

PHYSICO-CHEMICAL CHARACTERISTIC IN DIFFERENT LAKES OF MALAYSIA

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The objective of this study is to assess the physico-chemical characteristic of five selected lakes in Malaysia. The depth of the selected lakes range between 4 m and 100 meter. The selected lakes with increasing depth are Sembrong Reservoir, Bekok Reservoir, Dayang Bunting Lake, Sg Terip Reservoir and Kenyir Reservoir. Measurements were carried out at three sites in all lakes using a multi-parameter probe. The main parameters studied include temperature, dissolved oxygen, pH and chlorophyll-a. Additionally, water samples were also collected near surface for analysis of total phosphorus. Temperature-depth profile indicate that stratification of temperature was only apparent in deeper lake such as Kenyir. Stratification of dissolved oxygen was observed in most lakes despite their depth variation. Chemical stratification in the studied lakes was likely influenced by geological and chemical processes. Shallower lakes were observed to have higher nutrient concentration compared to deeper ones.

Keywords: reservoir, tropical lake, water quality



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INTRODUCTION

Lakes are lentic waterbodies, which uniquely differentiated by its characteristics. Physical features such as depth and morphometry affected the physical, chemical and biological processes in lakes. Comparative study on characteristics of lakes with different depths are limited.

The objective of this study is to assess the physico-chemical characteristic of five selected lakes in Malaysia. The depth of the selected lakes range between 3 m and 100 meter. The selected lakes with increasing depth are Sembrong Reservoir, Bekok Reservoir, Dayang Bunting Lake, Sg Terip Reservoir and Kenyir Reservoir. This study is undertaken to provide better understanding on characteristics of lakes in Malaysia.

RESULTS

Table 1 Mean results of the physico-chemical variables

	Sembrong	Bekok	Dayang bunting	Sg. Terip	Kenyir
Depth (m)	3.4±0.6	6.0±1.1	11.8±3.3	19.6±14.9	68±47
Temperature (°C)	30.8±0.6	31.6±0.4	31.4±0.02	31.0±0.2	31.0±0.4
DO (mg/L)	7.9±1.0	8.5±0.5	8.3±0.2	8.3±0.1	7.6±0.04
pH	7.7±0.3	7.2±0.6	8.6±0.03	7.3±0.2	6.3±0.6
Chlorophyll (µg/L)	34.4±7.4	14.1±7.7	6.0±2.8	5.9±1.1	4.2±2.7
Total Phosphorus (mg/L)	0.20±0.03	0.05±0.02	0.002±0.0	0.05±0.0	0.005±0.0

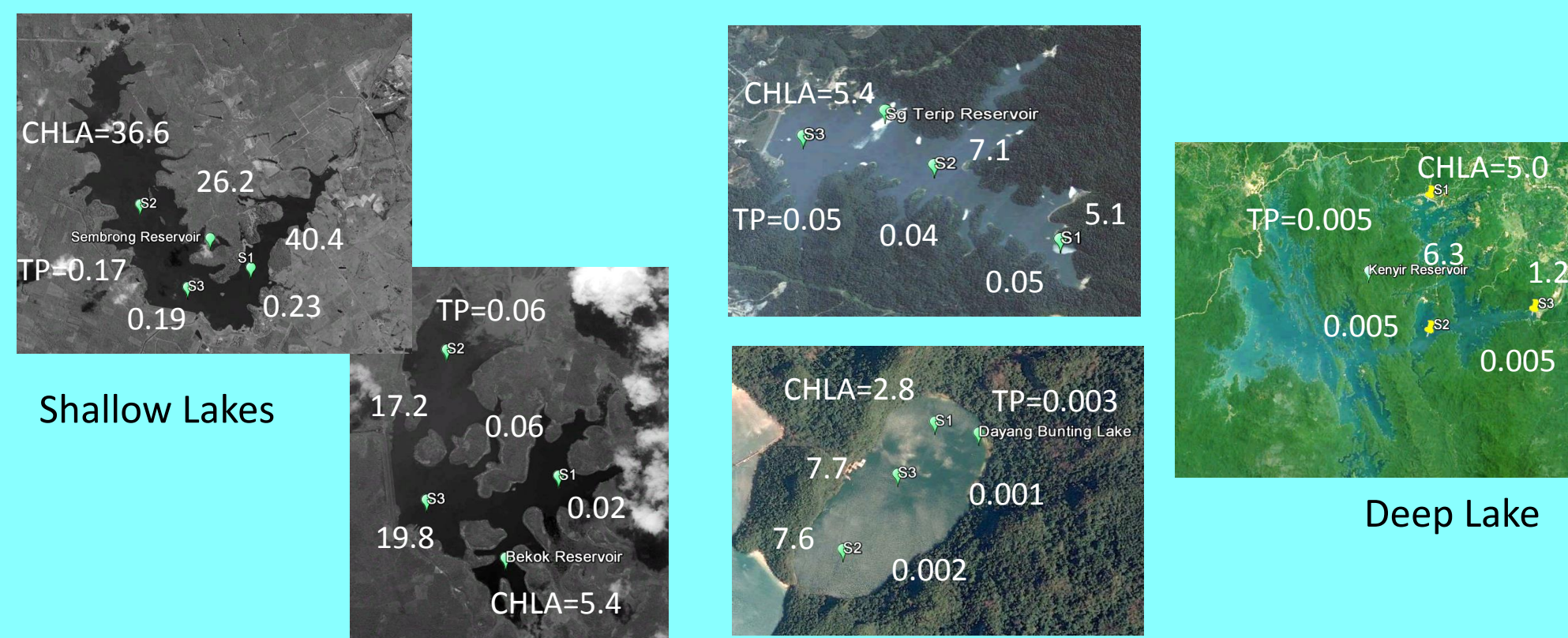


Fig. 1 Location of study areas and sampling locations

DISCUSSION

- Temperature-depth profile indicate that stratification of temperature was only apparent in deeper lake such as Kenyir Reservoir.
- Stratification of dissolved oxygen was observed in most lakes despite their depth variation.
- Depletion of DO in deeper lakes may be induced by the presence of thermocline that separates the hypolimnion from the well-mixed layer in the epilimnion while in shallower lakes DO levels may be influenced by the growth of biological communities.
- Chemical stratification in the studied lakes was likely influenced by geological and chemical processes.
- Shallower lakes were observed to have higher nutrient concentration compared to deeper ones (≥ 0.05 mg/L).
- High concentrations of chlorophyll-a in both Sembrong and Bekok reservoirs indicated eutrophic condition whilst low nutrient levels in Dayang Bunting, Sg. Terip and Kenyir reservoirs indicated oligotrophic-mesotrophic conditions.

CONCLUSION

- Depth variation in lakes shapes chemical-biological processes and composition.
- Shallow lakes is more sensitive to eutrophication due to its small volumetric capacity.
- Management of lakes should take into consideration on stratification pattern.

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Fig. 2 Temperature and dissolved oxygen profiles