

Assessment of Mass Bathing on River Water Quality During Simhastha Mahakumbh Mela 2016 in Ujjain, Madhya Pradesh India

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Abstract

The primary aim of the study was to assess few impacts on River water quality of Mass gathering and taking a holy dip during Maha Kumbhmela from 22 april 2016 to 21 may 2016 in Ujjain City and to make a comparison of few parameter to standard Stipulated by Central Pollution control Board (CPCB), New Delhi during the Mela Days. River water samples were collected from four sites Mangalnath Ghat, Triveni Ghat, Lalpul Ghat, and Narsingh Ghat and were analysis for a few Chemical and biological Parameters such as BOD and pH. During the Mass Bathing two ghats were found to be more affected than the other two ghats. These were noted to Mangalnath and Narsingh ghat in Ujjain during Mahakumbh at these sites parameter are observed to be more polluted in comparison to other two sites Lalpul ghat and triveni ghat. The water quality was reported to be of very bad status. As per Central pollution control board (CPCB) norms water was found to be of D class and was not fit for drinking, bathing. Several cases of water born diseases like typhoid, skin, eye, ear, and urinary tract infections were reported from local and nearby city hospitals immediately after mass bath especially in summer.

Keywords- Mass bathing, Water Quality, Chemical and Biological parameters, Kshipra River

I. INTRODUCTION

Water Is the most precise thing in the world, which we cannot live without. Water is super abundant on the planet as a whole, but fresh potable water is not always available at the right time or the right place for Human or ecosystem use. The water being an important part of environment occurs as solid, liquid and gas forms on the earth. As a liquid, it forms hydrosphere, which covers approximately three-fourth of the earth's surface. About 97% of the total available water on earth Is saline, and hardly 3% is fresh. A small portion of the fresh water fulfills the fresh water requirements of Human beings. River plays a significant role in fulfilling the fresh water requirements in the world. The most basic effect of water pollution is directly suffered by the organisms and vegetation that survive in water, including Amphibians. On a human level, several people die each day due to consumption of polluted and infected water.

India is a secular country so there many festivals celebrated like Deepawali, Dussahra, Eid etc except these festival some other festival which is celebrated enthusiastically, KUMBH MAHOTSAV is one of them. It is mass gathering of hindus along the banks of holy river in india. It is held by turn in four different cities of India i.e. Haridwar, Nasik, Allahabad and Ujjain. The Venue depends on the position of the stars and planets. It is held every third year at the one of four venues by rotation. Our study place Ujjain Kumbh is celebrated when Jupiter ascends into sun sign leo's quarter or the "Simhastha". It is believed that, a holy bath in sacred river during simhastha mela has purifying effects. For this reason, hindu religion follower believes that simhastha mela is the most auspicious place in the universe to take a holy bath. Armed with this faith pilgrims attend the kumbh mela and bath in the Kshipra in a mood of solemn reverence. Around 80 millions pilgrims were collected in Ujjain for dip in kshipra River during Simhastha Kumbh.

The present study is carry at two locations of Ujjain. Ujjain is a city in the state of Madhya Pradesh, India. It is located in the west central part of india, and in the north of the upper limit of the Vindhya mountain range. It is situated at 23°10' N latitude and 75°46'8"E longitude at a distance of 201 kms from the state capital Bhopal and on the river bank of Shipra which falls into nearby flowing Chambal. The city has an average elevation of 494 meters (1620 feet).

II. LITERATURE REVIEW

- 1) Nayak et. Al., (2014), studied physico-chemical parameter and biological parameter were collecting samples and after analysis of this samples they have compared with pre sagarmela(non-bathing time). The physico-chemical parameter of water like dissolved oxygen (D0), Bio-chemical Oxygen Demand (BOD), pH. In comparison to pre sagarmela, higher bacterial load was recorded during sagarmela.
- 2) Bhutiani and Tyagi (2012) studied water quality of Ganga River during Maha Kumbh-2010. Water samples were collected from five different sites and analyzed various physico-chemical and microbiological parameters. It has been seen that all

parameter tested were within the permissible limit according to WHO (2009) and BIS (2004). But it was seen that two sites were more affected than remaining three i.e. Har-ki-pauri and Mayapurghat at haridwar.

A. Material & Method

Method and material used in the present study were further divided into following parts.

1) Site Description

River kshipra originate from a hill of Vindhya Range one mile south of kshipra village lying 12 km south east of indore city (M.P.). Depending on the religious importance and pilgrims pressure four sites (ghats) of the river kshipra, were selected for the present study namely Mangalnath ghat, Triveni ghat, Lalpul ghat and Narsingh ghat. Distance of these following Ghats from Railway station Ujjain are 6 km, 7.5 km, 5.5 km and 4 km respectively.

2) Sampling Procedure

For collection of water sterilized bottles was used. Bottles were washed thoroughly and rinsed with distilled water, for microbial analysis each dry bottle was rinsed with 0.5ml sodium Thiosulphate (10% solution). Water samples were collected from a depth of 30-40 cm by lowering pre-cleaned plastic bottles into the river. Water collected in the air tight bottles was takes to the laboratory for further analysis.

The parameters analyzed during study including physico-chemical characteristics are BOD and pH.

- 1) pH- Assessment of this parameter was made using electronic pH meter.
- 2) Biochemical Oxygen Demand – BOD is a measure of the amount of oxygen used by biological and chemical processes in a stream of water over a 5-day. BOD is calculated by measuring the oxygen level of the water on collection and then 5 days after storage in the dark at a constant temperature of 20°C. The difference between DO and BOD is the demand or consumption of oxygen by chemical and biological process. The BOD is measured in milligram per liter of water. Unpolluted and natural water should have a 3 mg/l or less.

III. RESULT

The comparison of individual parameter for all the ghats have been done during the Simhastha Kumbh Mahatshov 2016 in Ujjain city the mela days in graph 1 to 6 to show the variation BOD and pH respectively.

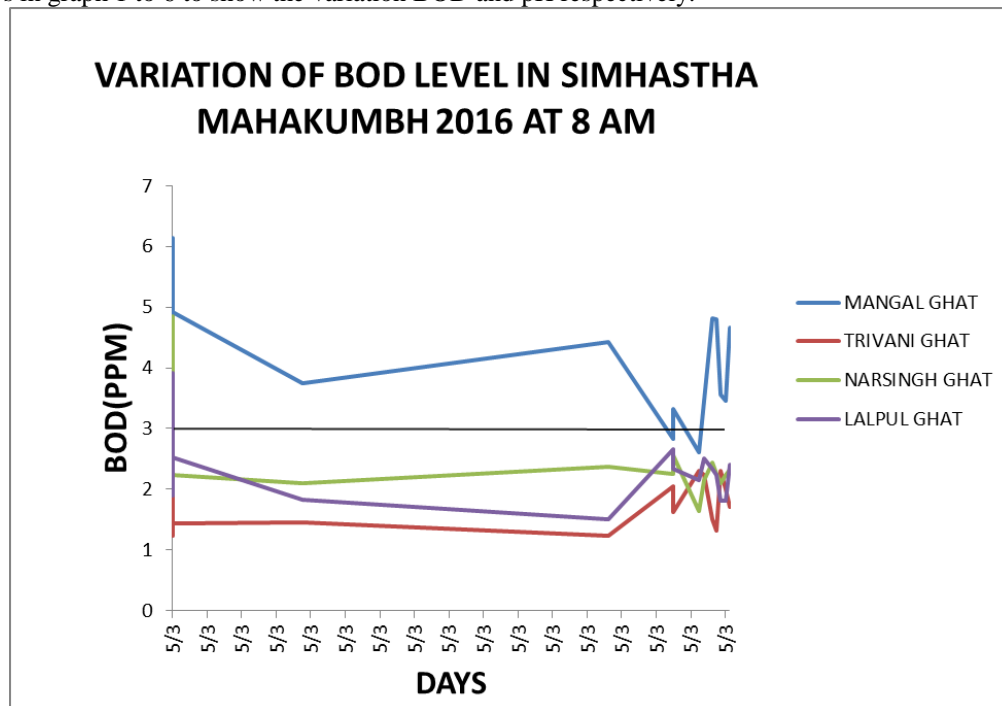


Fig. 1: BOD variations (22 april to 21 may)

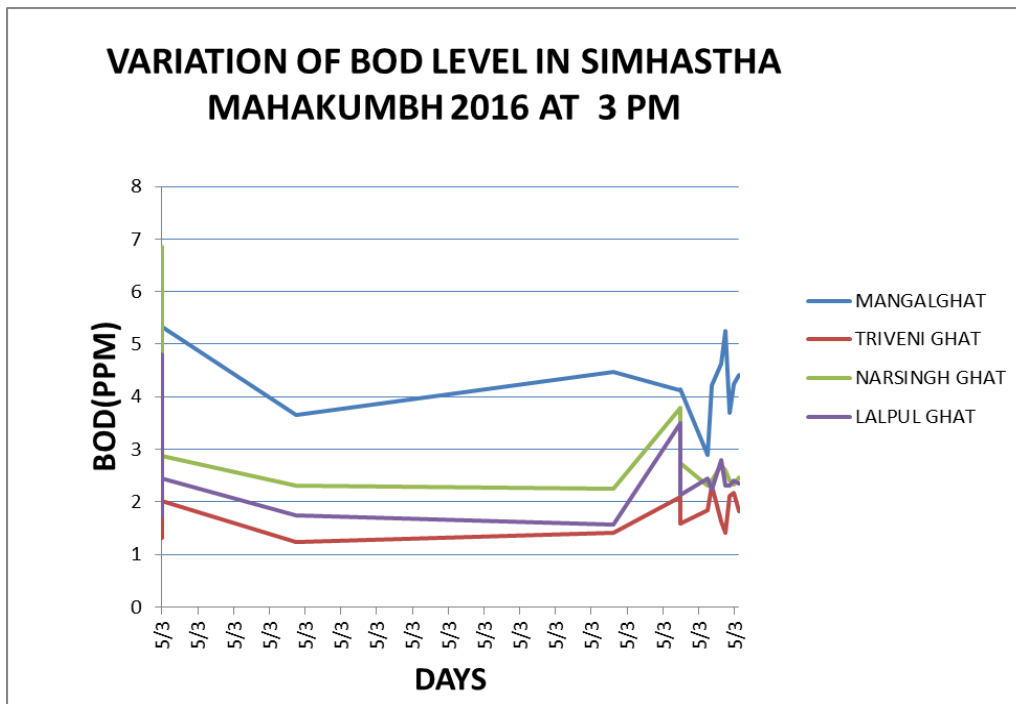


Fig. 2: BOD variations (22 april to 21 may)

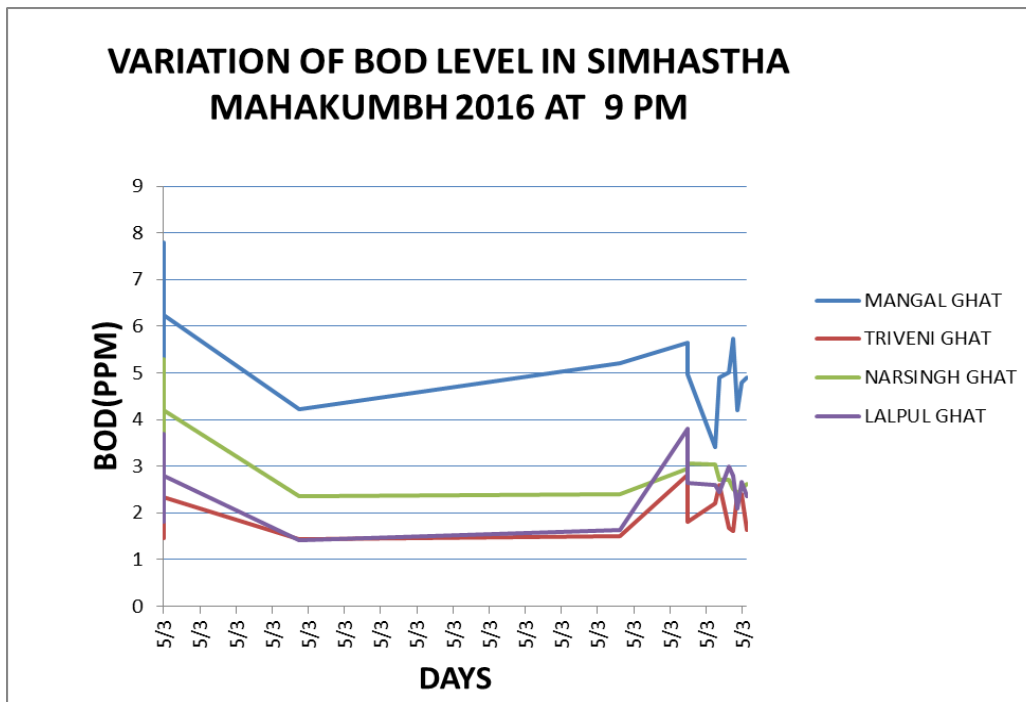


Fig. 3: BOD variations (22 april to 21 may)

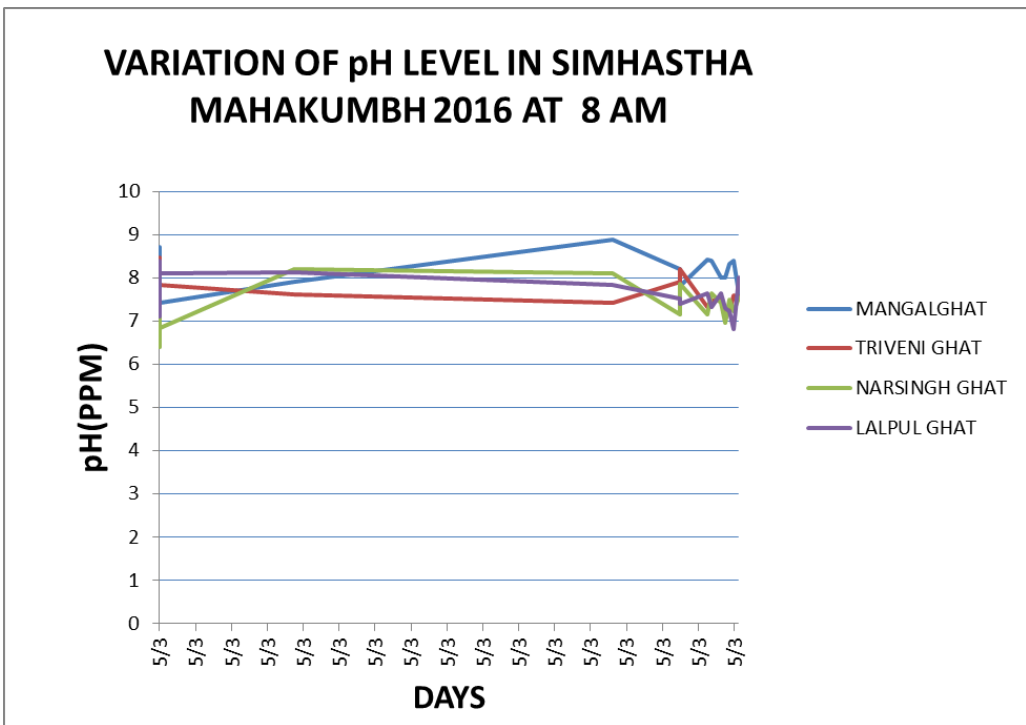


Fig. 4: pH variations (22 april to 21 may)

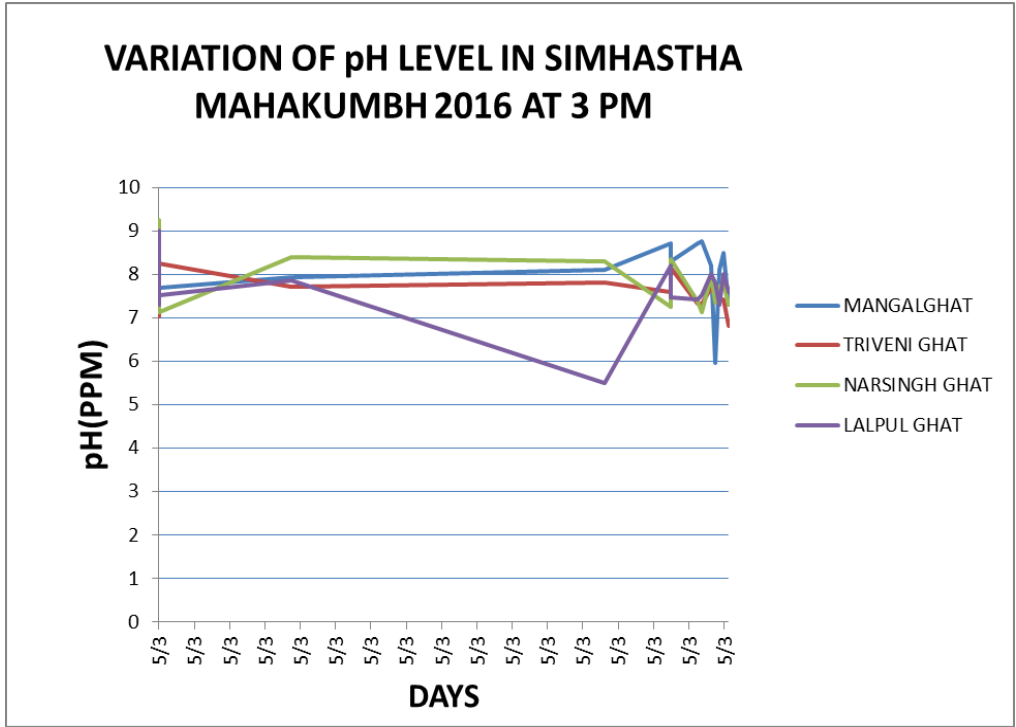


Fig. 5: pH variations (22 april to 21 may)

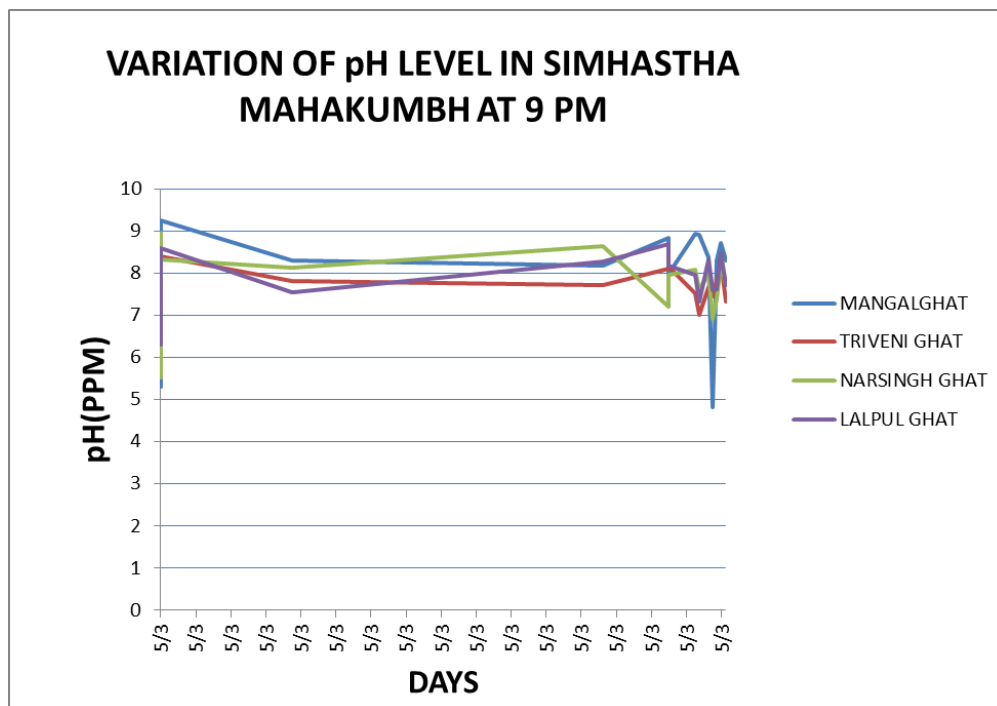


Fig. 6: pH variations (22 april to 21 may)

A summary of the result is given below:

A. BOD

During mela period value for BOD ranged 1.3 to 7.8 PPM and according to Central pollution control board (CPCB) the permissible limit of BOD is < 3 PPM. It is clear from the graph shown in 1 to 3 as expected the date on which maximum value of BOD was recorded as 7.8 ppm on 9th may (2nd Shahi snaan) at 9 PM and the minimum value of BOD as 1.3 ppm was recorded at 6th may at 8 AM.

B. pH

pH is an important parameter which is important to evaluating the acid base balance of water. The Central pollution control board (CPCB) limit of pH drinking water is 6.5 to 8.5 PPM. During the mela period values of pH varied between 4.8 to 9.25 PPM. It is not suitable for drinking and bathing purpose.

As it exceeds 8.5 PPM and less than 6.5 PPM. It is clear from the graph shown in graph 4 to 6 the maximum value of pH as 9.25 ppm was recorded on 21st may (3rd Shahi Snaan) at 9 PM and the minimum value of pH as 4.8 ppm recorded at 26th April at 3 PM.

IV. DISCUSSION

It is clear from the graph shown in fig 1 to 3 in BOD that the least polluted site was Triveni ghat whether during the mela or in the Simhastha Mahakumbh duration. This is due to the fact that it was least used ghat for all the rituals. Also the most polluted site was Mangalnath ghat during the mela dates. This was because of the fact that this was the mostly used ghat by the pilgrims for bathing as compared to the other ghats. It was observed that in the beginning of kumbh mela water quality was comparatively smaller than last week of Kumbh mela. Second most polluted ghat was Narsingh ghat. By fig. 4 to 6 with reference to pH the most polluted site was Narsingh ghat. The max. pH value exceeded according to CPCB the permissible value on the Narsingh jyanti, 2nd & 3rd Shahi snaan, Mohini ekadashi and Prodosh because of the fact that this was the second most used ghat by the pilgrims for bathing and all other rituals.

V. CONCLUSION

The present study is directed to evaluate the water quality during kumbh mela 2016 in Ujjain at different location. It may be resolved from the present study that mass bathing causes a computable change in the water quality. The chemical and biological parameters were analyzed pH and BOD respectively. The above parameters were found to be increased during bathing days and there is drastic change in water quality. It can be said that the water quality from all ghats Mangalnath ghat and Narsingh ghat are most polluted ghats and Triveni ghat was least polluted ghat. The main reason behind this is huge influx of all the sorts of waste and organic matter during the holy occasion at their various ghats as these are the ghats where mainly bathing and other customs

were performed. Regular monitoring at times should be performed and appropriate mitigation measures and better management of resources and provision of basic facilities although, could minimize the elevated levels of water pollution.

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