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ANALYSIS OF WATER QUALITY PARAMETERS IN PONDS OF RATANPUR, BILASPUR DISTRICT, CHHATTISGARH

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ABSTRACT

This paper present to study of the physico-chemical parameters of Ratanpur ponds in bilaspur district, Chhattisgarh. Monthly changes in physical and chemical parameters such as water temperature, transparency, turbidity, total dissolved solids, ph, dissolved oxygen, free carbon dioxide, and total hardness, chlorides, alkalinity, phosphate and nitrates. Were analyzed for a periods of one year from January 2011 to December 2011. All parameters were within the permissible limits. The results indicate that the ponds are non-polluted and can be used for domestic, irrigation and pisciculture.

Key words: Aquatic**,** Perennial, Physico-Chemical Parameters, Monthly variation.

INTRODUCTION

Water is one of the most important compounds to the ecosystem. Better quality of water described by its physical, chemical and biological characteristics. But some correlation was possible among these parameters and the significant one would be useful to indicate quality of water. Due to increased human population, industrialization, use of fertilizers in agriculture and man-made activity. The natural aquatic resources are causing heavy and varied pollution in aquatic environment leading to water quality and depletion of aquatic biota. It is therefore necessary that the quality of drinking water should be checked at regular time interval because due to use of contaminated drinking water, human population suffers from a variety of water borne diseases. It is difficult to understand the biological phenomena fully because the chemistry of water reveals much about the metabolism of the ecosystem and explain the general hydro biological relationship. The physico-chemical parameters of water and the dependence of all life process of these factors make it desirable to take as an environ in present study involves the analysis of water quality in terms of physico-chemical parameters of ratanpur dam, bilaspur district, chhattisgarh. The pondswater is basically used for domestic, agriculture purpose and fisheries activity. In india still now several researchers have done study on physicochemical and biological characteristic of standing and running water resources [1- 3]

MATERIALS AND METHODS

The water samples from ratanpur ponds were collected from four different stations in the morning hours between 9 to 11am, in polythene bottle regularly for every month. The water samples were immediately brought in to laboratory for the estimation of various physico-chemical parameters like water temperature transparency and ph were recorded at the time of sample collection, by using thermometer and pocket digital ph meter. Transparency was measured with the help of secchi disc while other parameters such as do, tds, free co2, hardness, chlorides, alkalinity, phosphate and nitrate were estimated in the laboratory by using standard methods as prescribed by apha, awwa, [4], trivedy and goel [2],kodarkar [3].

RESULTS AND DISCUSSION

The monthly variation in physico-chemical parameters is presented in table.

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Water Temperature

In the present study of the water temperature ranges from 22.5°c to 26°c. The maximum (26°c) temperature was recorded in the month of March (summer) and minimum (22.5°c) in the month of December (winter). It showed that higher temperature in summer and relatively lowers in winter. Similar study, Jayabhaye et al [5], salve and Hiware [6], observed that during summer, water temperature was high due to low water level, high temperature and clear atmosphere. Water temperature plays an important factor which influences the chemical, biochemical and biological characteristics of water body.

Water transparency

Transparency of Water Fluctuates from 6.0 cm to 92.0 cm. The Maximum (92.0cm) was recorded in the month of October (winter) and minimum (6.0cm) in the month of May during summer. Khan and Chowdhury [7] reported that higher transparency occurred, during winter and summer due to absence of rain, runoff and flood water as well as gradual settling of suspended particles. Kadam, et al; [8], also reported similar observation from Masoli reservoir.

Turbidity

The turbidity of water fluctuates from 0.4 NTU to 12.41 NTU. The maximum values (12.14 NTU) was recorded in the month of February (summer) It might be due to human activities, decrease in the water level and presence of suspended particulate matter, and minimum value (0.4NTU) in the month of October.

Total dissolved solids

The total dissolved solids fluctuate from 0.1g/l to 2.2g/l. the maximum value (2.2g/l) was recorded in the month of June. It is due to heavy rainfall and minimum value (0.1g/l) in the month of April.

pH

The pH was alkaline values ranges from 7.3 to 8.8. The maximum pH value (8.8) was recorded in the month of May (summer) and minimum (7.3) in the month of September. The factors like air temperature bring about changes the pH of water. Most of bio-chemical and chemical reactions are influenced by the pH. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH, the low oxygen values coincided with high temperature during the summer month [9].

Dissolved Oxygen

The value of DO fluctuates from 6.40 mg/l to 12.6 mg/l. The maximum values (12.6 mg/l) was recorded in the month of May (summer) and minimum values (6.40 mg/l) in the month of November (winter). The high DO in summer is due to increase in temperature and duration of bright sunlight has influence on the % of soluble gases (O^2 & Co^2). The long days and intense sunlight during summer seem to accelerate photosynthesis by phytoplankton, utilizing Co_2 and giving off oxygen. This possibly accounts for the greater qualities of O_2 recorded during summer. The quality is slightly lesser during winter, reported by [10].

Free Carbon dioxide

The value of free Co2 ranges from 0.0 mg/l to28.6 mg/l. The maximum value (28.6 mg/l) was recorded in the month of December (winter) and minimum value (0.0mg/l) in the month of March. This may be depends upon alkalinity and hardness of water body. The value of CO_2 was high in December. This could be related to the high rate of decomposition in the warmer months.

Hardness

The value of hardness fluctuates from 70 mg/l to 179mg/l. The maximum value (179 mg/l) was recorded in the month of April (summer) and minimum value (70 mg/l) in the month of October. Hujare [11] was reported total hardness was high during summer than monsoon and winter. High value of hardness during summer can be attributed to decrease in water volume and increase of rate of evaporation of water. Similar results were obtained in the present study.

Chlorides

The values of chlorides range from 31.06 mg/l to 57.61 mg/l. The maximum value (57.61 mg/l) was recorded in the month of May (summer) and minimum value (31.06 mg/l) in the month of February. In the present study maximum value of chloride reaches in summer. Similar results were reported by Swarnalatha and Narsing rao [12].

Alkalinity

Total alkalinity ranges from 121.25 mg/l to 200mg/l. the maximum value (200 mg/l) was recorded in the month of May (summer) and minimum value (121.25 mg/l) in the month of January (winter). Alkalinity was maximum value in April (summer) due to increase in bicarbonates in the water. Hujare [11] also reported similar results that it was maximum in summer and minimum in winter due to high photosynthetic rate.

Phosphate

The value of phosphate fluctuates from 0.12mg/l to 12.38 mg/l. the maximum value (12.38mg/l) was recorded in the month of August (monsoon) and minimum value in the month of October (winter). The high values of phosphate in August (monsoon) months are mainly due to rain, surface water runoff, agriculture run off; washer man activity could have also contributed to the inorganic phosphate content. Similar results reported by Arvind kumar [13].

Nitrates

The values of nitrate ranges from 4.40mg/l to 37.5 mg/l. the maximum value (37.5mg/l) was observed in the month of July (monsoon) and minimum (4.40mg/l) in the month of November (winter).

Table 1. Physical parameters of Ratanpur ponds, Bilaspur Dist, Chhattisgarh

Month	Temperature 0C	Transparency cm	Turbidity NTU	TDS gm/lit	pH
Jan	23	14	11	0.39	8.0
Feb	24	12	10	0.27	8.7
Mar	26	9.0	12	0.3	8.8
Apr	23	7.5	9	0.1	8.0
May	25	6.0	7	0.6	8.0
Jun	23.5	10	13	2.0	8.4
Jul	24	55	1.0	1.13	8.1
Aug	24.5	61	3	0.2	8.3
Sep	25.5	52	4	0.4	7.7
Oct	25.5	92.0	0.4	0.4	7.5
Nov	25	80	1.8	1.8	7.4
Dec	22.5	65	2	0.4	8.2

Table 2. Chemical parameters of Ratanpur ponds, Bilaspur Dist, Chhattisgarh

Months	Dissolved oxygen	Free Co2	Hardness	Chloride	Alkalinity	Phosphate	Nitrate
Jan	8. 0	4.4	80.0	42.0	120.0	1.91	8.0
Feb	9.05	---	80.00	30.0	123.0	3.3	10.84
Mar	12.5	4.0	102	44.0	180	3.39	12.0
Apr	12.0	5.4	170	45.0	150	4.14	25.0
May	12.6	3.4	142	57	200	4.8	33.0
Jun	12.0	8.6	160	41.0	170	11.12	13.05
Jul	10.04	9.8	75	44.0	155	10.68	35.8
Aug	9.79	6.0	90	47.57	190	12.38	12.0
Sep	9.05	20	104	38.34	190	4.58	4.88
Oct	8.82	13.2	70	42.6	170	0.1	4.43
Nov	6.40	15.0	110	44.55	150	0.19	4.40
Dec	9.21	22.6	88	48.61	140	5.5	5.25

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