



A STUDY ON WATER QUALITY OF KHOMPH-NIWARI LAKE AT CHHATARPUR, M.P.

S. L. Khare, S. R. Paul and Anita Dubey

Department of Chemistry, Govt. Maharaja College, Chhatarpur-471 001, M.P.

ABSTRACT

The present study deals with the analysis of water quality of Khoumph-Niwari lake for the period of one year from January 2005 to December 2005. The analysis of physico-chemical parameters includes temperature, suspended solids, dissolved solids, pH, total hardness, alkalinity, carbonates, bicarbonates, sulphate, dissolved oxygen, carbon dioxide, BOD and COD.

INTRODUCTION

Khoumph Niwari lake is an important water body as its water is used for the drinking purpose in Chhatarpur (M.P.), famous for Khajuraho temples, which are only 45 km away from the city. The water quality has been deteriorated due to discharge of various types of pollutants into the lake, and if the trend continues it may produce serious impacts on human health. A potable water has to be safe. Keeping the above in view it was decided to undertake the present study.

MATERIALS AND METHODS

Khoumph-Niwari lake is located between the villages Khoumph and Niwari. Its area is 54 ha. It was constructed in the year of 1662 by Chandel ruler of that time. This lake has municipal supply filtration plant situated on the main Chhatarpur-Mahoba road. Surface water samples were collected from the lake, once a month, for a period of one year from January 2005 to December 2005. Clean plastic bottles of 2 litres capacity were used for collection of samples. Care has been taken to avoid accidental contamination during sampling and transportation to the laboratory. Samples were brought to the laboratory and analysed for physico-chemical parameters following standard methods (APHA 1989).

RESULTS AND DISCUSSION

The results of the study are shown in Table 1. The recorded temperature showed wide fluctuation depending upon the weather conditions and load of inorganic and organic compounds. The water temperature was falling from June to December, then it started increasing up to summer. Total solids ranged from 164 mg/L to 182 mg/L. The WHO recommended highest value of total solids for drinking water is 500mg/L. The amount of total solids in the lake water is within the range.

The dissolved oxygen level in water is constantly changing due to the organic matter. The recommended minimum dissolved oxygen level for freshwater fish is from 6.0 mg/L to 8.0 mg/L. The amount of dissolved oxygen was minimum in winter season and rainy season, and maximum in summer season.

Alkalinity represents the buffering capacity of water. It was high during summer. It becomes low during rainy season due to dilution. Most natural waters will have pH values from pH 5.0 to pH 8.5. The pH values of the lake water are within the acceptable range.

Table 1: Physico-chemical characteristics of Khoumph-Niwari lake, Chhatarpur (M.P.) From January 2005 to December 2005.

Parameters	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Atm.Temp°C	20	22	24	30	40	40	36	34	32	30	24	16
Water Temp°C	18	20	22	26	30	30	28	28	27	24	22	14
Total Solids	166	166	166	172	180	182	170	164	167	165	166	167
Colour	LY	LY	LY	LY	LY	LY	LY	LY	LY	LY	LY	LY
Alkalinity	68	68	68	70	76	74	70	68	64	62	64	68
pH	7.4	7.3	7.3	7.4	7.5	7.6	7.6	7.5	7.4	7.3	7.3	7.4
Mg	25.5	25	25	26	27	27.5	27	26	24	23	25	25
TH	102	102	104	106	109	107.5	103	100	98	98	101	101
Chloride	23.2	23.4	24.4	25	26	26	24.4	24.2	23.2	23	22.6	20
Sulphate	1.3	1.31	1.34	1.36	1.4	1.38	1.4	1.38	1.38	1.36	1.33	1.32
Silicate	0.32	0.34	0.36	0.36	0.38	0.39	0.4	0.38	0.36	0.36	0.34	0.32
Phosphate	1.8	1.9	2.0	2.1	2.2	2.3	2.1	2.0	1.9	1.8	1.8	1.9
Iron	0.162	0.16	0.162	0.17	0.18	0.19	0.18	0.18	0.17	0.15	0.15	0.16
DO	7.0	7.1	7.2	7.4	7.56	7.54	7.0	6.9	6.8	6.8	7.0	7.0
BOD	14.2	8	14.2	14.6	16.6	16.4	16	15.6	15.4	14.4	14.2	14.3

LY = Light Yellow; All values are in mg/L except pH, temperature and colour.

Biochemical oxygen demand (BOD) values fluctuated between 8.0mg/L and 16.6 mg/L. The total hardness of water represents primarily the total concentration of calcium and magnesium ions. Waters containing hardness concentration up to 60mg/L are called "soft", and those containing 120-180 mg/L as "hard". Total hardness of the lake water is well below the highest limit.

Chloride is one of the important indicators of pollution. In the samples, the chloride concentration is between 20 mg/L and 26 mg/L. Phosphates are essential for growth of algae. The phosphate concentration in lake water is from 1.8 mg/L to 2.3 mg/L. It indicates fertilizer run off, domestic waste discharge and detergents. It contributes to pond water turbidity. Its concentration is within the ideal levels. Sulphate plays an important role in the growth of plants. Domestic sewage causes considerable increase in sulphate ions. Its concentration in lake water ranged from 1.30 mg/L to 1.4 mg/L, which is acceptable level in drinking water.

Sodium and potassium are important cations present in all kinds of waters. The lower concentration has no adverse effect on human health.

In all the samples, the physico-chemical parameters are well within the limits as the water is treated for municipal supply. It is recommended that proper maintenance of the lake is necessary. Proper sanitation measures and environmental education to public are essential to keep the water supply clean and safe.

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APHA, 1989. Standard Methods for the Examination of Water and Waste Water, 17th ed. American Public Health Association, Washington DC.