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Water Quality Assessment of Shankar Pond at Shankar Chowk, Saharsa, Bihar

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ABSTRACT

Physicochemical parameters of Shankar Pond located near the Shiva temple at Shankar Chowk, Saharsa, were systematically investigated. Temperature, pH, electrical conductivity (EC), alkalinity, dissolved oxygen (DO), and biological oxygen demand (BOD) exhibited their minimum values in January, whereas temperature reached its maximum in June (31.3°C). The highest pH was recorded during April and May (8.5). EC and alkalinity attained peak levels in May, measuring 252 mS cm^{-1} and 94.3 mg L^{-1}, respectively. DO showed its maximum value in June (10.5 mg L^{-1}), while BOD was highest in August (3.8 mg L^{-1}). Nutrient parameters revealed that nitrogen, phosphorus, and chloride concentrations reached their maximum levels in January, May, and June, respectively.

Key Words - DO, BOD, pH, E.C., alkalinity

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INTRODUCTION

Water is one of the most important components of an ecosystem. The quality of water depends on its physicochemical parameters and biological characteristics. Assessment of the quality of water resources is an important aspect of regional development because rivers, lakes, and manmade water reservoirs (ponds) are used for domestic, industrial, agricultural, and fish culture purposes (Jain and Seethapati, 1996). Water resources are used for several purposes such as domestic, agricultural, and industrial activities by local people. There is a threat of water contamination from surface runoff, animal waste, agricultural waste, fertilizers, and pesticides. Although extensive work on physicochemical parameters has already been carried out (Kumar, 1999; Kumar and Singh, 2001; Mandal *et al.,* 2003; Kumar and Mandal, 2015), there is no available data regarding the physicochemical parameters of Shankar Pond. Shankar Pond is situated near the temple of Lord Shiva, close to Shankar Chowk. The pond is used by devotees for bathing. It is surrounded by local houses to the north and west, while a large number of shops are located to the south. Waste from local houses and shops are dumped on the bank of the pond, so the water becomes contaminated due to runoff entering it. Furthermore, waste flowers and other temple materials are also disposed of in the pond.

MATERIALS & METHODS

Water samples were collected in the morning between 8 a.m. and 10 a.m. each month from January to December 2024. Temperature and pH were recorded on site using a thermometer and a pocket pH meter. The samples were brought to the laboratory in clean glass bottles. Total solids, electrical conductivity, alkalinity, DO, BOD, nitrate, phosphate, and chloride were measured in the

laboratory using standard methods prescribed by APHA (2012).

RESULT

Physicochemical parameters of Shankar Pond from Jan-2024 to Dec-2024 were analyzed for temperature, pH, E.C., alkalinity, DO, BOD, nitrogen, phosphorus, and chloride.

Temperature: Temperature ranged between 17.5°C and 31.3°C. The maximum temperature was recorded in June (31.3°C), followed by May (30.5°C). The minimum temperature was recorded in January (17.5°C). Monthly variation in temperature is shown in Fig. 1.

pH: pH values ranged between 7.3 and 8.5. The maximum pH was recorded in April and May, while the minimum was recorded in January. The high pH in April and May was due to high alkalinity. Monthly variation in pH is shown in Fig. 2.

Electrical Conductivity: Electrical conductivity ranged between 145 ms/cm and 252 ms/cm. The maximum E.C. value was recorded in May and the minimum in January. Monthly variation in E.C. is shown in Fig. 3.

Alkalinity: Alkalinity ranged from 72.3 mg/L to 94.3 mg/L. The maximum alkalinity was recorded in May and the minimum in January. The high alkalinity value in summer was due to an increase in bicarbonate in the water. Monthly variation in alkalinity is recorded in Table 01.

Dissolved Oxygen (DO): DO ranged between 9.4 mg/L and 10.5 mg/L. The maximum value was recorded in June and the minimum in January.

BOD: BOD ranged between 2.1 and 3.8. The maximum BOD value was recorded in August and the minimum in January.

Nitrogen: Nitrogen ranged between 0.78 mg/L and 0.94 mg/L. The maximum value was recorded in January and the minimum in June.

Phosphorus: Phosphorus ranged between 1.64 mg/L and 2.56 mg/L. The maximum value was recorded in May and the minimum in August.

Chloride: Chloride ranged between 31.2 mg/L and 49.7 mg/L. The maximum value was recorded in June and the minimum in September.

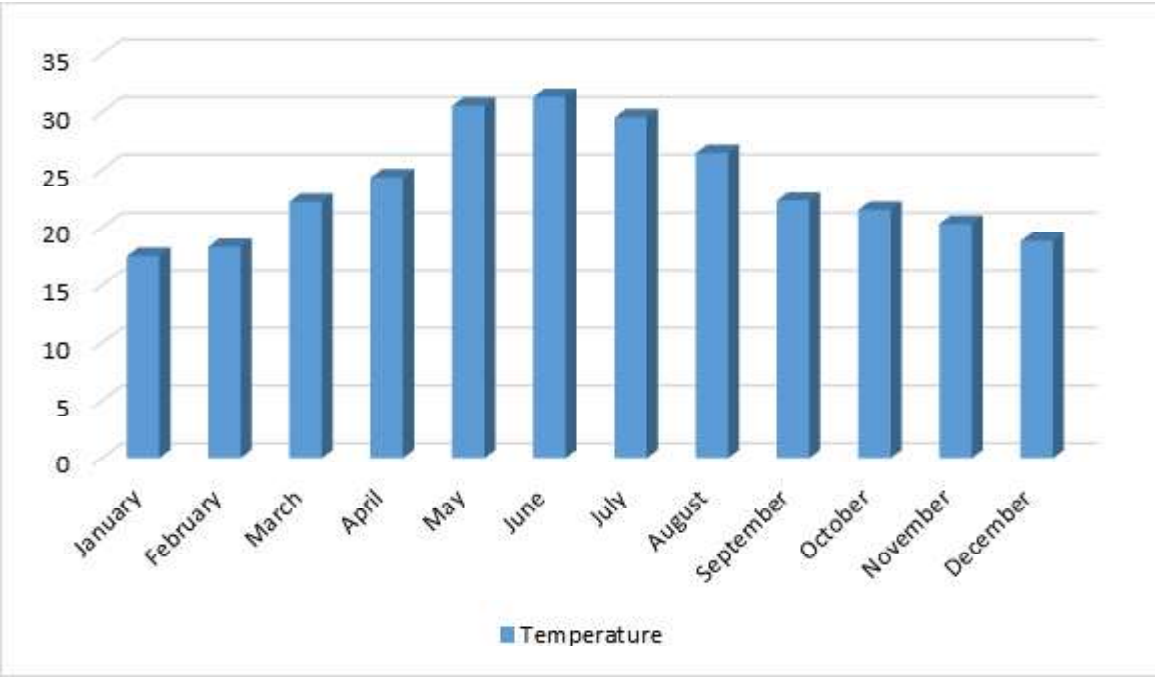

Fig. 1- Monthly variation of temperature of selected pond

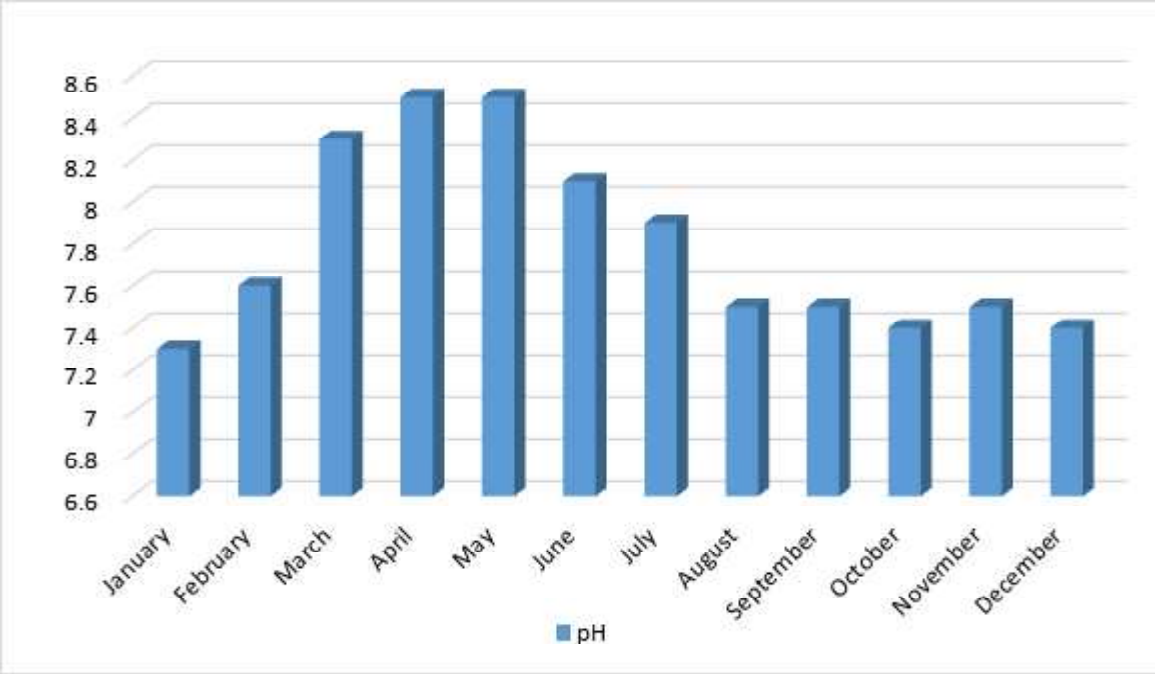

Fig. 2- Monthly variation of pH of selected pond

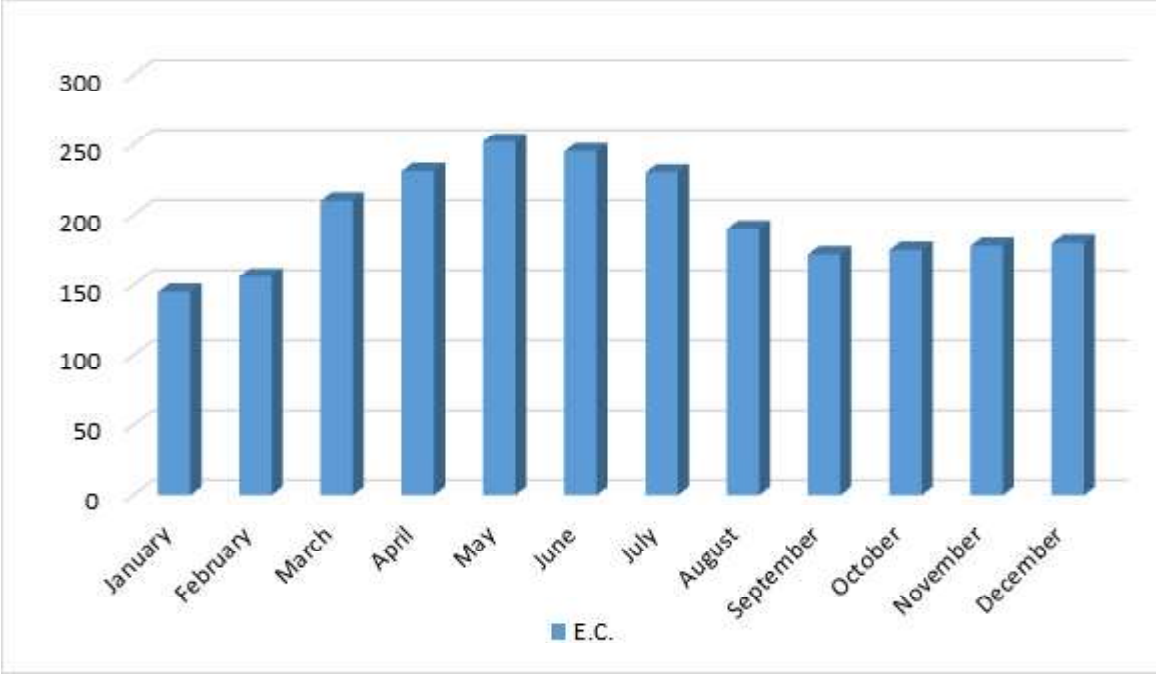

Fig. 3- Monthly variation of E.C. of selected pond

Table 1- Month variation of chemical parameters of selected pond

Month	Alkalinity	DO	BOD	Nitrogen	Phosphorus	Chloride
January	72.3	9.4	2.1	0.94	1.96	48.6
February	74.4	9.6	2.4	0.89	2.14	43.7
March	82.1	9.8	2.6	0.86	2.31	45.4
April	87.5	10.4	2.2	0.78	2.43	42.1
May	94.3	10.2	2.1	0.93	2.56	44.1
June	92.5	10.5	2.6	0.78	2.21	49.7
July	90.8	11.2	3.4	0.81	1.98	42.5
August	86.5	10.7	3.8	0.85	1.64	31.6
September	81.3	10.3	3.7	0.86	1.72	31.2
October	78.7	9.8	2.9	0.89	1.83	28.5
November	76.2	9.6	2.7	0.91	1.89	35.6
December	73.3	9.5	2.4	0.93	1.93	42.7

CONCLUSION

To assess the water quality of Shankar Pond, situated at the temple of Lord Shiva near Shankar Chowk in Saharsa, physico-chemical parameters were studied. Temperature was highest (31.3°C) in June and lowest (17.5°C) in January. The pH value ranged between 7.3 and 8.5. Electrical conductivity (E.C.) ranged between 145 ms/cm and 252 ms/cm, with the highest value observed in May. Alkalinity ranged between 72.3 mg/L and 94.3 mg/L. Dissolved oxygen (DO) ranged between 9.4 mg/L and 10.5 mg/L, and the maximum value was recorded in June. Biological oxygen demand (BOD) ranged between 2.1 mg/L and 3.8 mg/L, with the maximum value recorded in August. In January, minimum values were recorded for temperature, pH, E.C., alkalinity, DO, and BOD. Nitrogen was highest in January (0.94 mg/L) and lowest in June (0.78 mg/L). Phosphorus varied between 1.64 mg/L and 2.56 mg/L, with the maximum value observed in May. Chloride was highest in June (49.7 mg/L) and lowest in September (31.2 mg/L).

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