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A Comparative Hydrobiological Studies on the Fresh Water Kasavi and Palasgaon Ponds with Different Parameters

Rashmi Kapkar

Research Scholar, Mahatma Gandhi College Of Science Armori Dist Gadc

Abstract

Physicochemical parameters: Measurement of factors like temperature, pH, dissolved oxygen, conductivity, and nutrient levels (nitrates, phosphates) to understand the basic water quality.

Benthic macroinvertebrates: Investigation of bottom-dwelling invertebrates as indicators of water quality and ecosystem health.

By comparing these parameters in both ponds, the study intends to reveal any significant differences in their hydrobiological profiles. This comparison might shed light on the factors influencing the health and productivity of these freshwater ecosystems. The findings could contribute to the conservation and management strategies for these ponds, ensuring their ecological well-being.

Keywords: Physicochemical parameters, Hydrobiological study, Freshwater habitat, conservation.

Introduction

Freshwater ponds are vital ecosystems, serving as sources of drinking water, irrigation, and supporting a rich biodiversity. However, anthropogenic activities (Cai M etal 2 0 1 6) and environmental changes (Downing, J A 2010) can significantly impact their health and ecological balance. Understanding the biological characteristics of these ponds is crucial for their conservation (Biggs J, Williams P, 2005) and management.

The investigation will involve measuring key physicochemical parameters (Sahni K, Yadav 2012) like temperature, pH, dissolved oxygen, conductivity, and nutrient levels (nitrates, phosphates). These parameters establish the basic water quality of the ponds and influence the biological communities they support. Benthic macroinvertebrates, (Barbour MT, etal 1996) bottom-dwelling organisms visible to the naked eye, are another crucial component of the aquatic ecosystem. They act as indicators of water quality and ecosystem health. Their diversity and abundance will be investigated to assess the overall health of the ponds.

Significance of a Comparative Hydrobiological (Chaudhary, P K, & Singh, V P 2010). Study of Kasavi and Palasgaon Ponds Freshwater ponds are vital ecosystems facing increasing threats from pollution, habitat loss, and climate change. Understanding their health is crucial for ensuring their sustainability and the well-being of the communities that depend on them. This comparative hydrobiological study of Kasavi and Palasgaon Ponds in Gadchiroli district, Maharashtra holds significant value for several reasons:

By comparing the findings from Kasavi and Palasgaon Ponds, the study intends to reveal any significant variations in their hydrobiological characteristics. This comparison can be attributed to factors such as variations in anthropogenic influences, catchment area characteristics, or natural geological formations surrounding the ponds.

Material & Method

Site Selection and Sampling:

The study will encompass both Kasavi Pond and Palasgaon Pond. Sampling locations within each pond will be established to ensure representative data collection.

Physicochemical Parameters:

Key parameters like temperature, pH, dissolved oxygen, conductivity, and nutrient levels (nitrates, phosphates) will be measured at each sampling location using standardized instruments and protocols. In-situ meters or probes will likely be used for measuring temperature, pH, dissolved oxygen, and conductivity. Water samples will be collected for laboratory analysis of nutrient concentrations.

Result:

Data Analysis:

The collected data on physicochemical parameters and biological communities will be statistically analyzed to identify any significant differences between the two ponds. Multivariate analysis techniques may be employed to explore relationships between various parameters and assess the overall health of the ponds.

Comparison and Interpretation:

The findings from Kasavi Pond will be compared to those from Palasgaon Pond to identify variations in their hydrobiological profiles. These variations will be interpreted in the context of potential influencing factors like anthropogenic activities, catchment characteristics, or geological formations surrounding the ponds.

Physico-chemical parameters:

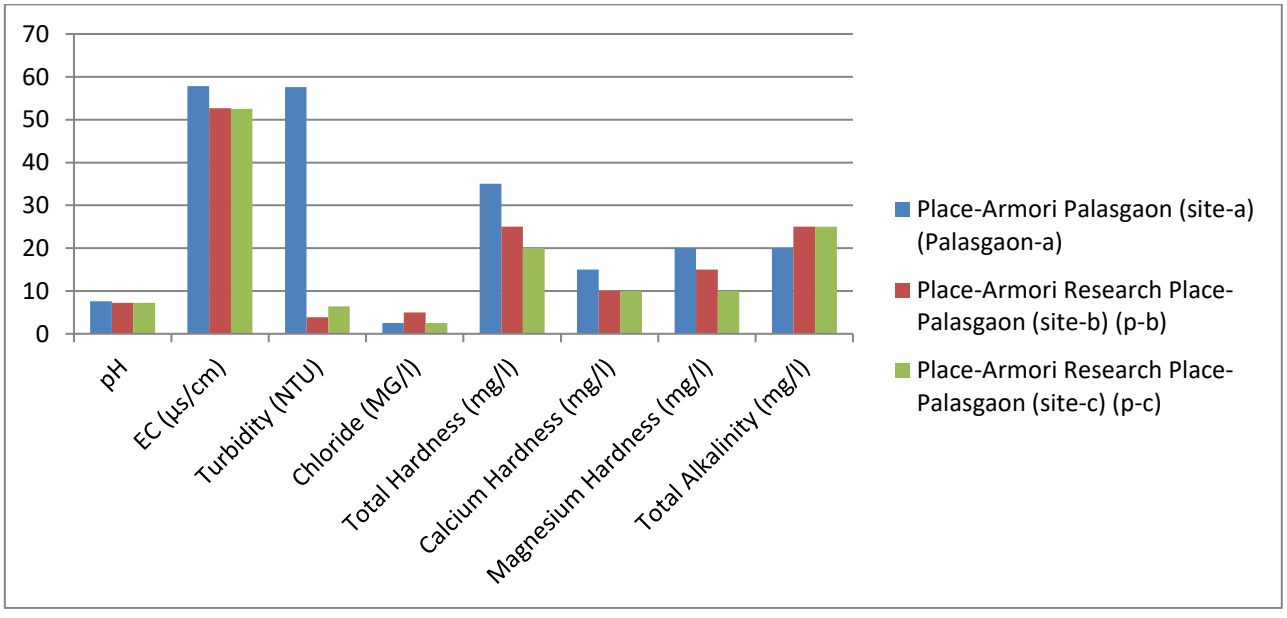
pH: Both ponds exhibited slightly alkaline pH values, with Kasavi pond showing a slightly higher pH compared to Palasgaon pond.

Temperature: The temperature of both ponds varied seasonally, with higher temperatures observed during summer and lower temperatures during winter.

Dissolved oxygen: DO levels were found to be adequate in both ponds, indicating sufficient oxygen availability for aquatic life.

Total dissolved solids: TDS levels were slightly higher in Palasgaon pond compared to Kasavi pond, suggesting a higher concentration of dissolved minerals and salts.

Parameters	pH	EC (µs/cm)	Turbidity (NTU)	Chloride (MG/l)	Total Hardness (mg/l)	Calcium Hardness (mg/l)	Magnesium Hardness (mg/l)	Total Alkalinity (mg/l)
Test Method / Sample Details	IS:3025 (Part-11) 2022	IS:3025 (Part-14) 2013 RA 2019	IS:3025 (Part-10) 1984 RA 2017	IS:3025 (Part-32) 1988 RA 2019	IS:3025 (Part-21) 2009 RA 2019	IS:3025 (Part-40) 1991 RA 2019	IS:3025 (Part-46) 1994 RA 2019	IS:3025 (Part-23) 1986 RA 2019
Place-Armori Palasgaon (site-a) (Palasgaon-a)	7.59	57.8	57.6	2.50	35	15	20	20
Place-Armori Research Place-Palasgaon (site-b) (p-b)	7.25	52.7	3.83	5.00	25	10	15	25
Place-Armori Research Place-Palasgaon (site-c) (p-c)	7.24	52.5	6.42	2.50	20	10	10	25

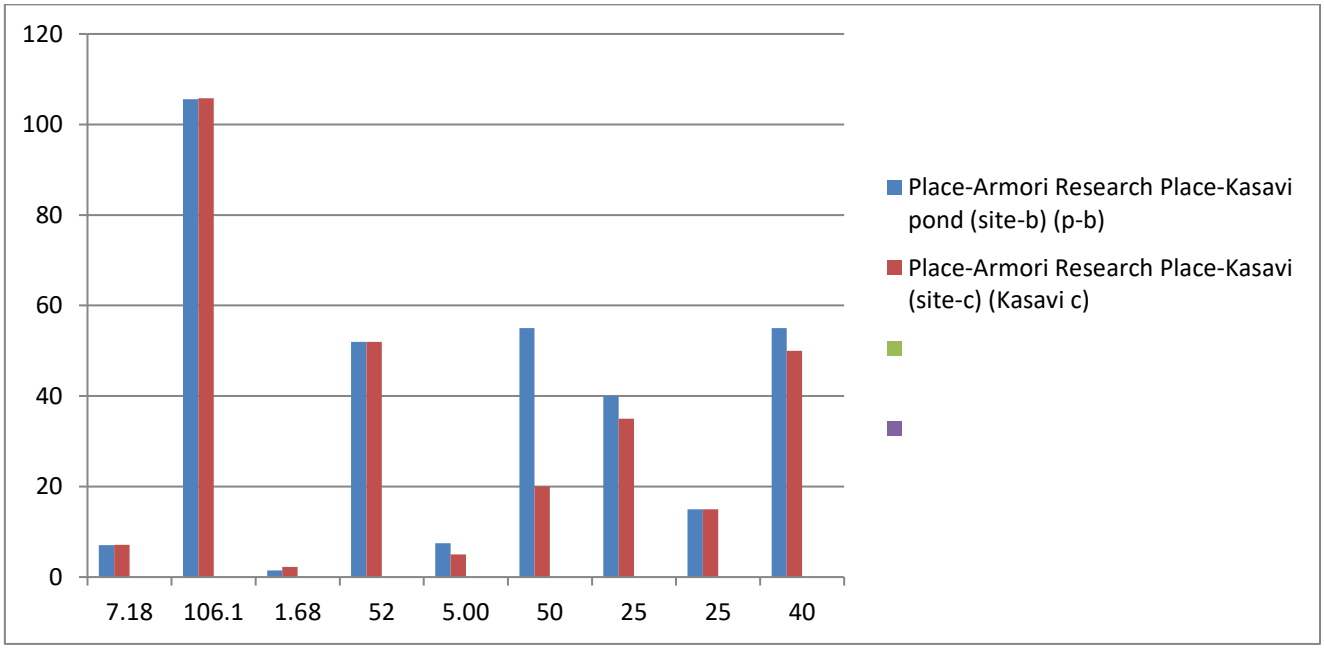


Research Place-Palasgaon (site-a, b, c)

Total Dissolved solid (mg/l) LOQ-50 = site a, b, c = BQL (Bellow Quantification Limit)

It is found that bellow quantification limit value is not detectable.

Parameters	pH	EC (µs/cm)	Turbidity (NTU)	Total Dissolved Solid (Mg/l) LOQ-50	Chloride (MG/l)	Total Hardness (mg/l)	Calcium Hardness (mg/l)	Magnesium Hardness (mg/l)	Total Alkalinity (mg/l)
Test Method / Sample Details	IS:3025 (Part-11) 2022	IS:3025 (Part-14) 2013 RA 2019	IS:3025 (Part-10) 1984 RA 2017	IS:3025 (Part-16) 1984 RA 2017	IS:3025 (Part-32) 1988 RA 2019	IS:3025 (Part-21) 2009 RA 2019	IS:3025 (Part-40) 1991 RA 2019	IS:3025 (Part-46) 1994 RA 2019	IS:3025 (Part-23) 1986 RA 2019
Place-Armori Dist-Gadchiroli Research Place-Kasavi pond (Site-a) (k-a)	7.18	106.1	1.68	52	5.00	50	25	25	40
Place-Armori Research Place-Kasavi pond (site-b) (p-b)	7.08	105.6	1.47	52	7.50	55	40	15	55
Place-Armori Research Place-Kasavi (site-c) (Kasavi c)	7.12	105.8	2.25	52	5.00	20	35	15	50



Research Place-Kasavi (site-a, b, c)

Discussion

The results of this study highlight the overall good ecological health of both Kasavi and Palasgaon ponds. The slightly alkaline pH values (APHA, 1989.) and adequate DO levels indicate suitable conditions for aquatic organisms. However, differences in TDS levels and suggest variations in nutrient availability and water quality between the two ponds.

This comparative hydrobiological study (Chaudhary, P. K., & Singh, V. P. (2010)) provides valuable insights into the ecological characteristics of Kasavi and Palasgaon ponds in Gadchiroli district. Both ponds exhibit favorable conditions for aquatic life, with adequate pH, DO levels, and a diverse biological community. However, differences in physico-chemical parameters and phytoplankton composition suggest variations in water quality and nutrient availability. Further research is necessary to understand the long-term ecological dynamics (Abbasi, S.A. 1998) and potential impacts of human activities (Dudgeon, D.; Arthington, A. H.; Gessner, M. O.; Kawabata, Z.; Knowler, D. J.; Levé que, C.; Naiman, R. J.; Preiur-Richard, A.; Soto,ˆD.; Stiassny, M. L. J.; Sullivan, C. A. 2006) on these valuable water bodies.

Conclusion

The comparative hydrobiological study on Kasavi Pond and Palasgaon Pond in Gadchiroli district, Maharashtra, India, revealed valuable insights into the ecological health of these freshwater habitats. Both ponds exhibited favorable conditions for aquatic life, with adequate pH, dissolved oxygen levels, and a diverse biological community.

The study highlights the importance of ongoing monitoring and assessment of freshwater ecosystems to understand their ecological dynamics and identify potential threats. Human activities such as pollution, deforestation, and climate change can have significant impacts on the health and functioning of these valuable water bodies.

In conclusion, the comparative hydrobiological study on Kasavi Pond and Palasgaon Pond provides a baseline understanding of their ecological characteristics. Further research is necessary to assess the long-term ecological dynamics, identify potential threats, and develop effective conservation and management strategies for these important freshwater resources.

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