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Short Communication

Studies on the physico-chemical parameters of Omi water body of Ago-Iwoye, Nigeria

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In Omi water body, the physico-chemical parameters such as dissolved oxygen ranged from 1.4 to 4.8 mg/L; pH, 6.7 to 7.2; temperature, 26.5 to 31.5°C; alkalinity, 24.2 to 25.4 ppm; conductivity, 23.0 to 28.3 Ohms/cm; turbidity 0.11 to 0.15 m; and free carbon dioxide from 3.5 to 4.5 mg/L. Dissolved oxygen, pH and water temperature serve as variables since the fluctuation of one affects the values of others. The investigation shows that Omi water is safe for drinking when purified.

Key words: Omi water, Ago-Iwoye, physico-chemical parameters.

INTRODUCTION

The Omi is one of the major water bodies found in Ago-Iwoye and suburbs (Ijebu-Oru, Ijebu-Awa and Ijebu-Ilaporo), which is utilized for domestic purposes including drinking. Studies on water quality mostly center on fish production and aquatic biotic integrity (Boyd, 1982; Abohweyere, 1990; King, 1998). The notable important physico-chemical parameters are transparency, dissolved oxygen, temperature, suspended solids and dissolved ions (Karr and Dudley, 1981). However the usage of water by man for survival is as important as that of fish.

Since 'good' water quality will produce healthier humans than one with 'poor' water quality, an analysis on the physico-chemical parameters of Omi water body was made. The findings of the analysis will prove to be quite informative, to the daily consumers of the water, as the Omi is of significant importance to the entire Ago-Iwoye dwellers (including students and staff of Olabisi Onabanjo University).

MATERIALS AND METHODS

Study on physico-chemical parameters of Omi water in Ago-Iwoye and suburbs was carried out between the 26th and 31st March, 2003. The daily duration of the study was 12 h (from 7 am to 7 pm) with a time interval of 2 h between each observation. The water temperature, pH and turbidity were measured in the field using mercury-in-glass thermometer, pH meter (model 51- Japan) and secchi disc (diameter = 12.0 cm), respectively.

Conductivity and dissolved oxygen (DO) were measured with portable electronic conductivity meter (Model Mel. V) and portable digital DO probes (Model Parker, 1987), respectively. Other samples were collected for the laboratory analysis of alkalinity and free carbon dioxide. The total alkalinity and free carbon dioxide were determined titrimetrically (APHA, 1980). Duncan multiple range analysis of variance was used to determine variations due to sampling errors.

RESULTS AND DISCUSSION

The daily range of physico-chemical parameters of Omi sample showed temperature of 26.5 to 31.5°C, DO of 1.4 to 4.8 mg/l, pH of 6.7 to 7.2, alkalinity of 24.2 to 25.4 ppm, conductivity of 23.0 to 28.3 Ohms/cm, turbidity of 0.11 to 0.15 m and free carbon dioxide of 3.5 to 4.5 mg/l (Table 1).

Temperature peak of 31.5°C was recorded on the last day (31/3/2001) of the experiment at 1.00 pm. Generally, temperature increased between 1.00 pm and 3.00 pm throughout the experiment and this may be assumed as time of high insolation. While both early morning and evening witnessed a significantly ($P<0.05$) lower temperature than the hot-dry afternoon temperature (Table 1).

Dissolved oxygen concentrations of the earlier days were significantly ($P<0.05$) higher than those of the latter days. The pattern of fluctuation does not follow that of temperature; it was significantly ($P<0.05$) lower in the afternoon (1.00-3.00 pm) and significantly ($P<0.05$)

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Table 1. Daily reading of physico-chemical parameters of Omi River.

Date	Time	WT (°C)	DO (mg/l)	PH	Alk (ppm)	Cond (Ohms)	Tub (m)	FCO (mg/l)
26/3/2003	7 am	26.6	3.6	6.7	25.3	27.8	0.11	3.6
	9 am	27.3	3.2	6.9	25.1	27.2	0.15	3.7
	11 am	28.0	2.9	7.1	25.1	28.3*	0.13	3.7
	1 pm	29.2 *	2.5	7.1	24.8*	26.7	0.13	3.8
	3 pm	28.4 *	3.9	7.1	24.2*	27.5	0.14	4.5*
	5 pm	27.2	3.9	7.2	25.1	23.7	0.15	3.7
	7 pm	27.5	4.8 *	7.1	25.1	23.7	0.15	3.7
27/3/2003	7 am	26.5	3.6	6.7	25.3	27.0	0.12	3.6
	9 am	27.6	3.4	6.9	25.3	27.2	0.11	3.6
	11 am	28.1	2.5	7.0	25.1	27.2	0.15*	3.6
	1 pm	29.7*	2.1	7.2*	24.9	26.4	0.13*	3.7
	3 pm	29.7*	3.3	7.1	24.8	26.9	0.14	3.9
	5 pm	28.2	3.7	7.1*	25.1	27.4	0.13	3.6
	7 pm	28.3	4.2*	7.0	25.2	27.2	0.13	3.8
28/3/2003	7 am	26.5	3.2	6.7	25.2	27.3	0.15	3.7
	9 am	27.0	3.1	6.9	25.2	27.3	0.14	3.6
	11 am	28.0	2.6	6.9	25.3	24.2	0.11	3.6
	1 pm	29.3*	2.0	7.0	25.0	24.3	0.11	4.1
	3 pm	28.9*	2.9	7.1	24.3	26.8	0.15	3.9*
	5 pm	27.5	3.8	7.1*	24.8	23.0	0.14	3.6
	7 pm	27.3	4.6	7.1*	25.1	24.1	0.15	3.7*
29/3/2003	7 am	26.6	3.6	6.7	25.3	27.4	0.13	3.7
	9 am	27.2	3.2	6.9	25.1	27.8	0.11	3.7*
	11 am	28.2*	2.9	7.1	25.3	28.1	0.13	3.6
	1 pm	30.4*	1.8	7.0	25.4	27.2	0.15	3.7
	3 pm	30.1*	2.0	7.1	25.0	26.4	0.15	4.1
	5 pm	28.3	2.8	7.0	24.8	26.2	0.12	3.7
	7 pm	28.0	3.1	7.1	25.3	27.0	0.12	3.8
30/3/2003	7 am	27.0	3.4	6.8	25.1	27.6	0.13	3.6
	9 am	28.1	2.8	7.0	25.1	27.4	0.13	3.7
	11 am	28.9	2.8	7.0	25.3	27.4	0.15	3.7
	1 pm	31.2*	1.6	7.1	24.7	25.2	0.11	3.8
	3 pm	30.6*	1.6	7.1	24.8	23.8	0.12	4.2
	5 pm	28.4	1.8*	7.0	25.3	24.6	0.13	3.7
	7 pm	27.4	2.6	7.0	25.1	24.2	0.13	3.6
31/3/2003	7 am	26.8	3.5	6.8	25.2	27.3	0.11	3.7
	9 am	28.0	3.0	6.8	25.3	27.3	0.11	3.6
	11 am	29.1*	2.4	7.1	25.3	27.5	0.13	3.6
	1 pm	31.5*	1.4	7.0	24.6	25.1	0.11	4.0
	3 pm	31.1*	1.5*	7.0	24.8	25.1	0.12	3.8
	5 pm	29.1*	2.1	7.1	25.1	24.6	0.13	3.5
	7 pm	27.1	2.7	7.1	25.2	24.4	0.11	3.6

* = Significant (P<0.5); WT = water temperature (°C); DO = dissolved oxygen (mg/l); Alk = alkalinity (ppm); Cond = conductivity (Ohms); Tub = turbidity (m); FCO = free carbon dioxide (mg/l).

higher during the morning and evening sessions. This is in agreement with finding that increase in water temperature decreases dissolved oxygen concentration (Huet, 1972). However, where higher levels of dissolved oxygen were found, it may probably be that high photosynthetic activities of the phytoplankton occurred at

that period. This is similar to documentation on the phytoplankton response to artificial enrichment with nitrates and phosphates in an upland and lowland reservoir in Plateau State of Nigeria (Kemdirin and Ejike, 1992).

The pH was generally alkaline in the afternoon and evening time and this indicates good buffering capacity of the water. The high biota production due to high pH values may have been supported by high free carbon dioxide values (Table 1). The low variation of free carbon dioxide may be due to low utilization by the few phytoplankton present, since phytoplankton bloom occurs mostly during rainy season (Hecky and Kling, 1981). However no further work has been done to identify these micro-organisms. But the work of Singh and Singh (2000) shows that certain micro-organisms like *Oscillatoria* sp. reflect low water quality.

The turbidity value is fairly high as this time falls within the dry season. This favours even solar heat radiation of the water body and removal of suspended solids which might make the water unfit for drinking. Also, the free floating biota and fish eggs constituting pollutants will be easily exposed to bottom predators (Boyd, 1979).

The physico-chemical parameters documented on this study fall within the minimum permissible limits (USEPA, 1979), which is relevant to Nigeria situation. Since the presence of certain micro-organisms in the Omi water is obvious, it is therefore suggested that this water should be purified by boiling, filtering or/and aluming to remove germs before drink.

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