



# WATER QUALITY STATUE OF PUSHKAR LAKE AFTER, DURING AND BEFORE THE PUSHKAR FAIR

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## ABSTRACT

Lake is the most fertile, diverse productive and interactive ecosystem in the world. The present work was conducted on the Pushkar lake situated in the historic holy city of Pushkar, Ajmer. This Lake comes under the category of sacred lake and is unique in terms of lake and is unique in term of religious and ecological significant. This study is based on the water Quality of the lake water. The Pushkar lake is facing many problems due to domestic and agriculture discharge, intermixing of storm and sewage water and blocked and extremely crowded in and around the lake at time of Pushkar fair. So many devotees come to Pushkar on the Kartik Poornima. The high concentration of BOD, Coliform, COD, Turbidity, hardness, chloride, phosphate, nitrate on the day of Kartik Poornima. The main sources of lake water pollution are mass bathing, over feeding of food to fishes, washing of cloth near the ghats, holy rituals, throwing of bones and ashes in the lake. The last five decades have damaged the surrounding ecosystem as the green cover gave way to human settlements in Pushkar. Because of all these the Pushkar Lake is very sacred. For improving the water quality some remedial are taken to increase the water level of the lake, increase the ground water level, improving the water quality, checking soil erosion lake, making water treatment plant near the lake and people must be aware how to revive the aesthetic importance of the holy Pushkar.

**Key Words:** Lake, Catchment area, Water quality, Physico– chemical parameters, Pushkar Fair.

## INTRODUCTION

Our country is in the midst a serious problem of natural resources scarcity. All living beings depends on water and exists in nature in many forms like oceans, rivers, lake, clouds, rain, snow and fog etc. The holy Pushkar lake is positioned withinside the small city of Pushkar withinside the Ajmer, district of Rajasthan. The Pushkar lake is one of the maximum distinguished spots of pilgrimage in addition to the well-known Pushkar fair. Encircled through several temples and ghats (bathing spots), the lake attracts heaps upon heaps devotees each 12 months to its threshold, to benefit religious difference and achieve salvation through taking a dip in its holy waters. This lake comes below the class of sacred lakes and is specific in phrases of non-secular and ecological significance. Lake is degrading rapidly. Millions of people take holy bath and perform other religious activities almost 12 months (Madhumita et al 2017, Praveen et al 2007, Santosh et al 2012, Deepanjali et al 2016). During Pushkar fair frequency and intensity of such activities increase which is main source affecting the water quality of the lake (Smita et al 2011, Praveen et al 2007, Santosh et al 2012). Mass bath in the lake causes an increase in BOD, Hardness of water, alkalinity, chlorine, fluoride, magnesium and nitrate content. The land which was formerly used for agriculture and plantation activities were converted to residential and commercial activities to meet the demands of increasing population. Due to unplanned growth of town and misuse of natural resources groundwater, changing land-use, clearing of forest cover, stabilizing sand dunes for resorts and other activities there is a huge destruction in the Pushkar valley which eventually resulted in destruction of natural habitat.

**INDIA**



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**RAJASTHAN**



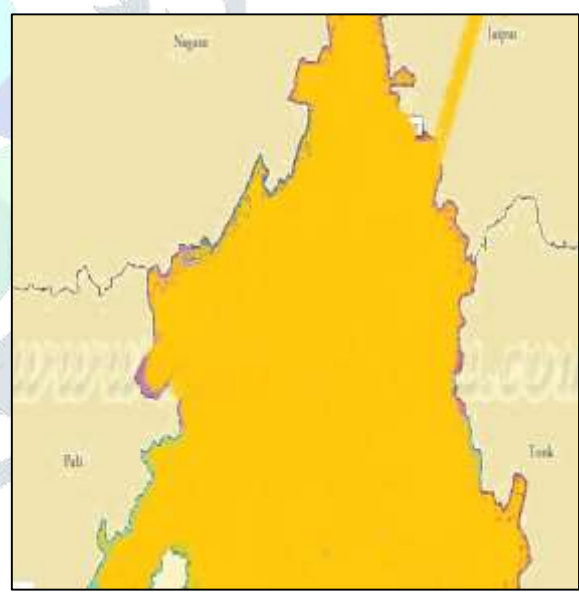
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**PUSHKAR LAKE (Study Area)**



[https://en.wikipedia.org/wiki/Pushkar\\_Lake#/media/File:Evening\\_lights\\_by\\_the\\_Pushkar\\_Lake,\\_Pushkar.jpg](https://en.wikipedia.org/wiki/Pushkar_Lake#/media/File:Evening_lights_by_the_Pushkar_Lake,_Pushkar.jpg)

**AJMER**



<https://www.veethi.com/places/rajasthan-ajmer-district491.htm>

**Fig. 01 Map of India, Rajasthan and Ajmer and picture of Pushkar Lake (Study Area)**

**Table 01 – Geographical features of Ana Sagar Lake**

S.no.	Characteristics	Description
1.	Location	Pushkar, Rajasthan
2.	Coordinates	26°29'14" N 74°33'15" E
3.	Lake Type	Artificial Lake
4.	Primary Inflows	Luni River
5.	Primary Outflows	Luni River
6.	Catchment Area	22 km <sup>2</sup> (8.5 sq mi)
7.	Basin countries	India
8.	Surface Area	22 km <sup>2</sup> (8.5 sq mi)
9.	Average Depth	8 m (26 ft)
10.	Max. Depth	10 m (33 ft)
11.	Water Volume	790.000 cubic meters (28000.000 cu ft)
12.	Surface Elevation	530 m (1740 ft)
13.	Settlements	Pushkar

## Study Area

Pushkar Lake or Pushkar Sarovar is located in the city of Pushkar in the Ajmer district of Rajasthan in western India. Pushkar Lake is a sacred lake for Hindus. Hindu scriptures describe him as "Tirtha Guru". It is a perceiver of pilgrimage sites connected to the waters and associates him with the myth of the Creator Brahma, whose most important temple is in Pushkar.

There are 52 bathing ghats (a series of stairs leading to the lake) around Pushkar Lake, and especially around Kartik Purnima (October to November) where Pushkar Fair is held, a large number of pilgrims gather for a holy moment. Spend time. Bathing in the holy lake is believed to cleanse sins and heal skin diseases. There are more than 500 Hindu temples around the lake.

Tourism and logging in the area have severely stressed the lake, affecting its water quality, lowering water levels and destroying fish populations. The government implements sludge removal, weeding, water purification, tree planting, and public awareness programs as part of its conservation efforts.



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**Fig. 02 Picture of Pushkar Lake (Study Area)**

## Methodology

The study was conducted on the Pushkar Lake. The water samples were analyzed for various parameters in the laboratory like Temperature, pH, Dissolved Oxygen, BOD, Total Hardness, Total Dissolved Solids, COD were monitored of the water samples collected from the Pushkar Lake. The samples were taken from Gau Ghat because this Ghat is used for bathing. The water samples were collected during period of September 2021 to December 2021 mid date of each month including the festival of Kartik Poornima in month of November. The samples were collected before, during and after The Pushkar Fair. On the day of Kartik Poornima mass bathing takes place at Gau Ghat. Some parameters were analyzed immediately on the spot which need to be determined instantly and rest of the samples were determined in the laboratory.

Plastic bottle of 1-liter capacity with stopper were used for collecting water samples. Each bottle was added with 1-2 drop of Nitric acid and washed then rinsed three times with distilled water. (Subroto et. al. 2009). The bottles were kept in a clean place. The

bottle was filled leaving no air space and then the bottle was sealed to prevent any leakage. Each container was marked with the name and date of sampling.

## Result and Discussion

The result obtained by physico-chemical analysis of all the sample are given in detail in table 1.2. Marked differences in various parameters were observed due to the climate condition and pressure of anthropogenic activities.

**Table 02 – The monthly average of Physico-chemical parameter of samples collected from Gau Ghat Pushkar Lake (September 2021 to December 2021) including Kartik Poornima festival.**

S.no	Parameters	Units	15 <sup>th</sup> Sept	15 <sup>th</sup> Oct	15 <sup>th</sup> Nov	19 <sup>th</sup> Nov	15 <sup>th</sup> Dec
1.	Temperature	°C	27.4	26.1	24.9	20.1	18.3
2.	pH		8.2	8.5	8.9	9.5	8.6
3.	Dissolved Oxygen	mg/l	6.6	5.8	5.5	4.4	5.2
4.	BOD		5.5	6.9	7.1	15.9	12.1
5.	Total Hardness		73.5	98.9	102.5	118.1	103.5
6.	Total Dissolved Solids		128.6	171.8	211.1	432.6	386.9
7.	COD		32.7	39.8	41.2	47.2	32.6

**Temperature** of Water is one of the most important factors in an aquatic ecosystem. During the investigation the temperature varied from 18.3 to 27.4 °C. The decrease in temperature during and after the fair may be due to change in weather, winter season starts in November after Kartik Poornima.

**pH** regulates most of the biochemical reactions. Fluctuation in pH depends on foreign input in water bodies. In the present investigation, pH varied from 8.2 – 9.5. The pH of a typical Eutrophic Lake ranges from 7.7 – 9.6, therefore Pushkar Lake is Eutrophic. High pH value (9.5) on Kartik Poornima may be due to mass bathing, holy rituals, over feeding to fishes, etc.

**Dissolved Oxygen** in water is considered to be the factor which reflects physical and biological processes taking place. Concentration of DO depends on photosynthetic activity of aquatic plants, surface agitation due to temperature, respiration rate of living organisms and decomposition of dead organic matter. In the present investigation DO concentrations varied from 4.4 to 6.6 mg/L.

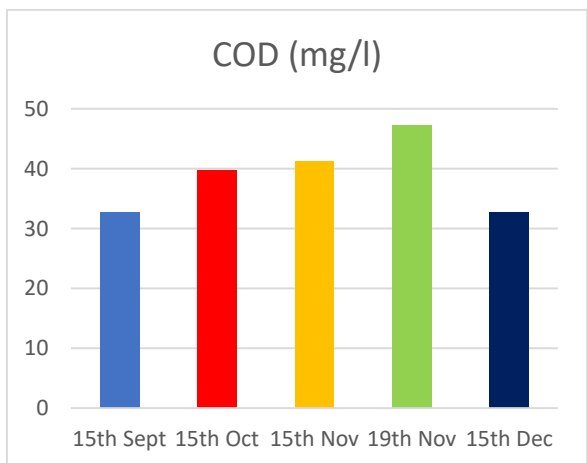
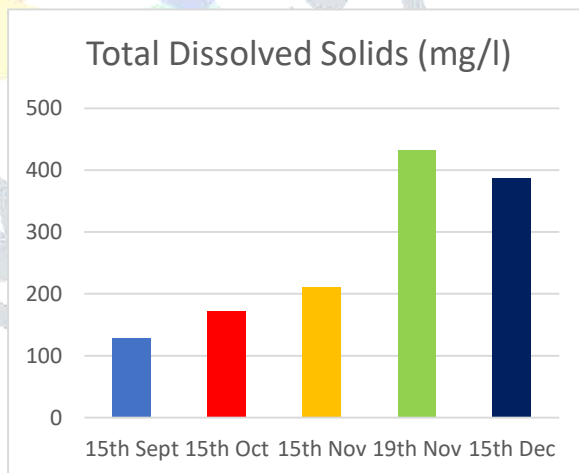
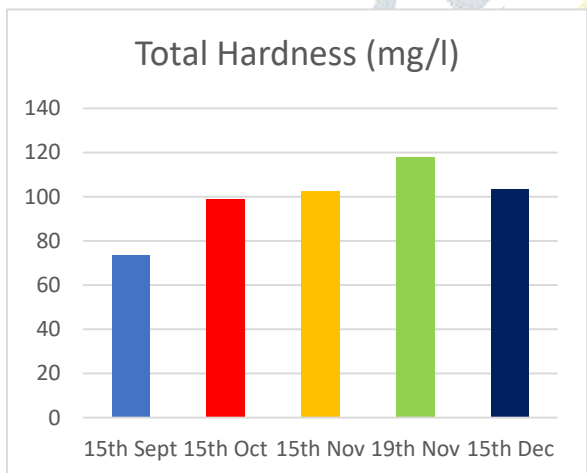
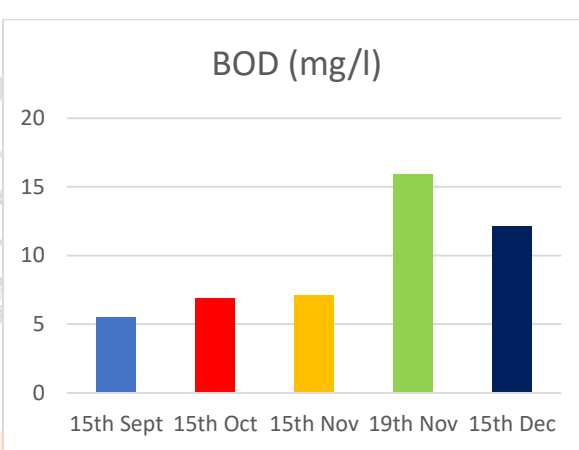
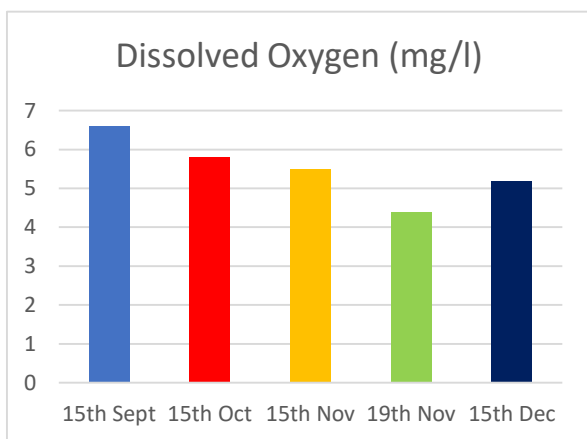
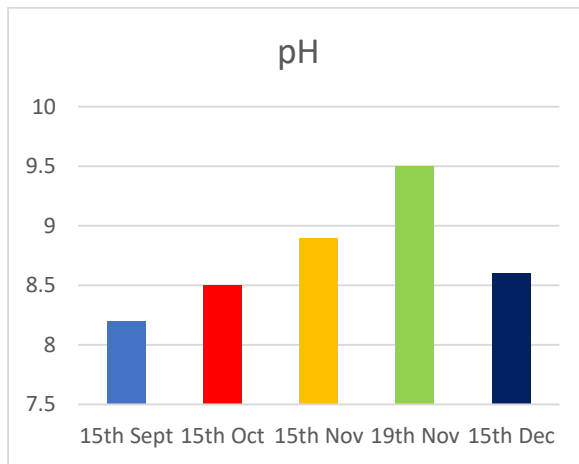
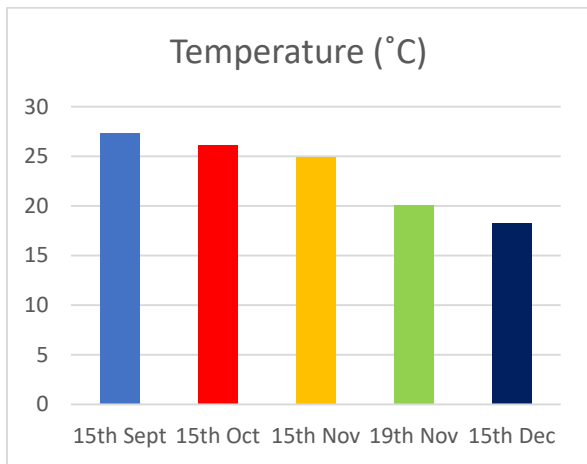
**Biological Oxygen Demand** determines the amount of oxygen required for biological oxidation of organic matter by microbial activity in the water. BOD can be used as a measure of waste strength. In the present study BOD values ranged between 5.5 – 15.9 mg/L with maximum value recorded on Kartik Poornima. This may be due to over loaded input of flowers, garlands and other religious matters offering food for fishes, birds and cows as well as mass bathing.

**Total Hardness** of Pushkar Lake varied from 73.5 - 118.1 mg/L. The source of hardness in Pushkar Lake is mainly due to addition of calcium and magnesium through increased influx of various chemicals used in religious activities. In the study maximum hardness was seen during Kartik Poornima and decreased after the fair in order to acquire its previous state.

**Total Dissolved Solids** are simply the sum of cations and anions concentration expressed in mg/L. TDS in this Lake fluctuated between 128.6 – 432.6, with highest value (432.6 mg/L) observed on Kartik Poornima due to mass bathing, offering food, flowers, garlands, lamps and other religious matter.

**Chemical Oxygen Demand** is the oxygen required by organic substances in water to oxidize them by a strong chemical oxidant. In the present investigation value of COD ranged between 32.6 – 47.2 mg/L with the maximum value (46.2 mg/L) on Kartik Poornima, this is due to input of domestic drains and use of soap and detergents for washing and bathing. Toxins and microorganisms may vary the value of COD also.

Graphical Representation of the Physico-chemical Parameters



## CONCLUSION

1. The water quality of Pushkar lake is not fit for aquatic life and human purpose.
2. In Pushkar lake water high concentration of BOD, Coliform, COD, Turbidity, Hardness, Chloride, Phosphate, Nitrate.
3. During the Pushkar fair pollution level is very high especially on the Kartik Poornima because of excess of activities of Hindu community which pollutes the environment.
4. The major sources of the water pollution are mass bath, over feeding of food to fishes, garlands, offering flowers, disposal of solid waste, lamps, ashes etc.
5. Large numbers of hotels and restaurants around the ghats is one of biggest problem as they also dispose waste into the lake.
6. Seasonality of tourist inflow is a critical issue for Pushkar. Huge inflow of tourist in very short time.

## SUGGESTION

1. It is suggested that Channelization of streams, should be done so as to increase the water storage capacity in the lake. It also minimizes the seepage and run-off part of the streams.
2. Make a specific area for the immersion of ashes and dead bones and the amount of ashes should be limited (10-50 gm) at most.
3. The amount of organic feeding of food to fishes should be stopped. Due to increase in organic matter dissolved oxygen in lake water is decreasing.
4. Give environmental knowledge to the pilgrims and brahmins so that they stop offering flowers to lake or to offer only one or two flowers in particular area.
5. Sediments should be removed up to 5m which is collected at the bottom. So that water storage capacity increases and also remove the material leading to Eutrophication.
6. Regular monitoring of lake should be done to note down environmental status of the lake.

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