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To Study Physico-Chemical Analysis Of Water (Pond) Of Botanical Garden Of Mata Jija Bai Government Autonomous P.G. Girl's College, Indore.

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Abstract

Water is a vital natural resource for human survival as well as an efficient tool of economic development. Water is a clear, colourless, and odourless liquid compound that is essential for human survival and the sustenance of all known forms of life. It is a vital component of our plant. Freshwater bodies, such as ponds, play an essential role in the ecosystem, serving as habitats for diverse aquatic organisms while also contributing to the hydrological cycle. Water analysis was done by APHA 2005. The water analysis result showed that the pond's water was contaminated. The chloride value shows high and slight turbidity in the water.

Key Words: -- water , garden , pollution.

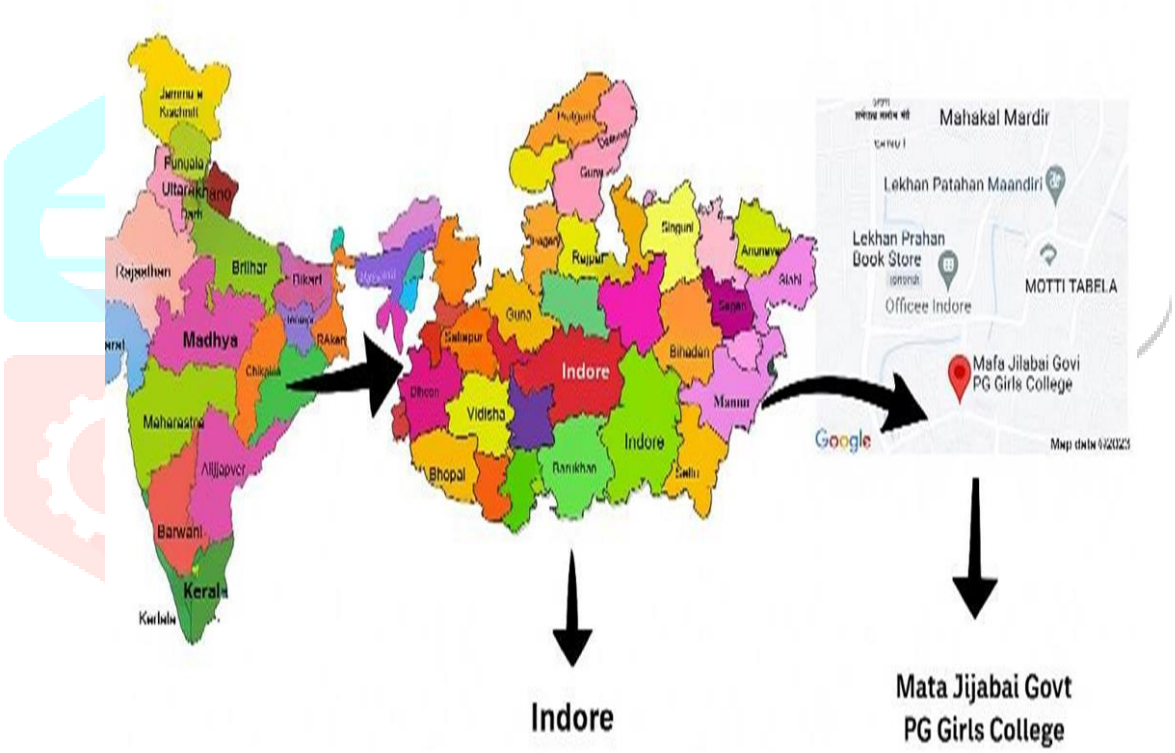
Introduction -- Water is a clear, transparent, colorless and odor odorless liquid compound that is essential for all living beings, including human survival and the sustenance of all known forms of life. It is a vital component of our planet, covering approximately 71% of the Earth's surface. Water is a chemical substance with the formula H2O, consisting of two hydrogen atoms and one oxygen atom. It exists in three states: solid (ice), liquid (water), and gas (water vapour). Freshwater bodies, such as ponds, play an essential role in the ecosystem, serving as habitats for diverse aquatic organisms while also contributing to the hydrological cycle. The quality of pond water is influenced by various natural and anthropogenic balance and health of the aquatic ecosystem. Understanding the physicochemical properties of pond water is crucial for assessing water quality, identifying potential environmental issues, and ensuring the sustainability of aquatic habitats.

Several contributors are to be noted who have made achievements in the field of hydrobiology in India. Some of the important and recent contributors in the field of limnology are Eletta and Adekola (2005) , Kiran (2010), Raut et.al; (2011) , Nailk et.al .(2011) , Bahekar and Thore (2013), Mahajan and Tank (2013) , Vinita and Kashyap (2023), Keerti Samdariya el.al; (2021) , Anubha Kumari and Nalini Bhardwaj (2022), who have studied the physico-chemical parameters of the various water bodies of India.

Physicochemical conditions prevailing in a water body is important for the assessment of water quality and extent of pollution. The parameters which are generally altered by pollution and for which one wishes to specify quantitative standards may be physicochemical, such as Temperature, pH, Turbidity, dissolved oxygen, free CO2, Total alkalinity, and inorganic nutrients like sulphate. phosphate. Nitrate etc.

2. Study Area

Madhya Pradesh is a state in central India. Its capital is Bhopal. Other major cities include Indore, Gwalior, Jabalpur, and Sagar. Madhya Pradesh is the second largest Indian state by area and the fifth largest state by population, with over 72 million residents. Madhya Pradesh is also called the 'Tiger State of India. Indore is the largest city of Madhya Pradesh in central India. It is situated between 22° 20' N -23° 05' N latitude and 75° 25 " E – 75° 15 " longitudes. Indore is the commercial hub of Madhya Pradesh.



Mata jijabai Government Girl's PG autonomous college Indore is situated in indore in Madhya Pradesh state of India. Established in 1952. Which is spread over 16.5 acres. In which geographical location of the college axial positions 22.705556 and longitude position 75.8507688*during. There is a botanical Garden in the college campus which has a pond with different biodiversity.

3.Material Method.:--

In order to investigate the water analysis of the college pond were chosen for collection sample was collected during the year 2024-25. The samples were collected in sterile plastic bottles, brought to the laboratory, processed within 1-3 hrs, and stored at −20°C for further analysis. Before sampling, all the bottles were washed thoroughly with detergent, tap water, and ethanol, then distilled water. Chemical parameters were determined by using standard methods immediately after taking them into the laboratory. Physico-chemical aspects of water such as pH, Temperature, Electrical Conductivity, Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Total suspended solids (TSS), Total Alkalinity, and Total Hardness. The method employed for

the analysis as per the standard methods recommended by APHA. The obtained values are compared with the standard limits. Kumari Sona Rani, Avinash Kumar, and Praveen Kumar Singh (2018)

Observation Table: --- Physical Parameters and Chemical Parameters.

S.No.	Variables	Rainy season	Winter season	Summer season
1.	Colour	Colour less	Colour less	Colour less
.2.	Odour	Odour less	Odour less	Odour less
3.	Taste	Taste less	Taste less	Taste less
4.	Temperature Air	24° C	19° C	30° C
5.	Temperature Water.	22° C	16° C	36° C
6.	pH	7.4	8.1	7.9
7.	Electrical conductivity (µmhos/cm)	178.17	106.00	283.16
8.	Total Dissolve Solid	220 ppm	162 ppm	298 ppm
9.	Turbidity	18NTU	12 NTU	23 NTU
10	Free Co_2	22 mg./lit.	16 mg./ lit.	39.00 mg/ lit.
11	Total Alkalinity	119 mg/lit.	130 mg/lit.	121.00 mg/lit.
12	Chloride	196.00mg/lit.	154.00mg/Lit.	293.9 mg/lit.
13	Total Hardness	130 mg/lit.	98 .00 mg/lit.	167.00 mg/lit.

4 .Result and Discussion.

The physico-chemical parameters are essential and fundamental to know the tropical status of an aquatic ecosystem. The observation table data reveal the seasonal variation in physico-chemical parameters of the college pond.

The physical parameters of water, like colour, which is colourless, tasteless, and odourless in nature. The temperature of air and water influences the activity of life of all biological organisms. During the study year temperature recorded ranged from 16 ° C to 36° C . The highest temperature recorded in Summer and the lowest temperature rise recorded in winter. The pH level of water shows the acidic or alkaline nature of an aquatic body. The pH value ranges from 7.4 to 8.1. The minimum value recorded in the rainy season and the maximum value recorded were 8.1 in the winter season. Electrical conductivity (µmhos/cm) value ranges during the investigation are 106.00 to 283.16 . The highest value is obtained in the Summer and the minimum value in the winter season. Turbidity during the period of investigation was found within the range from 12 NTU to 23 NTU within range. Minimum value in the winter season and maximum value in the summer season. The total alkalinity is found within the range. In the winter season, maximum total alkalinity i.e. 130 mg/lit. and minimum total alkalinity in the rainy season, 119 mg./lit. The free CO2 ranges from 22 mg./lit. to 39.00 mg./lit. This value is within range. Another important parameter is Chloride, which is observed under the limit. During the investigation maximum value was obtained in the summer season, and the minimum value was obtained in the winter season. The hardness is often used to assess the quality of water . Hard water contains a large concentration of alkaline earth metals dissolved in water. (Wetzel, 1975).

Conclusion

Monitoring water quality has been very effective for the determination of the current status of the hydrological condition of water. The Present study provides baseline data for the monitoring of the pond. It was found that the pond water was unsafe for drinking purposes. But pond water is used for irrigation for plants in the garden. Therefore, some effective measures are required to enhance the water quality by conserving water bodies and implementing water quality management.

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