and their following proclamation to their neighboring as well as the sewage water release to drain advanced extensive and growing community anxiety over their opposing effect on human-health and environment. The level of parameters investigated exceeded the permissible limit for sewage water determinations and agriculture purposes. As per our study we conclude, that the wastewater must be treated before dispose into the rivers or nallas in Khandesh region to avoid health hazards to agriculture as well as human being.

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References


