Analysis of Water Quality Parameters during Immersion of Lord Ganesh Statues in Hadoti Regions

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***Abstract*- Since water contamination of a growing city is always in the rising trend, its effect on the environment has been studied. Considering the above factors an attempt has been made to assess the water quality of Hadoti region of Rajasthan during Ganesh Pooja (Murtivisarjan). Idol is an image of a god which is used as an object of worship. After worshipped, these idols are immersed into water bodies. Idols are constructed by plaster of paris, clay, cloths, small iron rods, bamboo and decorated with different paints such as varnish, water colors etc. which can lead to significant alteration in the water quality after immersion. Paints which are used to colour these idols contains various heavy metals such as Mercury, Cadmium, Arsenic, Zinc, Chromium and Lead. Particularly, red, blue, orange and green colours contain mercury, zinc oxide, chromium and lead, which are potent carcinogens.The study on water quality assessment during Ganesh Pooja in Rajasthan comprises four districts of Hadoti region namely Kota ,Baran, Jhalawar and Bundi To compare the effect of Immersion on Ganesh Pooja on various water resources of Hadoti region samples have been collected a day before, after and during immersion in all four districts. The parameters in the study are pH, COD, BOD, DO, Conductivity, Turbidity, TDS and heavy metals Zinc and Iron. The maximum value and variation in pH and turbidity (only value) noticed in the water of Jhalawar district. On the other side, maximum value and variation in conductivity, TDS and COD found in Bundi district. The maximum value of DO and BOD and heavy metals recorded in Kota, while maximum variation in turbidity also noticed in Kota.**

***Index Terms*- BOD, DO, COD, TDS, Heavy metals.**

INTRODUCTION

Water is universally accepted as a symbol of life as it is most crucial for maintaining an environment and ecosystem conducive to sustaining all forms of life. It plays a vital role not only in fulfilling basic human need for life and health but in socio-economic development also. The demands for drinking, domestic activities, livestock, agriculture, industries, power generation and other uses are all increasing to meet the requirements of increasing population and also to cater for the enhanced per capita requirement due to rise in various human activities like festivals industrial waste dumping, unplanned Irrigation, the largest water sector, is feeling the pressure of increasing demands all over the world because of limited fresh water availability. On the other hand the need to increase agricultural production, for which also water is the most critical input, to meet the food and fiber requirement of increasing population is equally important. While our natural resources are depleting day by day either by various anthropogenic activities. The problem due to various religion activities by human to our water resource in the region is many, acute and serious. Due to religious convictions and belief people use to dump holy material and flowers during the various festivals in to water bodies. Remains of holy material are often seen floating on the surface creating ugly scene.

The water quality assessment of various surface water of Hadoti region of Rajasthan which compares four districts Baran, Bundi, Jhalawar and Kota. The problem of water availability and quality in Rajasthan is known to everyone. So it is very important and necessary to keep eyes on contamination of water reserves and monitor them by assessing their quality time to time. Religious activities in or around water bodies are making them more contaminated with hazardous impurities and more polluted resulting in killing of aquatic life, fishes etc. This paper analyzes the various types of hazardous contamination and resulting variation in physicochemical parameters of water reservoirs of Hadoti.

STUDY AREA

Hadoti, being rich in its natural and cultural heritage, has supporting prehistoric civilization which has its marks in the form of series of rock shelters and cave painting dating back 5000 BC. It lies between 23 degree 45 to 25 degree 53 N latitudes and 79 degree 09 to 77 degree 26 longitudes, with a total area of 24156.6 sq. Kilometers and is 300 meter above M.S.L. The geographical environment is basic determinant of its socio-economic, cultural activities.

Figure: 1 Hadoti region (sampling location)

The Hadoti region consists of several districts of Kota, Baran, Jhalawar and Bundi as shown in the map of Rajsathan. The Hadoti region is surrounded on the western side by the Mewar region of Rajasthan and on the south by the Malwa region of Madhya Pradesh state. The origination of the Hadoti region has got a significant story to back upon. The name of the region has been taken up from the Hada Rajputs, which comprises a branch of the Chauhan Rajput clan. As early as the 12th century, these Hada Rajputs migrated into the Hadoti region. Hada Rao Deva, a member of this Hada Rajputs group, occupied Bundi in the year 1241 and also Kota in the year 1264. In the Hadoti region, there is Kota, which had gained its status as an independent state in the year 1579. Similarly Jhalawar became separate state in the year 1838. Hadoti is a treasure house of art and sculpture. Some of the archeological wonders are found in the temples that are situated in every nook and corner of it. Bundi is an important city bearing witness to some of the striking artistry. It is located in a narrow encompassing gorge.

SAMPLING LOCATIONS

The samples were collected from Kota, Baran, Jhalawar, Bundi serially named as 1, 2, 3, 4 and these were collected from all four sampling locations on the day before immersion, during the immersion in water bodies and after the immersion at immersion point (series1, 2, 3).In Kota the sample were taken from Kishore Taal situated in the heart of city, Second sample point is Baran where samples were taken from Parvati river. Samples 3, belonged to Jhalawar were taken from NayaTalab and last sampling point is Jeetsagar situated in Bundi.

SAMPLING ANALYSIS

For assessment of water quality during Ganesh Puja in Hadoti region, four locations of four districts of Hadoti region were chosen. Samples were collected in sterilized polypropylene bottles using standard method. Sampling location and respective sampling coding given is shown in graph or in table. Physiochemical parameters such as pH Turbidity, TDS, conductivity, DO, BOD were analyzed by using handheld portable multi parameters of HACH. While heavy metals were analyzed by using AAS of ECIL 4139. Details of analysis methods are summarized in the table.

S.No.	Parameters of water analysis	Method employed
1	pH	Hand Held multi parameter HACH
2	Turbidity	Nephelometric
3	TDS	Handheld multi parameters HACH
4	Conductivity	Hand Held multi parameter HACH
5	DO	Hand Held multi parameter HACH
6	BOD	Hand Held multi parameter HACH
7	COD	Titrimetric
8	Zn	AAS ECIL 4139
9	Fe	AAS ECIL 4139

Table :1 Sample analysis methods

RESULTS AND DISCUSSION

The study has been carried out in four districts of Hadoti region namely Kota, Baran, Jhalawar and Bundi.During the observation the maximum value and variation in pH and turbidity (only value) noticed

in the water of Jhalawar district. On other side, maximum value and variation in conductivity, TDS and COD (DO variation) found in Bundi district. The study revealed the maximum values of DO and BOD and Heavy metals in Kota, while maximum variation in turbidity, heavy metals, BOD were also noticed in Kota.

Figure 2: Shows Immersion of Ganesh Murti in Hadoti regions

The physiochemical characteristics of surface water of different locations were analyzed which have shown in different column figures (2-6). Samples collected from four districts have been given no. 1,2,3,4 respectively to Kota, Baran, Jhalawar, Bundi and samples taken as before, during and after immersion of Pratima are represented as series 1, series 2, series 3.

Figure :3 Ph

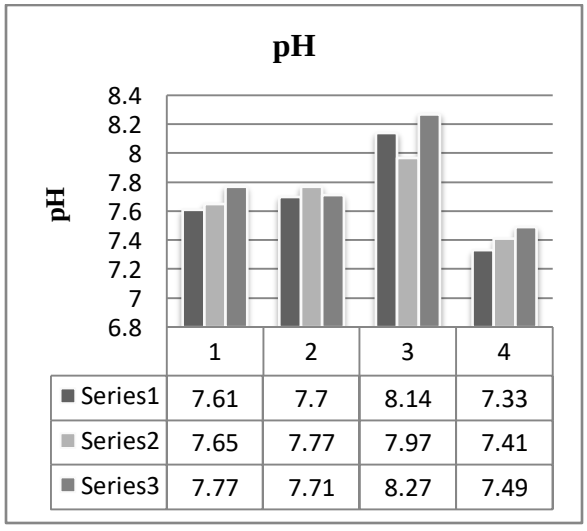

Figure :4Turbidity

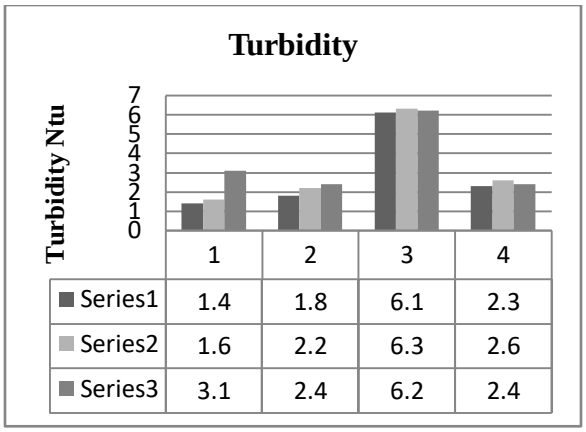

Figure :5 TDS

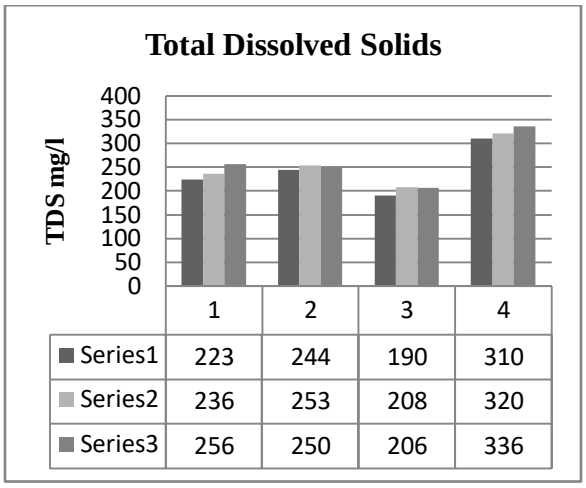

Figure:6 Conductivity

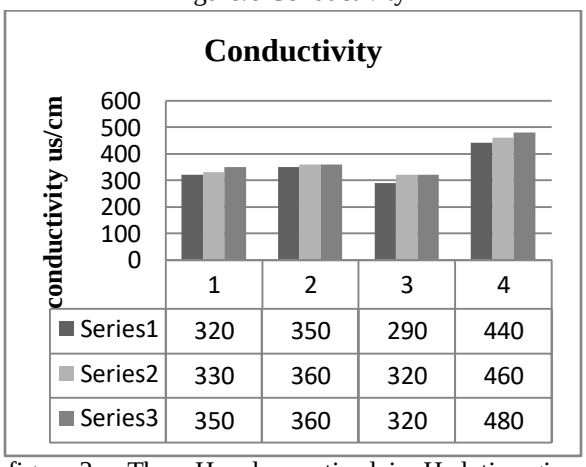

figure:3 - The pH value noticed in Hadoti region during study were in permissible limit and values varied from 7.33 to 8.27. The acceptable limit of pH value of drinking water is 6.5 to 8.5, so water of all locations is drinkable. Slight change recorded in pH value after immersion in Jhalawar. The pH value came down which shows that some acidic material

was added in water reservoir. While in other sample the pH increased.

figure:4 - Turbidity ranged from 1.4 to 6.3 NTU Turbidity is due to colloidal and extremely fine dispersion suspended matter such as clay. Particle dispersed due to solid waste disposal also contributes to turbidity. Least turbulence found in Kota while maximum value in Jhalawar, maximum variation after immersion found in Kota.

figure:5- The values of TDS were ranged 190 to 336 mg/L, the maximum value in Bundi showed that more particles dissolved in immersion of Devi statue. While the lowest value 190 mg/l in Jhalawar shows the less amount of dissolved particles in water reservoir due to immersion. Kota district showed the major variation in TDS after immersion of Holy Pratima.

figure:6- The conductivity of water observed between 290 to 480 ms/cm, the lowest recorded in Jhalawar and maximum found in Bundi district. The values of conductance do not affect water quality for drinking purpose. Maximum variation in conductivity also noticed in Bundi district.

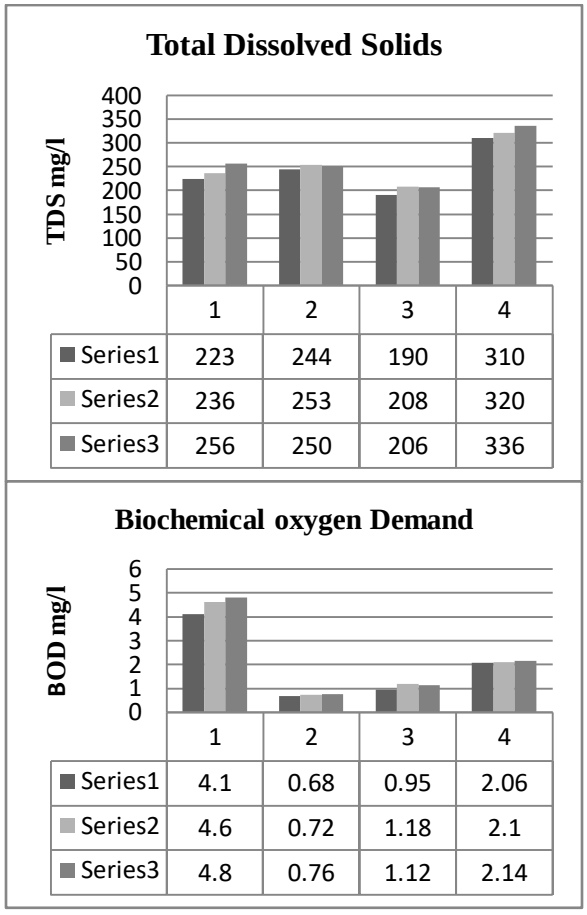

Figure:7Dissolved Oxygen Figure:8-BOD

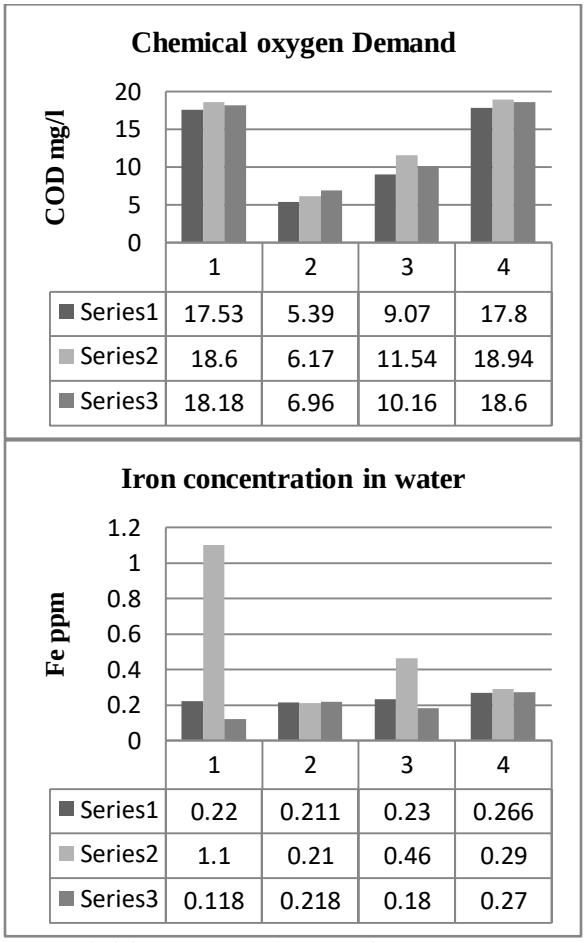

Figure:9 COD Figure:10 –Iron Concentration

figure:7- During the study the maximum value of DO in all region ranges between 3.54 to 5.18 mg/l. Comparative low DO indicates the mild pollution in water bodies due to waste generated by religious activities in water resources. The maximum value of DO 5.18 mg/l in Kota shows that this water is more suitable for aquatic life or fishes than other reservoir.

figure:8- Value of BOD which is the sign of Bio-oxidisable organic material, was found in the range of 0.68 to 4.8 mg/l. It is clear that water is slightly polluted with organic waste. The variation in BOD was found to be maximum in Kota.

figure:9- Chemical oxygen demand ranged from 5.39 to 18.94 mg/l. High values of COD at Bundi and Kota showed that water was contaminated with chemically oxidisable inorganic and organic matter. Maximum variation was found in Bundi.

figure:10- The concentration of heavy metals was found to increase due to immersion of Ganesh Pratima and the maximum variation noticed in Kota

where iron concentration increased to 1.10 ppm from .22 ppm. High level of iron in water of Kota shows the contamination of water body significantly.

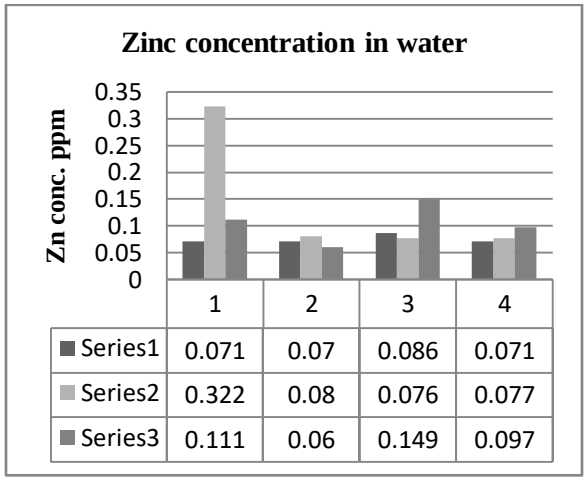

Figure:11- Concentration of Zinc

figure:11- Zinc contamination recorded between 0.06 to .322 ppm. Maximum was in Kota while lowest in Baran. Maximum variation noticed in water of Kota. The maximum value and variation in pH and turbidity (only value) noticed in the water of Jhalawar district. while maximum value and variation in conductivity, TDS and COD (DO variation) found in Bundi district. During the study, the maximum value of DO and BOD and Heavy metals recorded in Kota, while maximum variation in turbidity, heavy metals, BOD noticed in Kota.

CONCLUSION

The problems due to various religious activities by human to water resource in the region are many, acute and serious. Due to religious convictions and belief, people dump holy materials and flowers during the various festivals in to water bodies. This type of inoculations of various metals into water body introduces various types of hazardous diseases and many other problems to aquatic life and fishes. After idol immersion, the water bodies were polluted especially with heavy metals. It is worrisome because due to deterioration of potable water, this water resource is harmful for domestic and drinking purpose. The cumulative effect of this usage can be disastrous because many of these metals are poisonous. During the Hindu festive season, hundreds of idols of God and Goddess are immersed in the different water bodies. So, It is very important to keep eyes on various hazardous impurities in water and achieve the objective of integrated, efficient, environmentally and financially sustainable development and the management of the scarce water resources of the region and at the same time ensure optimal utilization of every drop of water, through water conservation, increased distribution efficiency and use of water saving devices and practices. The water sector would then be able to accelerate economic growth of the state. Even though some cities have now provided water tanks for Ganesh immersion, they still need to ensure that the water in these tanks is properly treated before it is put back into rivers or the sea. Plaster of Paris idols with chemical paints that get immersed into such tanks are collected and have to be disposed off in an eco-sensitive manner. Companies who specialize in water treatment should be invited to provide solutions to ensure that the water in these tanks does not pose a hazard. Actually no one can change the problem. Only awareness among the masses can reduce the pollution gradually.

REFERENCES

[1] Ap Singh,S.Kghosh and P Sharma,Water Resources Management,21,515(2007).
[2] A Quadir, R. N Malik and S.Z Husain, Environment Monitoring Assessment,140,1, (2007).
[3] A.J Horowitz,Iahs Special Publication, 4, 58(1995).
[4] Apha Standard Methods for Examination of Water and Waste Water, American Public Health Association, Washington D.C. (1998).
[5] Dhirendra Mohan Joshi Water Quality of River Ganga in Haridwar Et Al. 289 Vol.2, No.2 (2009), 285-292.
[6] D.R Khanna. Ecology and Pollution of Ganga River, Ashish Publishing House, Delhi, 1 (1993).
[7] D.K Todd, Groundwater Hydrology, 2nd Ed. John Wiley and Sons, New York .P-535. (1980).
[8] H.M. Raghunath. Groundwater, Wiley Eastern Ltd, Delhi India, 563 (1987).
[9] R.M Garalls,F.T Mackenzie and C Hunt, Global Environment,11,260,(19975).
[10] S.P Mathur, Naveneetmaheshwari .Water Quality and Environment in and Around Industrial City Kota.Journal of Environment

Protection Vol.20, 10 October 2008.Page.917-922.

[11] Vikas moadosiya, C.K Bohra, Study of Physic Chemical Parameters of Waste Water of Various Region of Bikaner City, Rajasthan. Journal Chemical, Biological and Physical Science. Sec B Vol.3, No.1 Page 588-592.