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Original Research Paper

Evaluation of Dissolved Oxygen and Biochemical Oxygen Demand in *Ex Situ* Ganesh Idol Immersion

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Immersion of idol
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ABSTRACT

In order to quantify the effect of religious activity in water pollution, *an ex situ* study for Ganesh idol immersion has been carried out and dissolved oxygen (DO) and biochemical oxygen demand (BOD) were evaluated. The results showed an adverse impact on the water quality of the micro-environment of the idol immersion. The present investigation highlights the importance of analysis of the samples from water columns in the micro-environment of the idols after immersion and not the surface waters where the echelon of the effect gets diluted.

INTRODUCTION

Festivals are moments of great joy and celebration in India and people show their faith in unique ways. Every religious activity, with each passing year, becomes more cumbersome, the celebrations being on a grandiose scale. Many, either simple rituals or other complex ones, bracket together with water in one or the other way. Ganesh festival in India is one such activity rejoiced on a large scale. The celebration of this festival in late August or early September as Ganesh Chaturthi according to Indian calendar is in the States of Maharashtra, Tamil Nadu, Karnataka and Andhra Pradesh and many other parts of India. Idols of Lord Ganesha are worshipped in people's homes and on a large scale at public places for ten days, and on the last day, immersed in water as a custom (Athawale & Athawale 2006). Millions of idols are immersed each year since ancient time in different lotic and lentic water bodies such as lakes, reservoirs and rivers of India (Vikram Reddy & Vijay Kumar 2001).

Immersion of idols of the gods and goddesses is a part of religious ceremony of the Hindu religion. In Hindu philosophy, the idols are temporary structures where the souls of the gods and goddesses are brought in through the religious rites. After the ceremony is over, the idols which are simply clay structures, are required to do away with by immersing in water bodies. Idol immersion is, therefore, not just waste disposal but a philosophical exercise in realizing the temporariness of the material world. Immersion of the idols has posed an environmental problem. The idols along with other worshipping auxiliaries are immersed in the water bodies. It is obvious that any disposal of some amount of earth, straw, paints, decorative items, fruits, etc. have the potential to have short and long term impact on water quality (Geesen 2006).

Many workers have reckoned the water quality after this religious activity related with immersing the idols into waters (Tamot et al. 1991, Jain 1999, Dhote et al. 2001, Vikram Reddy & Vijay Kumar 2001 Patil & Dongare 2006). The effect of idol immersion has been analysed for surface waters or to a finite depth. No worker was able to analyse the effect of the activity at the level where

the idol rests after the custom which is more important than the analysis of surface waters, but this is impracticable due to variable depth of lakes and rivers. The present investigation is designed to appraise the exact impact of idols on the water column within the environs of idol after immersion through the *ex situ* studies and to carve up its influence from other sources of water pollution.

MATERIALS AND METHODS

Four glass tanks with top side open, each having dimensions as width, height and depth of 30, 45 and 30 centimetres respectively, were taken and filled with equal volume of water (Fig. 1). Three idols of same size and nearly equal weight (573±14 g) but different materials like shadoo (clay), plaster of Paris and fibre (plastic) were immersed in three different glass tanks. Control was maintained throughout the experiment without any idol. The water from each glass tank was sampled and analysed per week for dissolved oxygen and biochemical oxygen demand following the methods of APHA (1980).

RESULTS AND DISCUSSION

The results obtained during the study are shown in Fig. 2. Dissolved oxygen is one of the most important parameters in water quality assessment and reflects the physical and biological processes prevailing in water. The control tank did not show any significant changes in the levels of DO varying from 6.84 to 6.19 mg/L. The decrease in DO of tank with plaster of Paris is more significant while

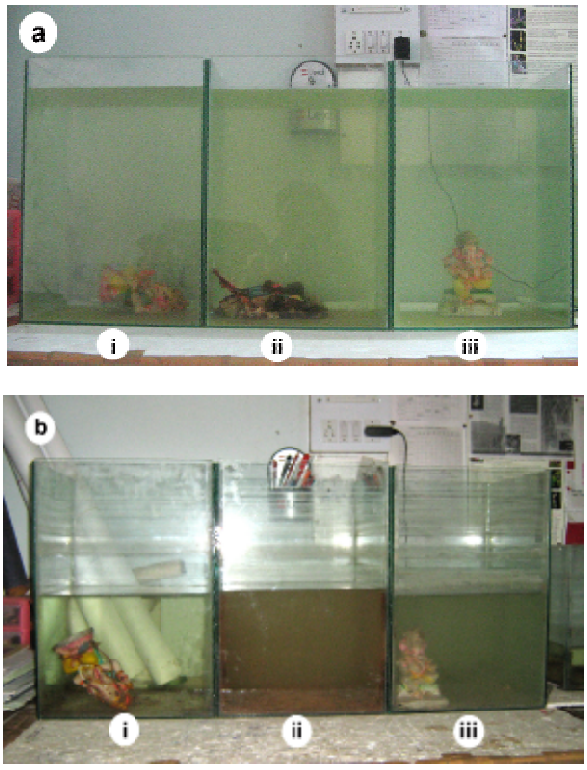

Fig. 1: (a) experimental setup, (b) situation after 5 weeks. (i) Fibre idol, (ii) shadoo idol, (iii) plaster of Paris idol.

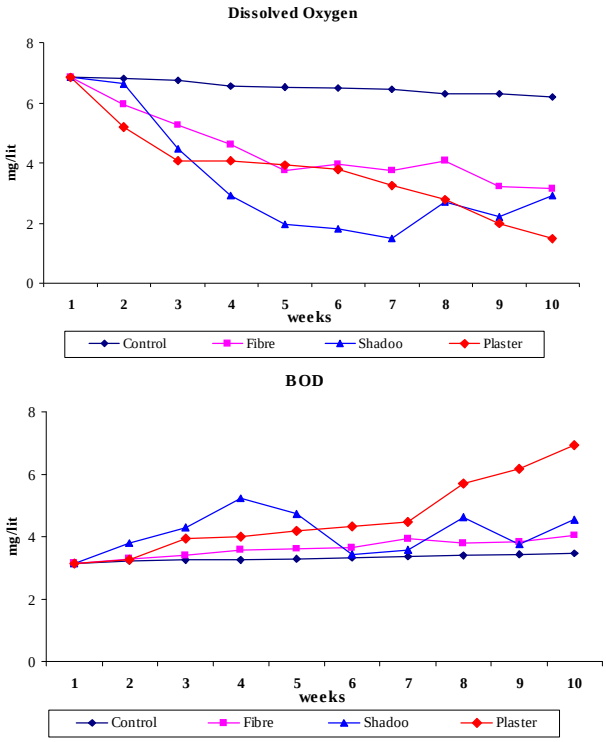

Fig. 2: Evaluation of dissolved oxygen and BOD in *ex situ* Ganesh idol immersion.

tank with fibre idol showed very less changes after sudden drop to 3.73 mg/L. A sudden decrease in DO level of shadoo idol was observed from second week to fifth week. The dissolved oxygen was constant up to seventh week followed by slight increase in last three weeks. The dissolved oxygen decreased during Ganesh idol immersion in the lakes of Bangalore city of Karnataka (CPCB Annual Report 1999-2000) and Kolhapur city of Maharashtra (Patil & Dongare 2006) in India.

Very slight variations in BOD in control tank were recorded (3.12 to 3.47 mg/L). The tank with fibre idol showed BOD values ranging between 3.12 and 4.02 mg/L. The water samples in the shadoo idol tank showed a marked increase in BOD from 3.12 mg/L in first week to 5.21 mg/L in fourth week and dropped to 3.42 mg/L. Increase to about 4.63 mg/L was again seen in the eighth week. These fluctuations might be due to dismantling of the shadoo idol after first week and mixing of all the particulates and colours in water. Gradual increase in the BOD was noted in the samples from water tank with plaster of Paris idol from 3.12 mg/L to 6.92 mg/L in ten weeks. This sudden increase may be due to the harmful chemicals used in colours used for plaster of Paris idols.

CONCLUSIONS

A gradual decrease in dissolved oxygen coupled with eventual increase in BOD with every idol was observed which clearly indicates that the health of water is damaged with each idol. The decrease in the dissolved oxygen of tank with plaster of Paris idol is more while tank with fibre idol showed very less changes after initial sudden drop. The decreased levels of dissolved oxygen are harmful to the

aquatic ecosystems which in turn collapses turning into dead zone at a particular lower level.

Freshwater is a limited and vital resource to the living world. Insufficient quantity and quality of freshwater will not support sustainable development of community. The adverse effect of religious activities like idol immersion, mattresses washing before dashehara, mass bathing after or before the visit to the god as a custom or in Kumbh-melas, definitely harm the quality of freshwaters.

The religious customs will not stop even after the showcase of extent of damage to ecosystems and environment. These can be minimized by creating awareness among the society to avoid the immersion of idols in natural water bodies and continue their custom using artificial tanks made specially for it.

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