



ASSESSMENT OF PHYSICO-CHEMICAL PARAMETERS OF CHINTAHARAN MAHADEV GHAT OF RIVER YAMUNA AT MATHURA, UTTAR PRADESH, INDIA

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ABSTRACT

The present study was carried out to determine the Physico-chemical properties of Yamuna River water of Chintaharan Mahadev Ghat in Mathura District . Yamuna river is holy river in India. The River Yamuna, the largest tributary of River Ganga has been one of the most prominent & important rivers of India. Unfortunately, certain stretches of River Yamuna are much polluted. Various urban centers e.g. Delhi, Mathura, Agra etc. Water is a most valuable natural resource for all living creatures on the earth. An attempt has been made to study the Physico-chemical condition of water of Yamuna River at Chintaharan Mahadev Ghat , Mathura, (UP). during the months of July 2025 and River water samples were taken to the laboratory and analyzed. The analysis was done for the parameters like Turbidity, pH, Total Dissolved Solids, Electrical Conductivity, Total Hardness, Total Alkalinity, Chloride, Calcium and Magnesium. pH shows that Yamuna River water is alkaline in nature. Turbidity and Total Dissolved Solids was found above WHO the permissible limits.

KEYWORDS: Yamuna River, Physico-Chemical, Water etc.

INTRODUCTION

The Yamuna river is the biggest tributary of the Ganga River. The main tributary of the Yamuna river originates from the Yamunotri glacier near Bandar Punch (38°59'N 78°27'E) in the Mussourie range of the lower Himalayas at an elevation of about 6320 meter above mean sea level in the district Uttarkashi (Uttaranchal). The catchment of the Yamuna river covers parts of the states of Uttaranchal, Uttar Pradesh (U.P.), Himachal Pradesh, Haryana, Rajasthan, Madhya Pradesh and the entire state of Delhi. Yamuna, the largest tributary of the Ganga River, is among the most polluted in the world due to heavy population and industrial plants on its banks. The river Yamuna traverses a distance of about 1370km in the plain from Saharanpur district of Uttar Pradesh to the confluence with river Ganga at Allahabad .Water is the most essential and prime necessity of life. It is an essential requirement for the life supporting activities. Surface water generally available in Rivers, Lakes, Ponds and Dams is used for drinking, irrigation and power supply etc. The usual source of drinking water is from streams, rivers, wells and boreholes which are usually not treated. Quality of water generally refers to the component of water, which is to be present at the optimum level for suitable growth of plants and animals. Aquatic organisms need a healthy environment to live and have adequate nutrients for their growth. The productivity depends on the physicochemical characteristics of the water body. The maximum productivity obtained when the physical and chemical parameters are at optimum level. The Yamuna is the largest tributary river of the Ganges (Ganga) in northern India, originating from the Yamunotri Glacier at a height 6,387 meters on the south western slopes of Banderpooch peaks. The cities of Delhi, Mathura and Agra lie on its banks. Yamuna is one of the most polluted rivers in the world.

MATERIAL AND METHODS

Water samples from selected sites were collected during the months of July 2025. The samples were collected from the surface water of the River in pre-cleaned polyethylene bottles.

Physico-Chemical Analysis

The collected samples were analyzed for major physical and chemical water quality parameter like pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Alkalinity (TA), Total Hardness (TH), Chloride (Cl⁻), Calcium (Ca⁺⁺), Magnesium (Mg⁺⁺), Phosphate and Potassium (K⁺).

RESULT AND DISCUSSION

The average results of the physicochemical parameters for water samples are presented .

pH

pH is the scale of intensity of acidity and alkalinity of water and measures the concentration of hydrogen ions. The observed pH of water samples is 9.10.

The pH of water samples is slightly alkaline and found within the limit prescribed by World Health Organization.

Electrical Conductivity

Conductivity is the measure of capacity of a substance or solution to conduct electrical current through the water. The observed EC values is 120 mg/l . High EC values indicating the presence of high amount of dissolved inorganic substances in ionized form.

Total Dissolved Solids

TDS indicates the general nature of salinity of water. Water with high TDS produces scales on cooking vessels and boilers. The observed TDS value 1027mg/l.



Total Alkalinity

Total Alkalinity is the measure of capacity of water to neutralize the acids. Alkalinity increases as the amount of dissolved carbonates and bicarbonates increase. The observed Alkalinity level is 530 mg/l.

Turbidity

The turbidity in water is mainly caused by sand, silt, clay, phytoplankton, microorganism or organic material suspended or dissolved in it. The observed turbidity values is 30.70 (NTU). The turbidity values for all the investigated samples were found to be greater than the value prescribed by WHO.

Total Hardness

Waters become hard primarily due to excessive presence of bicarbonate, chloride and dissolved sulphate in water primarily. The observed Total Hardness values is 330 mg/l.

Chloride

Chloride concentration in water indicates presence of organic waste particularly of animal origin. The observed Chloride concentration is 349mg/l. All the samples were found within the permissible limit prescribed by WHO.

Calcium and Magnesium

The sources of Ca and Mg in natural water are various types of rocks, industrial waste and sewage. There is evidence that hard water plays a role in heart diseases. Higher concentration of Mg makes the water unpalatable and act as laxative to human beings. The observed value of calcium concentration is 168 mg/l and magnesium concentration is 44mg/l.

Phosphate

The major source of Phosphate in natural fresh waters is the weathering of various rocks. Many industrial waste and domestic sewage are rich in Phosphate increase its concentration in natural waters after disposal. The observed value of phosphate is 0.94 mg/l.

Potassium

In the present investigation, the observed value of potassium concentration is 3.96mg/l.

CONCLUSION

This study assessed the Physicochemical properties at Chintaharan Mahadev Ghat of Yamuna River in Mathura. The analysis was carried out by taking certain important parameters like pH, electrical conductivity, total dissolved solids, turbidity, total alkalinity, total hardness, chloride, calcium, magnesium, Phosphate and potassium. In the present investigation, it was found that the maximum parameters were at the level of pollution except few parameters like pH, total hardness and chloride. Thus the study indicated that the Yamuna River in Mathura city was highly polluted and unsafe for human use for the sampling time.

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