



## Halide Analysis in Water during Festival Periods

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### Abstract

The concentration of halide in the Varal Devi lake water were determined during festival periods. The water sample collected from three different sites of Varal Devi lake in Bhiwandi city. Sampling of water sample carried out pre, during and post Idol immersion activities. The physicochemical parameter like chloride and residual chlorine were determined. The results were compared with standards prescribed by WHO (1973) and ISI (10500-91). The level of Chloride in all water samples from all station are less than the standard set by WHO and BIS. It was found that the water samples collected from three sites of Varal Devi Lake in Bhiwandi city was not contaminated with chloride but vice versa is true for residual chlorine.

**Keywords:** Lake Water, Chloride, Residual Chlorine, Festival Period.

### 1. Introduction

Water is very precious to all forms of life on the earth. Therefore it is necessary that the quality of drinking water should be checked at regular time interval, because due to use of contaminated drinking water, human population suffers from various water borne diseases. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life.

The immersion of idol of Lord Ganesh during month of August to October is a major source of contamination and sedimentation to the Varal Devi lake water. The water from this lake is used for drinking purpose. The idol are made up of clay, plaster of paris, cloth, paper wood, thermocol, jute, adhesive materials and synthetic paints etc. Any change in the natural quality may disturb the equilibrium system and would become unfit for designated uses [5,8]. In India, most of the population is dependent on surface water as the only source of drinking water supply. The groundwater is believed to be comparatively much clean and free from pollution than surface water.

Economy of Bhiwandi is mostly dependent on the power loom industry. In present research work water sample from Varal Devi lake is analysed to determine the concentration of anions like chloride and Residual Chlorine. There is always a need for and concern over the protection and management of surface water and groundwater quality [2,6] The lakes have complex and fragile ecosystem, as they do not have self cleaning ability and therefore readily accumulate pollutants [1,7]. The release of pollutants and harmful substance due to idol immersion activity changes the original characteristics of water which could be rather harmful to human health after consumption. The literature survey reveals that no water quality management studies with respect to this anion is made in this region so far. Hence it is very essential to maintain the quality of surface water for human consumption, for the aquatic life and for other subsequent uses.

Thus concentration of chloride were analyzed and compared with standard values recommended by WHO and BIS [12]. Concentration of Residual chlorine are compared with BIS.

### 1.1 Chloride:

Conductance of water sample have a direct relationship with chloride concentration, as the chloride level increases, conductance of water also increases, which shows high amount of ions are present in water because chloride is one of very significant component of salt. Fresh water also contain chloride ion which again leads to high level of conductance, if chloride concentration goes high. Chloride concentration of less than 12 mg/liter are contributed in ground water due to its origin from marine bedrock. Around 4mg/liter chloride are found in surface water. Restrained impact on aquatic ecosystems and ecology will be considered with slight elevated level of chloride concentration. Most of large hydra animals and fishes are not having direct influence with the concentration of chloride until it rises up to one thousand milligram per litre. Various human activities are also responsible for discharge of high level of chloride ions in the water. From the soil and ground water, the chloride cannot be easily removed by biological and chemical processes, as chloride ion is considered a mobile ion. Human activities are accountable for high concentration of chloride in water [3,13].

### 1.2 Residual Chlorine:

For destruction of germs and harmful micro organisms in drinking water and swimming pool, chlorine and chlorine based disinfectants agents are added. They provide residual level of protection against waterborne pathogens, virus, bacteria due to which it has a wide spread use as disinfectant agent. Chlorine residual is a low level of chlorine remain in water body after its initial use. It comprises of significant safeguard against the hazards and harm of microbial contamination. For killing of bacteria, harmful micro organisms and sanitization of swimming pool, chlorine is added as a powerful and strong agents [12].

## 2. Method and Materials:

Lake Varal Devi is one of the important wetland lakes. It is located in Bhiwandi and is one of the largest lake of city. Many visits were done to Varal Devi lake for collection of water sample. The water sample collected from three different sites of lake. The sites are First Ganpati Vicersion point, Near Lake View Restaurant (Site S1), Second

Ganpati Vicersion Ghat, Kamat Ghar Gaon, Chandan Baug, Near Peace Park (Site S2) and Third Ganpati Vicersion point, Phenapada, Phulegaon (Site S3). The sampling done from all this sites during morning hours. Period of sampling are before, during and post idol immersion activities. Pre idol immersion samples were collected a three week before the commencement of the immersion activities. During idol immersion samples were collected during the immersion activities. Post idol immersion samples were collected till six week after the completion of immersion activities. The water samples collected and analysed for chloride and Residual Chlorine [4,9,12]. Standard procedure for sampling were adopted. The samples were collected in plastic canes of two liters capacity without any air bubbles. The samples were kept in refrigerator [10,11]. All the reagents used for the analysis were AR grade and double distilled water was used for preparation of solutions [11].

2.1 Chloride: chloride is determined by classical method using silver nitrate (Argentometric titration). Amount of chloride is calculated using following equation.

$$1\text{cm}^3 \text{ of } 0.0282\text{N AgNO}_3 = 1\text{mg of Cl}^-$$

**Table 1: Chloride Concentration**

Periods	Chloride in $\mu\text{g/ml}$		
	S1	S2	S3
Before Immersion	52.0 $\pm$ 0.0	52.0 $\pm$ 0.0	48.0 $\pm$ 0.0
During Immersion	24.0 $\pm$ 0.0	24.0 $\pm$ 0.0	28.0 $\pm$ 0.0
Post Immersion	44.0 $\pm$ 0.0	40.0 $\pm$ 0.0	44.0 $\pm$ 0.0

### 2.2 Residual Chlorine:

Residual Chlorine is estimated by measuring the amount of iodine evolved during titration [12].

**Table 2: Residual Chlorine**

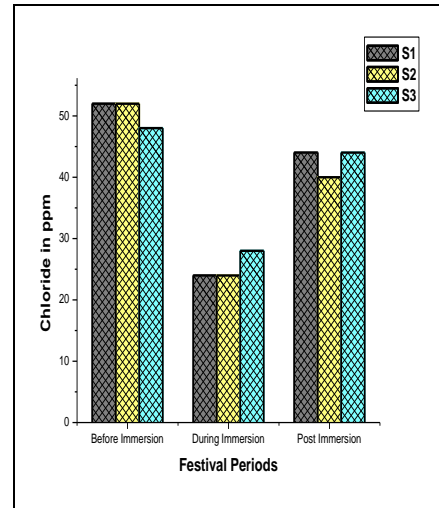
Periods	Residual Chlorine in ppm		
	S1	S2	S3
Before Immersion	3.264±0.0	6.528±0.0	3.264±0.0
During Immersion	6.528±0.0	6.528±0.0	9.792±0.0
Post Immersion	9.792±0.0	9.792±0.0	13.056±0.0

**3. Results and Discussion:**

**3.1 Amount of Chloride:**

**Table 3 : Chloride in ppm**

Periods	Chloride in µg/ml			WH O µg/ml	BIS , USP H µg/ml
	S1	S2	S3		
Before Immersion	52.0±0.0 V=0.0	52.0±0.0 V=0.0	48.0±0.0 V=0.0	250	250
During Immersion	24.0±0.0 V=0.0	24.0±0.0 V=0.0	28.0±0.0 V=0.0		
Post Immersion	44.0±0.0 V=0.0	40.0±0.0 V=0.0	44.0±0.0 V=0.0		



**Fig 1: Chloride in ppm Vs Festival Periods**

High chloride content can cause high blood pressure in people. Chloride in excess (<250 mg/l) imparts a salty taste to water and people who are not accustomed to high chloride may be subjected to laxative effect. High Chloride concentration is also an indicator of large amount of organic matter. The level of Chloride in all water samples from all station are less than the standard set by WHO and BIS[14].

**3.2 Residual Chlorine:**

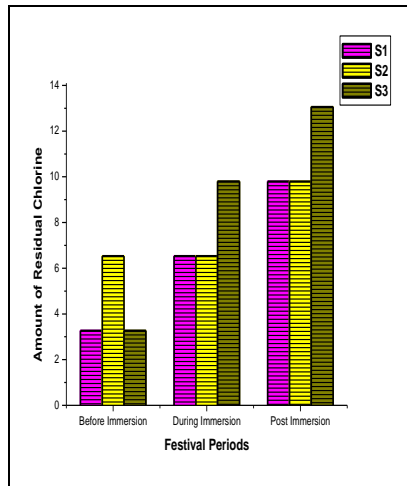
**Table 4: Residual Chlorine**

Periods	Amount of Residual Chlorine µg/ml			BIS µg/ml
	S1	S2	S3	
Before Immersion	3.264±0.0	6.528±0.0	3.264±0.0	0.2
During Immersion	6.528±0.0	6.528±0.0	9.792±0.0	
Post Immersion	9.792±0.0	9.792±0.0	13.056±0.0	

Variance of all water samples from all sites are zero

Detection of residual chlorine is applicable only when the water has been chlorinated and must not be greater than 0.5ppm [15].

Residual chlorine in all water samples collected from all the stations were found to be greater than the standards prescribed by BIS.



**Fig 2: Residual Chlorine against Festival Periods**

#### 4. Conclusion:

Wetlands are very important natural areas. Millions of water animals depend on them. Wetlands have on average the richest biodiversity of all ecosystems. Amount of chloride is determined in the lake water of Bhiwandi pre, during and post activities of Immersion. Amount of this anions are estimated in lake water that will help us in understanding the risk of using this water for potable purposes.

There are different sources of contamination in the water which include point sources like metals from smelting and mining process, solid and effluents discharge from factories and industries, exhaustion from vehicles, whereas non point sources include use of pesticides and insecticides, artificial and natural soluble salt, disposal of industrial, agriculture and municipal wastes, excess utilization of fertilizers. Whatever is the source, it makes the water polluted and contaminated which causes harmful and hazardous effects to animals, plants and ultimately to human beings [6,7].

In the present study concentration of chloride is below the standard prescribed by WHO and BIS. The water does not have any harm with

respect to concentration of chloride on human health. But amount of residual chlorines are greater than the standard value prescribed by BIS. This means that slow dissolution of Idol releases the chloride ions which are combined with the chloride added for disinfection of water and then after remain as a residual chlorine [16,17].

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