

Study on Water Quality of Temporary Ponds after Idol Immersion

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ABSTRACT: The idols immersion in natural water bodies is an important religious process at the culmination of festival celebrations. The religious significance attached to this traditional practice is that idol to be submerged in water bodies as a mark of respect to the deities. Idols are an image of a particular God which is used as a symbol of worship. After worshipping, these idols are immersed into holy flowing water bodies. Idols are constructed using various materials which damage water quality after immersion. Paints which are used to color these idols contain various toxic metals. These metals are carcinogenic. The materials of idols are frequently found floating on the water. The water quality parameters are deteriorated after decomposition of idol materials. The heavy metals concentrations are increased in water. Heavy metal pollution caused by idol immersion can damage the ecosystem. Several physico-chemical parameters were estimated using standard techniques. Most of the studies showed significant changes in the water quality parameters after immersion. The significant changes in physic-chemical properties of water revealed increased in all other parameters.

KEYWORDS: Ganga water, Idol immersion, semi-burnt Idol, Ganga sarovar, Pollution, Physicochemical parameters.

I.INTRODUCTION

Traditions and cultures are the main symbol of each county. India is a rich cultural country in which diverse cultural and religious festivals are organized throughout the year for reforming human duties, ethical values and enhancing eternal energy [1-2]. In Indian culture, various religious festivals are organized for development of ethical values and maintain humanities from generation to generation [3]. Idol is an image of a deity to which religious worship is addressed or any person or thing regarded with admiration, adoration or devotion and also a religious. Idols are a visual image of Gods/Goddesses which is used as an object of worship in personally and/or collective forms. It is an image of a god/Goddess which is used as an object of worship for maintaining concentration in devotees. In India, idols are worshipped with all rituals on various occasions in a particular month of the year. After worship, these idols are immersed into flowing water bodies. The physico-chemical and biological characteristics of natural water bodies were reported by several researchers [4-7]. Idol immersion activities in water bodies are adding to the pollution load. Non-biodegradable materials and synthetic paints used for making these deities are serious threat to aquatic life and environment.

In present case study, the effects of idol immersion were performed in temporary pond named as Ganga Sarovar-I and II constructed by district administration after completion of all rituals process (Figs 1-3).



Fig. 1: Performing Idol immersion in Ganga Sarovar after initiated rituals by Administrative authority and Saints (sadhoo/sant)



Fig. 2: Idol immersed in Ganga Sarovar-I after completion of ritual



Fig. 3: Idol immersed in Ganga Sarovar- I and II and idols material left in pond

II.EXPERIMENTAL PROCEDURE

The experimental sites are situated on holy Ganga river bank, Varanasi, India. These sites are located at the convex of Ganga bank area in the south north of Varanasi (25° 18' N latitude, 83° 01' E longitude and 76.19 m above the mean sea level).It is situated in the eastern Gangetic plains of India (Figure4).

Present study was carried out in the simulated conditions to find out the impact of different idols on temporary pond water. The water sample was collected from Ganga Sarovar-I after 60 days and from Ganga sarovar II after 30 days. The contaminated pond water samples were also collected for investigation of physico-chemical parameters of pond water. Collected water samples were taken out for analysis of physicochemical parameters such as pH, Alkalinity, Total Hardness (TH), Total Dissolved Solids (TDS), Total Dissolve Solids (TDS), Dissolved Oxygen (DO), Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD)test as per the standard procedure of APHA, (2005). Microbial population was studied using standard biological techniques.

III.RESULTS AND DISCUSSION

The case study was focused on assessment physico-chemical characteristics of the Ganga Sarovar-I and II water. The study revealed that idol immersion activity has negative impact on pond water quality.

A.EFFECT OF IDOL IMMERSION ON PHYSICO-CHEMICAL PARAMETERS

Except DO, all other physico-chemical parameters show increase in their concentration after 60 days of idol immersion in stagnant Ganga Sarovar-I and II water. The results of present investigations are shown in Table 1.

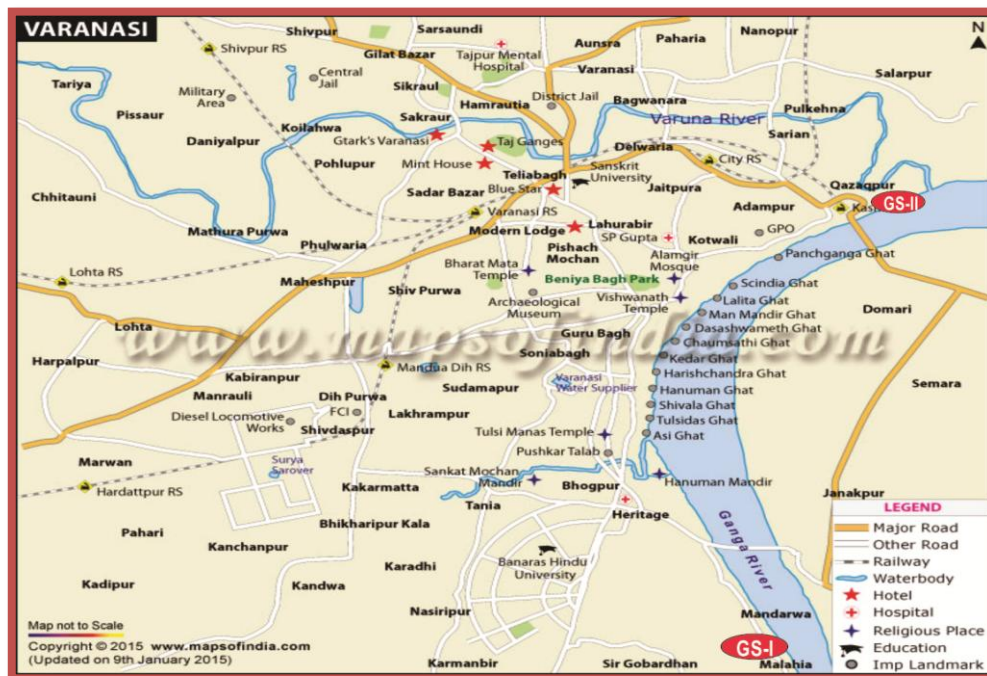


Fig. 4: Site map. Ganga Sarovar-I (GS-I) and Ganga Sarovar-II (GS-II)

The pH of stagnant Ganga Sarovar-I and II water is important. The pH of water is a major factor because many chemical reactions and microbial activities are governed by it [8]. The pH range varied from 4.7 to 5.9 for temporary pond water. The minimum (6.8) was observed on immersion while pH 4.7 was observed during immersion period of idols in pond water (Table 1).

The dissolved oxygen plays an important role to measure the quality of water. There was no change observed in DO during the investigation period; the variation was found in stagnant Ganga Sarovar-I and II water (Table 1). Dissolved oxygen is reduced by the biological decay of organic material such as decaying paints and idol-making materials.

Biochemical oxygen demand is the amount of oxygen required by microorganisms for decomposition of organic matter in the water. BOD gives an idea about the quantity of biodegradable organic substances present in water. The higher BOD values indicate the presence of various biodegradable organic matters. In the present study, maximum BOD value was observed during immersion period (Table 1) due to increased amount of decomposition of organic matter of idols into the Ganga Sarovar-I and Ganga Sarovar-II.

COD is the capacity of water to consume oxygen during the decomposition of organic matter. It helps to indicate the pollution status of water body. The values of COD were found to vary from Ganga Sarovar-I to Ganga Sarovar-II water respectively (Table 1). COD of Ganga Sarovar I water increased with increasing incubation period, which was possibly due to decomposition of the immersed idol materials [9].

TDS is directly related to the purity and quality of water. As represented in the Table 1, the total dissolved solid value of Ganga Sarovar-I and Ganga Sarovar-II increased with increasing incubation period. The total dissolved solid values were found to increase significantly due to dissolution of idols coloring materials and different days of incubation. Presence of suspended solids in water transparency is an impotent index of eutrophication. Huge quantities of inorganic and organic materials were added to the Ganga Sarovar-I and Ganga Sarovar-II after 40 days of idol immersion which contribute much in increasing TSS. High turbidity creates damage to aquatic microbial community. Present investigation showed that TSS, turbidity and bad smelling increased or transparency of pond water decreased up to its black appearance after few day idol immersion (Table 1) due to addition of different colouring materials of idols [10-11].

Hardness is an important factor for detecting water quality. In the present investigation, the maximum hardness recorded in Ganga Sarovar-II in compared to Ganga Sarovar-I and flowing Ganga water after 40 days idol immersion (Table 1). High value of total hardness during immersion was observed by different researchers [12-14].

The results obtained by present study indicated that concentration of all anions such as nitrate, phosphate, sulphate and chloride are increased in Ganga Sarovar-I and Ganga Sarovar-II due to microbial attack on idols materials (Table 1).

Table 1- Water quality parameters of pond water

| S. No | Parameters | Ganga Sarovar-I (after 60 days) | Ganga Sarovar-II (after 30 days) |
|-------|--------------------------------|------------------------------------|-------------------------------------|
| 1 | pH | 4.6 | 5.1 |
| 2 | DO (mg/L) | 0.22 | 1.3 |
| 3 | BOD(mg/L) | 32.7 | 20.4 |
| 4 | COD (mg/L)D | 97.8 | 73.4 |
| 5 | TH(mg/L) | 319.7 | 289.8 |
| 6 | TA (mg/L) | 387.4 | 302.3 |
| 7 | TDS(mg/L) | 976.4 | 937.2 |
| 8 | TSS (mg/L) | 3820.6 | 2472.7 |
| 9 | NO ₃ ⁻ | 98.3 | 83.6 |
| 10 | PO ₄ ³⁻ | 0.96 | 0.76 |
| 11 | SO ₄ ²⁻ | 189.7 | 121.3 |
| 12 | Cl ⁻ | 57.7 | 63.2 |
| 13 | TMP (cfu/mlx10 ⁻⁴) | 9.7 | 7.4 |
| 14 | Smell/appearance | Very Bad/Black | Very Bad/Black |

Conventional dilution plate count method for microorganism on semi-synthetic medium resulted in a mixed population [15]. These microbial groups were growing in oxygen and nutrients rich pond water after idol immersion. The microbial population was enumerated and given in Table 1. Results indicated higher microbial load in Ganga Sarovar-I and Ganga Sarovar-II due to large number of idols immersion.

B. IDOL IMMERSION AND WATER QUALITY

The immersion of idols in artificial ponds particularly developed for this purpose by administration are dangerous due to high growth of microbial populations and their attack on idols making organic, inorganic and polymeric materials because idol making material are good nutrient source for microorganism. After that many toxic intermediates and metal ions are also produced in stagnant pond water. Enamel paint based modern process of making idols have major issue of toxicity and its bad impact on the environment and is not accepted by traditional Indian mythology.

IV. CONCLUSIONS

The major findings of the both scientific and ethical observation revealed that the water quality of temporary pond degrades. The higher concentration of parameters studied is probably due to heavy pollution load after the idol immersions, resulting in the deterioration of the Ganga Sarovar-I and II water which creates major cause of holy Ganga river pollution.



ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 3, Issue 1 , January 2016

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