COMPARATIVE ANALYSIS OF SOME PARAMETERS AT VARIOUS LOCATIONS AND ECODISCRIPITION OF HEBBAL LAKE, ULSOOR LAKE, SANKEY TANK AND LALBAGH LAKE IN BANGALORE AND ITS IMPACT ON THE ECOSYSTEM AND BIODIVERSITY OF ALGAL SPECIES IN EACH

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Abstract

The amount of atmospheric oxygen dissolved in the water is termed as dissolved oxygen and Salinity is the dissolved salt content of water body. It is a general term used to describe the levels of different salts such as sodium chloride, magnesium and calcium sulfates, and bicarbonates etc. Optimum levels of DO and Salinity are required for the survival of all the aquatic living organisms. Rapid increase in the population, drastic growth of industries, which are the resultants of Urbanization have introduced enormous amount of pollutants like NO₂, CO₂, SO₂ gases into the air, which when dissolves in the water bodies, making the water acidic. This depletes the amount of Dissolved Oxygen and Salinity, which are essential for the aquatic life.

Dissolved oxygen, Salinity, organic matter, hydrological patterns, geological position, paleoclimatic events, human interactions and biological interactions, determine the biological communities and ecological status of an inland lake. Muddy bottom also controls the distribution of dissolved substances in the natural lake.

Life in aquatic ecosystem depends on dissolved oxygen in the water bodies. Oxygen concentration is higher in the air about 21% than that of oxygen concentration in water bodies. Oxygen concentration differs in epilimnion and hypolimnion of the lakes. Dissolved oxygen may change with depth. Dissolved
oxygen % determines the type of organisms in a lake. Temperature increase also lowers the oxygen; microbes also play a role in altering the oxygen concentrations in the water bodies.

The aim of our experiment was to find out the DO and salinity of the four lakes in our city at different ecological locations of the lakes, like the boating area, sewage entering area, undisturbed area etc and collect the water samples to check the algal biodiversity in these lakes, because algal bloom in the water bodies can be a bioindicator of that ecosystem. Our result shows that sankey tank and lalbagh lake show similarities and hebbal lake and ulsoor lake show lot of variation.

In this paper a detailed report of our study will be presented

INTRODUCTION

According to census 2001, India’s population is about 1200 million and is projected to grow up to 1333 by 2025; as a consequence the demand for fresh water for domestic, irrigation as well as for industries would shoot up. Nearly 150 lakes adorn the city of Bangalore. Once serving as sources of water for the entire area now their water has become insufficient with the growing population count. This has led them to be used now as popular spots of tourist attraction(http://www.mapsofindia.com/bangalore/places-of-interest/lakes/). Proper understanding of the water bodies is necessary to encounter such problems in the future, as the overall condition of health of aquatic systems is determined by the interaction of all its physical, chemical and biological components which makes up its ecosystem (Ramachandra and Malavika solanki, 2007). Anthropogenic factors that influence the lake biota need to be monitored and minimized. The identification and understanding of the mechanisms responsible for eutrophic triggers like nitrogen import in water samples are essential for the proper development of control strategies(Woralla and burtlo,2002). The present survey of four prominent water bodies in Bangalore urban district was intended to confirm with earlier observations of chemical and biological parameters and the present status in terms of human dependency on the water bodies.

MATERIALS AND METHODS

Selection of water bodies
Four major water bodies in Bangalore urban district were selected for the present study viz., Sankey tank, Ulsoor lake, Hebbal lake and Lalbagh lake. The water bodies chosen have economic and ecological significance of the fast developing cosmopolitan like Bangalore city.

Map 1: Map of Bangalore with the selected water bodies.

Collection of water samples

Four sampling points covering the perimeter of the four lakes were selected and study was conducted post monsoon. Collection of water samples from the sites were analyzed for chemical and biological parameters like oxygen content, alkalinity, organic matter and abundant plankton species. During sample collection in the water bodies, necessary precautions had been taken to collect undisturbed
water samples. Samples were collected in 250 ml polypropylene bottle and transferred to laboratory for analysis.

Analysis of water samples

The collected water samples were analyzed (chemical and biological parameters) on the same day in the laboratory to determine oxygen content, alkalinity, organic matter and abundant plankton species.

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Water bodies</th>
<th>Location</th>
<th>Area</th>
<th>Features (economic value, pollution threats, renovated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sankey tank</td>
<td>13.01°N 77.57°E</td>
<td>15 ha (37.1 acres)</td>
<td>Recreation, fed by rainwater run-off</td>
</tr>
<tr>
<td>2.</td>
<td>Ulsoor lake</td>
<td>12.97°N 77.63°E</td>
<td>50 ha (123.6 acres)</td>
<td>Recreation, military training, game fishing, renovated.</td>
</tr>
<tr>
<td>3.</td>
<td>Hebbal lake</td>
<td>13°02′48″N 77°35′12″E</td>
<td>75 ha</td>
<td>Recreation, fed by sewage and rain water run-off, major sewage canal adjoining.</td>
</tr>
<tr>
<td>4.</td>
<td>Lalbagh lake</td>
<td>12.95°N 77.59°E</td>
<td>Not available</td>
<td>Recreation.</td>
</tr>
</tbody>
</table>

Results and observations

The measured parameters in each water body are presented in figures 1-6 and Table 1.
Legends: SAN = Sankey tank, ULS = Ulsoor lake, HEB = Hebbal lake and LAL = Lalbagh lake.

Table 1: Prominent algal (Phytoplankton species) recorded in the water sample.

<table>
<thead>
<tr>
<th></th>
<th>SAN</th>
<th>ULS</th>
<th>HEB</th>
<th>LAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>microcysts, euglena, diatoms, oscillatoria</td>
<td>microcysts, spirulina</td>
<td>microcysts, euglena, diatoms, oscillatoria</td>
<td>Microcysts, diatoms</td>
</tr>
</tbody>
</table>

CONCLUSION

From the present survey it is seen that the water quality of the four tanks has been deteriorated to a crucial point for the lake environment. Bangalore is a cosmopolitan and commercially significant city, the water bodies are not utilized for drinking or irrigation instead used for recreation and fishing. The governmental organizations have to look into the matter so as to facilitate further fishery on large scale, breeding of
migrant and native birds, also promote recreation and tourism. Ample work concerning the water bodies in Bangalore have opined on similar lines and the present study is a preliminary comparative account laying emphasis on management strategies of the lake systems in the region.

REFERENCES


Websites:

http://www.mapsofindia.com/bangalore/places-of-interest/lakes/