



SCENARIO OF PHYSICOCHEMICAL STATUS OF RAMALA LAKE, CHANDRAPUR (MAHARASHTRA) BEFORE AND AFTER GANPATI VISARJAN

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ABSTRACT:

The annual rituals of immersion of idols of lord Ganesha is celebrated by millions of Hindus. Besides river, small water bodies like lakes and ponds in the city are utilized for this purpose,. Quality of the water in closed water body such as lake get more effected due to immersion of idols painted with toxic dyes, which in turn effect flora and fauna of water body.

The present study revealed the impact of idol immersion and concerned anthropogenic activities on the physico-chemical characteristics of Ramala lake. Near about 12 physico-chemical parameters were studied before and after visarjan, during the period from August 2016 to September 2016. The water samples were analysed immediately following the standard analytic methods (APHA2005).

Keywords: - Ramala, Physicochemical status, Idol immersion, Lake, Anthropogenic activities.

INTRODUCTION :

Water is one of the important and abundant compounds of ecosystem. All living organisms need water for their survival. Earth is the only planet having 7% of water. But due to increased human population, industrialization, urbanization and various anthropogenic activities, water has become highly polluted.

Physicochemical and biological properties of water are affected due to water pollution. As it affects the living creatures, pollution has become a threat to aquatic ecosystem.

Surface water usually have some degree of contamination due to various routine activities. It increases due to religious activities such as idol immersion

While celebrating the festivals like Ganeshotsav, Durga Pooja, people generally ignore environmental impact of pollution of air, water, noise caused by various activities performed during it.

Ganesh chaturthi, which is marked by the birthday of lord Ganesh is celebrated throughout the country, specially in Maharashtra Ganesh idols of various sizes and decorated with beautiful atoms are worshiped on this occasion. Traditionally, the idols made of clay and shadu and coloured with natural colours were used to worship . Nowadays, plaster of paris (POP) , chemical paints and plastic as well as thermocol are used for preparation and decoration of idols Idols made up of plaster of Paris (POP) take several months to dissolve completely in water. Along with idols people dump other accessories like Thermocol, plastics etc. Also, the colors used in decoration of idols contain harmful chemicals containing heavy metals such as lead, mercury which leaks into water when idols are immersed in such water bodies It increases acid content, TDS (Total dissolved solids) and heavy metal in water. It kills aquatic flora and fauna.

Therefore it is very essential to evaluate physico-chemical parameters.

Ramala lake, running along the north the north east section of city wall, was built up by Gond king of Chandrapur in fifteenth century previously the lake was spread over in 158 acres area which is now reduced to 33 acres. As the lake is situated in the heart of Chandrapur city, and the only perennial water body, it is used for idol immersion in huge proportion. This study was undertaken to reveal the extent of pollution due to idol immersion in lake. To fulfill the objective, essential physico-chemical parameters of lake water were analysed before and after idol immersion.

MATERIAL AND METHODS:-

For this two sampling stations were selected where particularly the process of idol immersion takes place.

Sampling station I: this spot is located on the south-west embankment, having huge banyan tree and used for idol immersion

Sampling station II: Mahadeo Mandir spot which is used for idol immersion as it is convenient for this process. Samples were collected from these two stations three days before idol immersion and during idol immersion on three successive days.

Study period which was selected for this research was from 20th August 2016 to 5th September 2016 as the idol immersion took place within this period. Samples were subjected to physicochemical analysis including pH, temperature, turbidity, dissolved oxygen, total calcium, total hardness, magnesium hardness, alkalinity, biological and chemical oxygen demand. Analysis was conducted in the zoology Post Graduate department Zoology laboratory of Sardar Patel College, Chandrapur using standard methods given by APHA (2005) and Trivedi and Goyal (1986)

RESULT AND DISCUSSION:

Idols which are made of plaster of paris (POP) or clay and painted with toxic colours, when immersed in water body, result in its siltation and contamination in various ways. On immersion of these idols in the reservoir, the water gets contaminated with various heavy metals present in the paints of idols and a change in chemical load in the water body is expected Dhamji and Jain (1995) and Hosetti et.al (1994)

Khanna and Bhutiani (2003) observed variations in ecological status of Sitapur pond at Haridwar.

pH : Hydrogen ion concentration is considered as an important ecological factor, which is affected by addition of organic substances and materials used in idol preparation. Nearly neutral pH of water is regulated by carbon dioxide and bicarbonates (HUTCHINSON G.E) pH was found slightly alkaline during study period. Addition of organic matters during idol immersion affect the pH of water body.

Temperature—Temperature is one of the most important ecological factors which affects plants and animals. In the present study, water temperature was found to be 28°C and 30°C at the two sampling stations which was somewhat increased than the water temperature before Visarjan.

Turbidity – Turbidity in water is caused by suspended matter such as clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, planktons and other microscopic constituents. Turbidity interferes in self-purification of water by reducing photosynthetic activity of aquatic plants.

Before Ganesh Visarjan in Ramala lake value of turbidity was in the range of 15 NTU to 20 NTU. After Visarjan turbidity showed increased value i.e. in the range 30 NTU to 38 NTU.

Total hardness - Total hardness in water is the sum of concentration of alkaline earth metal

cations such Ca^{++} Mg^{++} . Before Visarjan the value of total hardness was found 145 mg/L and 182 mg/L whereas after Visarjan the values showed much more difference. Total hardness was found high during immersion period as reported by Malik et. al (2012) , Gadhia et.al (2014)

Calcium Hardness- The acceptable limit of Calcium hardness is 75 mg/L/ (According to BIS and WHO). Carbonate contents in water are present mainly in association with calcium and magnesium. Before Ganesh Visarjan, the calcium hardness varied from 40 mg/L to 43 mg/L at sampling station I and at sampling station II was 40 mg/L to 44 mg/L. These values shifted to 48.33 mg/L and 58.81 mg/L after Visarjan respectively. Similar findings were observed by Bhattacharya et-al (2014 and Giripunje (2014)

Total Alkalinity – Bicarbonate alkalinity together with carbonate alkalinity is called as total alkalinity. It is mainly due to Calcium, Magnesium, Sodium and potassium. Water samples from both the stations showed higher alkalinity after Ganesh Visarjan; Ujjania N.C and Multani A.A Malik G.M et.al also reported the same finding.

Chloride – Chloride is one of the major inorganic anion of water. High chloride concentration indicated pollution due to organic wastes. Both the sampling sites showed high values of chloride after idol immersion.

Total dissolved solids (TDS)-TDS refers to suspended matters dissolved in water. It may affect quality of water in various ways. Before Ganesh Visarjan in lake .TDS values of sample from station I and station II was found to be 375 mg/L and 325mg/L whereas after Visarjan the samples from the same stations showed surprising increase in the readings.

Dissolved oxygen – Dissolved oxygen is one of the important factors of water quality, which influences the flora and fauna.The influx of anthropogenic discharges containing oxidization

organic matter and certain pollutants consume more DO thereby degrading the ecological quality (Pena et-al 2010)

The declined values of dissolved oxygen after Ganesh Visarjan clearly indicate its effect. It was also related to rise in the temperature as proved by Malik G.M et.al.

Free CO₂ – Free carbon dioxide is added in the water from microbial activity which is an important factor for algal growth. Free CO₂ value was found to increase during idol immersion.

Biochemical oxygen demand(BOD)

BOD is the amount of oxygen required for biochemical oxidization of organic matter by aerobic bacteria which in turn decline the concentration of DO in water leading to inability for fish and other aquatic organisms to survive (Waziri and Ogugbuaja,2010 and Agrawal and Saxena,2011)

Biological oxygen demand is a direct measure of oxygen requirement and indirect measure of biodegradable organic matter. It is an important parameter for water quality. The increased value of BOD was again due to idol immersion. Similar findings were observed by Jadhav P and Dongare M.

Chemical oxygen demand (COD)

High values of COD indicate pollution due to inflow of several chemical components such as paints, oli, grease etc. Addition of decorative materials, worship components during idol immersion result in increased COD level in present water body

The highest value of COD in lake water is due to the increased concentration of oxygen demanding pollutants. In summer at high temperature the living plankton require more oxidized organic matter (Mathur S.P. Maheshwary Navneet, 2006).

The COD values observed maximum during idol immersion. Similar findings were observed by Vyas, A and Bajpeyi, A. Dhote.S et.al.

CONCLUSION:

The present investigation was undertaken to show effect of idol immersion on physicochemical status of water of Ramala lake. Results clearly proved that idol immersion has negative impact on physicochemical and eventually biological status of water, as these are correlated with each other.

Water quality was deteriorated too much during idol immersion. The idols made up of POP and painted with toxic colour exert pollution burden on lake water. Religious activities cannot be prohibited completely but essential steps should be taken to minimize the pollution of waterbody. Instead of using plaster of paris (POP) idols can be made up of clay or mud (shadu) and painted with natural colour. Decorative material such as thermacol or plastic should be separated before immersion.

Public awareness is needed to control the pollution and degradation of water bodies. Some unique and creative methods should be adapted to make eco-friendly idols with natural colors etc. which will help to solve this problem up to some extent. Nowadays, one of the NGOs of Chandrapur city, Eco-pro, along with the team of students of Sardar Patel College, Chandrapur is taking many efforts for this issue. Let us hope for good.

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