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RESEARCH ARTICLE

WATER QUALITY ANALYSIS OF A LENTIC WATER SYSTEM OF BANNERGHATTA BIOLOGICAL PARK, BENGALURU

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ABSTRACT

Biological Park is within Bannerghatta National Park. Physico-chemical analysis was carried out on water samples of Kavalkere pond in Bannerghatta Biological Park area. The pond is used for recreation and the water analysis showed that water is slightly coloured and slightly contaminated while the other characteristics fall within Indian permissible limits.

Key words:

Bannerghatta, Biological Park,
Kavalkere, Physico-chemical,
Analysis, Characteristics.

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INTRODUCTION

Bannerghatta National Park (BNP) situated 22 km south of Bengaluru in peninsular India is located at a mean altitude of +921m above mean sea level (MSL). Bannerghatta Biological Park is carved out of Bannerghatta National Park in the year 2002. The Biological Park has different regions like Zoo, Butterfly Park, Safari and Centre for conservation of rescued captive animals. Research on habitat and ecology is essential to a National Park to monitor ecological changes and human impact in order to provide crucial data for continuous planning and management of the National Park. Research may also help in providing valuable insights for ecosystem conservation and management of protected areas. There are a few fresh water habitats in the area of Bannerghatta Biological Park which are perennial water bodies maintained by the Biological Park. Kavalkere pond situated in the Zoo area is selected for the present study. Kavalkere is a quite large pond used for recreation of visitors to the Park by providing boating facilities. Washings of the zoo is also lead to this water body due to which water is slightly coloured and contaminated.

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MATERIALS AND METHODS

The water samples were collected from a selected location in the pond at monthly intervals for 1 year. Water samples were collected in autoclaved glass bottles and acid washed plastic bottles. For estimation of dissolved oxygen, samples were collected in 250ml glass bottles and fixed immediately. Water temperature and pH were checked in the field using mercury thermometer and digital pH pen respectively. Free carbon dioxide content in water is also checked immediately after collection by standard methods described by APHA. Physico-chemical analysis of samples for parameters like dissolved oxygen, total alkalinity, total iron, phosphate, silica and nitrate nitrogen were carried out in the laboratory within four hours of collection according to standard methods described by APHA.

RESULTS AND DISCUSSION

Physico-chemical characters like temperature, pH, alkalinity, free carbon dioxide, dissolved oxygen, phosphate, nitrate, silica, iron etc., are very important abiotic factors of an aquatic ecosystem which play major role in productivity and sustaining of organisms in the system. Many of them like phosphate, nitrate act as limiting factors in the growth of plankton. The results of the physico-chemical analysis of the Kavalkere are tabulated in Table 1. The findings are as follows:

Table 1. Physico-chemical characteristics of water of Kavalkere (range of parameters)

Parameters	Values
Water temperature(°C)	20.0 – 27.2
pH	7.4 – 8.6
Free CO ₂ (mg l ⁻¹)	0.0 – 8.2
Conductivity (μ mho cm ⁻¹)	115.28 – 426.39
Total alkalinity (mg CaCO ₃ l ⁻¹)	48 – 152
Nitrate-nitrogen (mg l ⁻¹)	Traces – 0.26
Phosphate (mg l ⁻¹)	Traces to 0.29
Silica (mg l ⁻¹)	0.01 – 1.3
Total iron (mg l ⁻¹)	0.02 Traces to 0.9
Dissolved O ₂ (mg l ⁻¹)	6.8 – 10.83

Water temperature: The range of water temperature recorded was 20.0 – 27.2°C. The minimum temperature was recorded in December and the maximum in March.

pH: Water was found to be slightly alkaline throughout the study period with pH ranging from 7.4 to 8.6. The pH was slightly lesser in June and September probably due to rain.

Conductivity: Conductivity ranged from 115.28 to 426.39 μ mho cm⁻¹. It also remained low during rainy season.

Free Carbon dioxide: The free CO₂ content of water ranged from 0.0 to 8.2 mg per liter. The higher CO₂ level was observed in winter months which may be due to decreased photosynthetic activity by lower density of planktons.

Total Alkalinity: The total alkalinity due to both carbonate and bicarbonate ions ranged between 48 to 152 mg per liter.

Nitrate-nitrogen: It ranged from traces to 0.26 mg per liter, minimum during January and maximum in September. Nitrate is an important factor for all aquatic organisms which may also act as a limiting factor.

Phosphate: Phosphate is also a limiting factor for aquatic plants and microbes. It ranged between traces to 0.29 mg per liter.

Silica: Silica content varied from 0.01 to 1.3 mg per liter.

Total iron: It ranged from traces to 0.9 mg per liter. Iron is an important factor for phytoplankton.

Dissolved O₂: The dissolved oxygen concentration ranged from 6.8 to 10.83 mg per liter, minimum during summer and maximum during winter. Comparatively high oxygen level may be due to lower water temperature. Water temperature was the controlling factor for dissolved oxygen content.

Conclusion

Kavalkere did not dry in the study period showing perennial nature. Enough rain fall in the region ranging from 625mm to 750mm annually supports in maintaining enough water level in the pond throughout the year. Analysis showed that the physico-chemical parameters are within the Indian permissible limits. Hence water of Kavalkere is not polluted. It supports growth of good number of plankton both phytoplankton and zooplankton and a number of aquatic bacteria which contribute

for primary productivity and maintenance of biogeochemical cycles. If release of washings of the Zoo area is prevented water may be used for animal consumption also.

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