



Short Communication

Ganesh idol immersion: impact on water quality of Tapi River, Surat, Gujarat, India

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Abstract

India is a country of diverse cultural and religious festivals. Ganesh Chaturthi and Durga Puja are two major festivals involving idol immersion as ritual. The present study was carried out to assess the impact of idol immersion on water quality of Tapi river during Ganesh festival. Water samples were collected for pre-immersion, immersion and post-immersion periods during morning hours. Collected samples were analyzed for various Physico-chemical and analyzed microbiological parameters viz. pH, Temperature, Dissolved Oxygen, BOD, COD, total hardness, total solids, total dissolved solids and total Viable count. Significant changes in results of all selected parameters were noted after the immersion however within BIS standard limits. Observations indicate that efforts of public awareness campaigning attain good response and helped to reduce the impact of idol immersion on water quality and also reduce the resultant pressure on the ecology of the natural water bodies.

Keywords: Idol immersion, Tapi River, Physico-chemical properties, TVC, eco-friendly practices.

Introduction

India is a country of festivals where people enjoy cultural and traditional festival celebrations. Some of these involve 'idol immersion' in water as the celebration finale. Beautiful idols are immersed into water bodies like rivers, ponds and lakes with prayers for success, happiness and peace.

Two major festivals in India that involve idol immersion are - 'Ganesh Chaturthi', dedicated to Lord Ganesha and 'Durga Puja', dedicated to Maa Durga¹. These activities cause the water pollution and adversely affect the flora and fauna of balanced ecosystem.

The impact of idol immersion on water bodies has been studied by different groups of which causes an adverse effect on living beings of water bodies and on the ecosystem. N.C. Ujjania and Azhar A. Multani conducted the work to study the effect of Ganesh idol immersion on Tapi river water quality In 2011. They selected Ashwanikumar immersion point (Ovara) of the Tapi River as a study site and evaluate the physico-chemical parameters which conclude that pollution level was increased due to religious activities and causes adverse effects on ecosystem².

In 2010, Desai and Tank have done a research work to investigate the deterioration of water Quality of River Tapi at Surat and study revealed that such celebration rituals negatively affect the water quality of river³. Similar studies were carried out by various groups of researchers^{2,4,5} and the observations

state that the pollution load is increased significantly during idol immersion period.

For some years now we have been observing a growing awareness about the water pollution caused by the immersion of Ganesh idols made out of Plaster of Paris, in natural water bodies such as lakes, rivers and the sea⁶ and the appeal for maximum use of idols made up of clay and other eco-friendly materials is positively accepted by devotees.

The present study has been carried out to observe the impact of idol immersion on water quality of Tapi river and two sites namely Utran and Ashwanikumar ovara were select for the study.

Material and methods

To carry out this study, water samples were collected from the selected sites during morning hours at pre-immersion, immersion and post-immersion periods. Samples were analyzed for physico-chemical and microbiological parameters viz. pH, Temperature, Dissolved Oxygen, BOD, COD, Total Hardness, Total Solids, Total Dissolved Solids and TVC for bacterial count following the APHA(2005)⁷ and the standard methods of Trivedy and Goel (1986)⁸.

Results and discussion

Results of physico-chemical parameters and microbiological study are depicted in Table-1.

Table-1: Physico-chemical and microbiological analysis of water.

Parameter	Utran			Ashwanikumar		
	Pre-Immersion	During Immersion	Post-Immersion	Pre-Immersion	During Immersion	Post-Immersion
pH	7.93	7.1	8.1	7.96	7	8.3
Temperature (°C)	29.7	31.1	31.3	29.7	31.3	31.4
TS (mg/l)	440	560	520	480	640	620
TDS (mg/l)	320	400	340	360	440	350
Total Hardness (mg/l)	120	132	128	128	140	119
Calcium Hardness (mg/l)	58	88	69	67	99	76
Dissolve Oxygen (mg/l)	6.7	4.06	5.9	5.68	4.26	5.1
BOD (mg/l)	16	23.4	20.7	21.3	26.4	22.7
COD (mg/l)	49.37	81.63	61.57	74.06	102.44	89.53
Total Viable Count (CFU)	10.9×10 ⁵	19.3×10 ⁵	12.4×10 ⁵	12.5×10 ⁵	25.4×10 ⁵	13.9×10 ⁵

pH was found alkaline during the study period but decline was observed during immersion period i.e. from 7.93 and 7.96 to 7.1 and 7.0 respectively. Rise in temperature by 2°C was recorded after immersion which may be due to the chemical and biological reactions take place in water because of immersion of idols and other materials. Total Hardness is a very useful parameter in order to determine water quality. Hardness was recorded higher comparatively at both the sites. Concentrations of calcium and magnesium were noted increased which increases the hardness of water.

DO is the important factor for water quality and plays important role in survival of aquatic organisms. During pre-immersion and immersion periods, DO was varied between 6.7 to 4.06 mg/l and 5.68 to 4.26 mg/l at Utran and Ashwanikumar immersion sites respectively. Depletion in DO can be related with increased Biochemical Oxygen Demand and Chemical Oxygen Demand. Idol immersion activities suppose to increase the load of nutrients which may affect the microbial organisms as well as the organic matter which reduce the oxygen. Considerable changes in BOD and COD were noted after immersion.

The results of total viable count were recorded in term of Colony Forming Unit/ml (CFU/ml). Water samples collected after immersion showed the higher TVC i.e. 19.3×10⁵ and 25.4×10⁵ at Utran and Ashwanikumar sites respectively. Various food as 'Prasaad' and 'Nirmalya' materials immersed in water with idols may be responsible for Increased TVC as it increases the concentration of nutrients in water as soon as decomposition starts. Higher concentration of nutrients like Nitrate, Nitrite and Phosphate affects the bacterial population and increases

bacterial load⁹. Similar results were observed by Yanamadala¹⁰, where he stated that one possibility of decreasing bacteria populations in the water was decreased nutrient concentrations in the water.

Results obtained by Desai and Tank³ were shown much difference in the values of important parameters during pre-immersion and immersion periods. Total hardness, BOD, COD, and TDS were recorded 144 mg/l, 68.0 mg/l, 262.08 mg/l and 240 mg/l respectively during immersion period which indicates that water quality deteriorated in excess. That study was conducted during Ganesh festival-2009 when the number of idols immersed was near around 25000 idols.

Physico-chemical quality parameters of eight major ponds at the Varanasi city studied in the year 2012-13 was studied by Mishra, Singh and Tiwari¹¹ and experimental results suggested that nitrate (52 mg/L), BOD (2.5mg/L), TDS (2420 mg/L) and phosphate (7.5 mg/L) were very high as compared to the permissible limit of drinking and irrigation water quality standard (BIS, IS-10500, FAO).

During Ganesh festival-2016, near about 55,000 idols of different sizes were immersed in Tapi river from various ghats¹². Recorded results of present study show the significant changes in values of all the parameters, however they are lies within the desirable limits set by BIS, IS-10500 Standards. It was observed that the values of these parameters recorded higher during the immersion period were decreased slowly after immersion period may be because of self-purification mechanism of a water body or dilution of deteriorated water as

Tapi is a perennial river. Various eco-friendly practices for idol immersion carried out for last two-three years have played major role to spread awareness among people and become helpful to reduce the water quality deterioration because of idol immersion rituals. People become rigid when it comes to change the ancient rules and rituals which is right at some extinct. These eco-friendly practices like Idol of clay, paper, turmeric, betel nut etc., use of natural colours, appropriate management of 'Nirmalya', Distribution of Food items used as 'Prasad' among the poor, avoiding the use of non biodegradable material and many others will maintain the faith of devotees in rituals and will helpful to maintain the purity of natural resources at the same time.

Conclusion

Water quality deterioration of Tapi river as a result of idol immersion during Ganesh festival has been reduced in compare to past few years. Growing awareness about the water pollution caused by the immersion of Ganesh idols made using non-biodegradable materials in natural water bodies observed during last few years can be the reason for that. Various eco-friendly methods for immersion should be continued and use of them should be increased in order to reduce the negative impact of ritual activities on natural water bodies. Concentration of Nutrients affects bacterial load in the river thus it can be reduced by avoiding deposition of bio-degradable organic matter like food and flowers in river.

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