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To determine the heavy metals with respect to chemical parameters of Bhiwandi (Maharashtra)

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Abstract
A study on physico – chemical characteristics of river water of the Bhiwandi city area was assessed in the vicinity of various sites. The study was conducted in winter season (October 2013 to January 2013). The fluctuations in physico – chemical parameters were noted during the study period. The values of pH were found to vary from neutral to alkaline which are within permissible limits. The results indicated high concentration of metals in the samples under study.

Keywords: Heavy metals, Oil and Grease, Polluted water, Water borne disease, Chemical Parameter.

Introduction
Water is one of the most important compounds in the ecosystem. Better quality of water described by its physical, chemical and biological characteristics. But some correction was possible among their parameters and the significant one would be useful to indicate the quality of water. The quality of water is a vital concern for mankind because it directly linked to human health water sources were polluted by domestic wastage in rural areas whereas industrial wastages discharged into natural sources in urban areas. (A. K. De, J. A. Sayyed and A. B. Bhosle O. Ogbonna, *et al.*). We need water every day for various domestic, irrigation and drinking purpose.

When there is no revolution in industry and agriculture, water quality was near about good, but due to industrial and agricultural revolution water, which is collected in the various water resources highly polluted in various ways. In this area some work was done by – Dhake et.al (2008) [5], S. Moscow *et al.* (2008), Medha *et al.* (2008) [4]. The purpose of present study is to find out the impurities in river water because the river contain waste water and the pollutants from dye and textile industries.

Materials and Methods
Study Area
The river is the oldest river from the 16th century A. D there were Nizamshahs rule and the place is also used as a port at that time. The location of Bhiwandi is 19.296664°N and 73.063121°E, Height above MSL 23.132 meters. Now a days it contains only waste water and a pollutant from dyes industries which were situated nearby area.

Preparation of water samples
The water samples were collected in polythene bottles of capacity 1 to 2 liters in the month of October 2013 to January 2013 at 30 days intervals between 12:30 noon to 7:00 p.m. The standard procedures were adopted for the determination of physico – chemical parameter APHA (1992) [8].

### Determination of water quality parameters
The analysis of various physico – chemical parameters, like pH, temperature, Total Dissolved Solids (TDS), Suspended Solids (S.S), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Alkalinity, Lead, Arsenics, Iron, Magnesium, Sodium, Calcium, Oil and Grease and Phenols were carried out as per the method described in APHA (1992) [8]. The instruments used were in the limit of precised accuracy temperature colour, odour was measured at the time of sampling itself.

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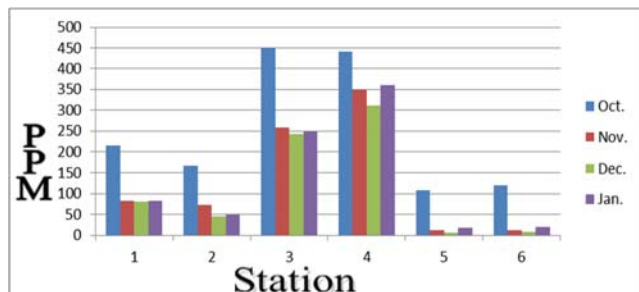Maharashtra, India.

Results and Discussion
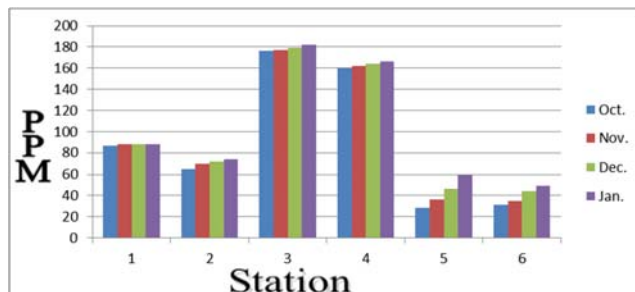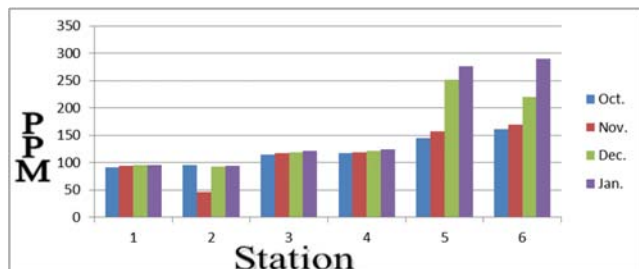The monthly values of chemical parameters and heavy metals of the river are shown in the table.
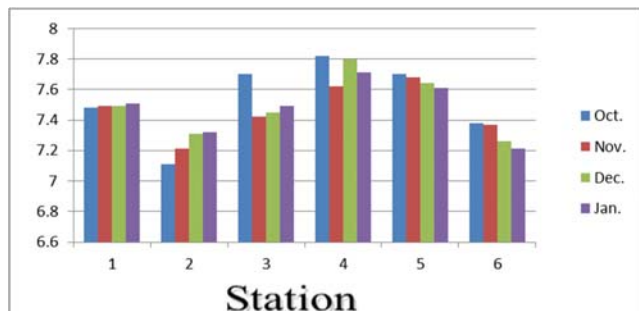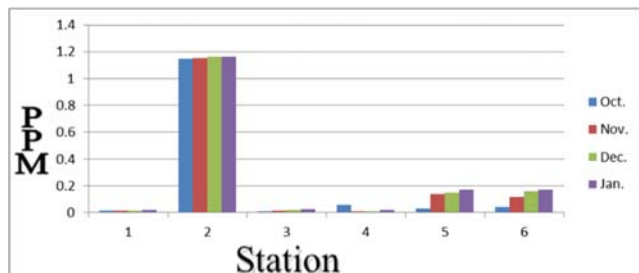

pH
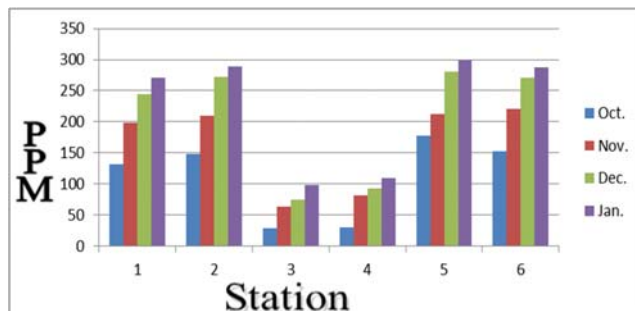
Alkalinity

COD

BOD

S.S
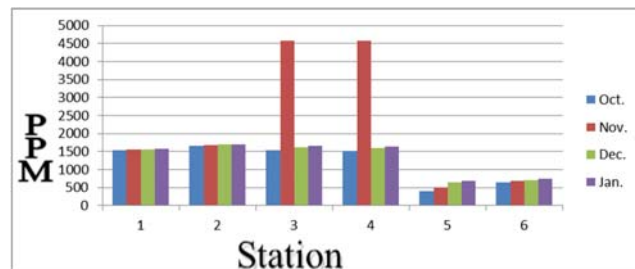
T.D.S.

Lead
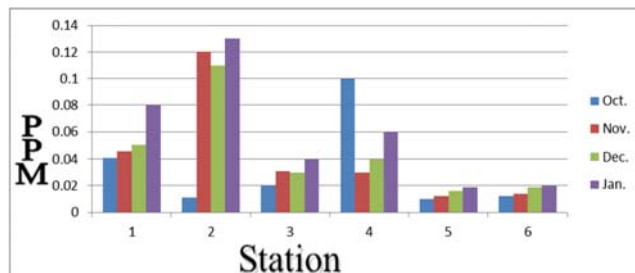
Arsenic
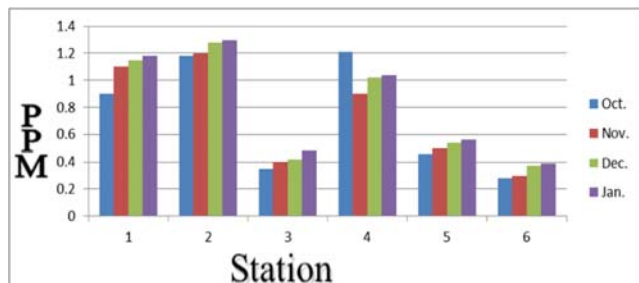
Iron
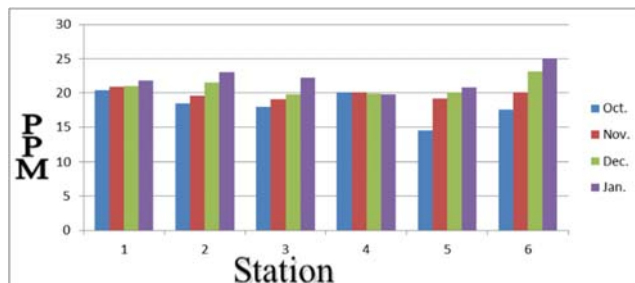
Magnesium
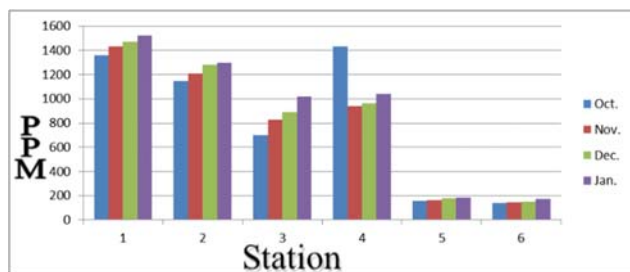
Sodium

Calcium

Oil and Grease

Phenols

(**Note**: No Bar Graph- Below Detectable Level)

1) pH of the collected water sample.

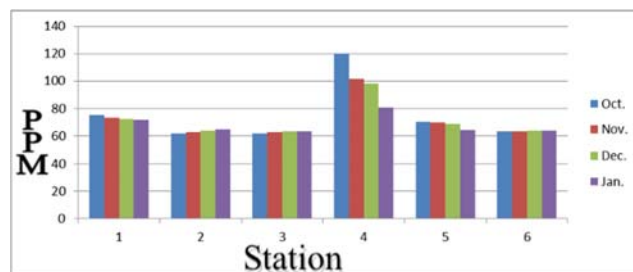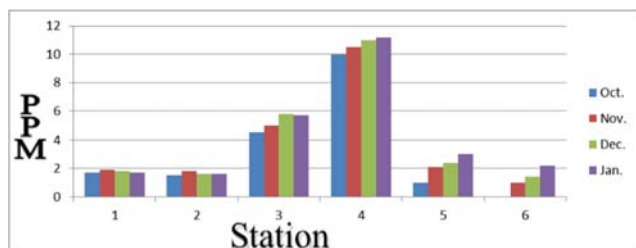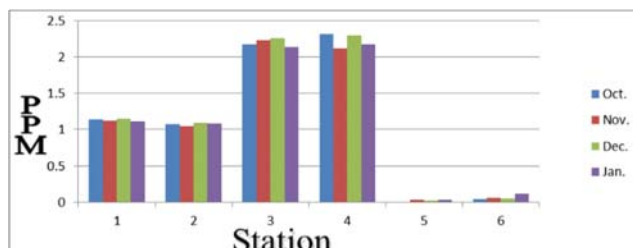pH is most important in determining the corrosive nature of water. Lower the pH value higher is the corrosive nature of water. The higher pH values observed suggests that carbon dioxide, carbonate-bicarbonate equilibrium is affected more due to change in physico – chemical condition (Karanth 1987). It was observed that the pH of the water on sample S4 is higher than other samples this variation is due to pollution. The higher pH values of May produce incrustation sediment and deposition.

2) Temperature

There is a closed reaction between the atmospheric temperature and water temperature. Air temperature is one of the most importance, ecological factors which control the physiological behaviour of the aquatic system and distribution of the microorganisms. The temperature of the collected water samples varies between 28 ºC to 37 ºC. Lowest temperature was recorded for sample S1 whereas highest temperature for sample S3.

3) Total Dissolved Solids (TDS)

It was reported that alkaline ponds were richer in solids than acidic ones the quantity of TDS was proportional to the degree of pollution. The higher TDS was recorded because of the addition of the solids from rain off water. The value of TDS in water samples varies from 396ppm to 1690ppm. Higher value was recorded for sample S2 in January whereas lower value recorded for sample S5 in October.

4) Alkalinity.

Alkalinity of water is a measure of its capacity to neutralize acids. This is due to the primarily salts of weak acids or strong bases. Bicarbonates are formed in considerable amount from the action of carbon dioxide upon basic materials in soils and other salts of weak acids. Alkalinity in the sample range from 28ppm to 298ppm. Higher alkanity was recorded for sample S5 in January whereas lower value recorded for sample S3 in October.

5) BOD and COD

BOD and COD are the amount of oxygen required by living aquatic organism and decomposable of chemical waste material, respectively. If BOD increased in organic matter it results in the excess oxidation of organic water to carbon dioxide. While in a high value of COD shows a higher accumulation of organic waste in the river. The value of BOD in samples range was 28.32ppm to 182.14ppm. The value of COD in sample ranges was 7.1ppm to 361ppm. Highest value of BOD was recorded for sample S3 in January whereas lower value recorded for sample S5 in October. Highest value of COD was recorded for sample S3 in October whereas lower value recorded for sample S5 in December.

6) Suspended Solid (SS)

Suspended Solids indicates the salinity behaviour of water. It has been observed that SS values were very fluctuating. Higher value of S.S in sample S 6 in January and lower value recorded in S2 in November.

7) Iron

Iron in water is considered as micronutrient when its concentration is less than 0.3ppm. In present investigation, iron concentration of S2 is higher than any other sample. In a sample S6 iron concentration was decreased.

8) Calcium and Magnesium.

In all the collected water samples of the river was found in the range of 61.8 to 120.24 Vijayakumara *et al.* (2005) [7], Jawale and Patil (2009) [3] analysed mongrel water Jalgaon observed magnesium maximum 30.19 mg in December and minimum 6.33 mg in Oct. In present study observed calcium range 8.60 ppm to 94.10 ppm and magnesium 14.7 ppm to 25.1 ppm.

9) Lead and Arsenic

Lead is poisonous to animals and humans, damaging the nervous system and causing brain disorders. Excessive lead also causes blood disorders in mammals. Lead is a neurotoxin that accumulates both in soft tissues and the bones. In collected water sample lead was found in the range of 0.01ppm

to 1.165ppm. Higher value of Lead in sample S2 in January and lower value recorded in sample S3 in October. Arsenic and many of its compounds are especially potent poisons. Arsenic is also found in the water and its range 0.01ppm to 0.1ppm. Higher value of Arsenic in sample S2 in January and lower value recorded in sample S2 in October.

10) Sodium
Sodium compounds are of immense commercial importance, being particularly central to industries producing glass, paper, soap, and textiles. In collected water sample sodium is also found. As per our study the highest value was in S1 sample i. e 1520ppm and the lowest value was in S6 sample i. e 140ppm.

11) Oil and Grease and Phenols.
Oil and Grease is found in the water sample. Sample S4 as the maximum value i,e. 11.2ppm and sample S6 as the value below dectable level. Phenols too found in the water sample. Sample S4 as maximum value i,e. 2.32ppm and sample S5 as minimum values 0.01ppm.

Conclusion
On the basis of the above discussion, it may be concluded that water of the river is polluted and it may cause various diseases. Remedial measures are required to sustain the quality of water.

Acknowledgements

Reference
1. De AK. Environmental Chemistry', 3rd Ed, New Age International (p) Limited, Publishers, New Delhi, 1994.
2. Sayyed JA, Bhosle AB. Der ChemicaSinica, 2010; 1(2):104.
3. Jawale AK, Patil SA. Journal of Aquatic Biology, 2009; 24(1):7-12.
4. Medta KA, Patil CL. J Chemtracks. 2008; 10(1and2):345.
5. Dhake RB, Phalak RP, Waghulde GP. AJCER, 2008; 1(1):54.
6. Moscow S, Jothivenkatachalam K, Subramani P. Der Chemica Sinica. 2011; 2(2):1999.
7. Vijayakumara, Narayana J, Puttaiah ET, Harishbabu K. Journal of Ecotoxicology an Environmental Monitoring. 2005; 15(3):253-261.
8. APHA, Standard methods for the examination of water and waste water; 18th edition, USA, 1992.