



ANALYSIS OF WATER QUALITY USING PHYSICO-CHEMICAL PARAMETERS OF MOHANRAM POND IN SHAHDOL DISTRICT, MADHYA PRADESH, INDIA

Zoology

Vandana Ram

UGC Post Doctor Fellow Department of Zoology Pt.S.N.Shukla Govt.P.G.College, Shahdol (M.P.)

Binay kumar Singh

Professor of Zoology Department of Zoology Pt.S.N.Shukla Govt.P.G.College, Shahdol (M.P.)

ABSTRACT

This Paper deals with the Physico - chemical Parameters of Mohanram Pond in Shahdol district, Madhyapradesh. Monthly Changes in Physical and Chemical Parameters Such as Water Temperature, 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 March 2016 to February 2017 simultaneously E.coli and Total bacteria test also done. All Parameters were within the permissible limits. The results indicate that the tank is Non-polluted and can be used for Domestic, Irrigation and Fisheries but it is not suitable for drinking without treatment.

KEYWORDS

Perennial tank; Physico-Chemical Parameters, Monthly variation.

INTRODUCTION

Pond irrigation is one of the oldest and significant sources of irrigation in India. The ponds occupy vital role in the irrigation as well as local ecosystem. This perennial pond provides multiple uses like source of drinking water, domestic uses, fish culture; recharge of ground water etc. As water is one of the most important compounds of the ecosystem, but due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity, the natural aquatic resources are causing heavy and varied pollution in aquatic environment leading to pollute water quality and depletion of aquatic biota. It is therefore necessary that the quality of drinking water should be checked at regular time of interval, because due to use of contaminated drinking water, human population suffers from varied 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 quality of water is described by its physical, chemical and microbial characteristics. But, if some correlations were possible among these parameters, then significant ones would be fairly useful to indicate the quality of water. This study is important, because fluctuation in the water quality has an influence on the biotic communities (Aher and Mane, 2007). This information is important to be communicated to the general public and the Government in order to develop policies for the conservation of the precious fresh water resources (Ali et al., 2000). The aims of this study were designed to monitor monthly variation in water quality parameter of Mohan Ram Pond so as to assess its status and suitability through the portability and aquaculture point of view and to compare observed levels of studied parameters with the corresponding WHO and IS:10500,1992 guidelines values for drinking-water quality.

Image showing different sides of pond



MATERIAL AND METHODS

The water samples from Mohanram Pond were collected from two different sites in the evening hours between 4 to 6 pm 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 and pH were recorded at the time of sample collection by using Thermometer and Pocket Digital pH Meter. While other Parameters Such as DO, TDS, Free CO₂, Total Hardness, Chlorides, Alkalinity, Phosphate and Nitrates were estimated in the laboratory using Indian standard procedures. For the estimation of DO, Free CO₂, Total Hardness, Chlorides, Alkalinity, Phosphate and Nitrates, titration methods were used while pH, TDS and Turbidity estimated by digital devices simultaneously E.coli and Total bacteria test also done with the help of bacterial test kit.

RESULT AND DISCUSSION

Month	Temperature in 0C	Turbidity NTU	TDS mg/l	pH
Jan	21	001	310	7.5
Feb	24	002	450	7.6
Mar	26.5	004	640	8.0
Apr	28	004	810	7.9
May	30	003	780	7.7
Jun	30	002	960	8.2
July	28	005	730	8.6
Aug	27	003	570	8.2
Sept	26	003	550	7.8
Oct	26	002	540	7.5
Nov	20	002	510	7.4
Dec	20	001	480	7.4

Month	Free CO ₂	Dissolved oxygen	Hardness	Alkalinity	Chloride	Calcium	magnesium
Jan	0.7	3.4	229.0	244	200	0.353	34.3552
Feb	0.5	3.6	243.0	265	150	0.368	36.2865
Mar	0.9	7.6	268.0	353	100	0.387	41.8216
Apr	3.7	7.2	282.0	352	200	0.429	39.2600
May	4.5	8.8	278.0	356	250	0.446	41.6508
Jun	8.1	10.4	287.7	340	300	0.387	44.2616
July	8.8	6.8	200.0	232	250	0.404	45.6036
Aug	4.4	8.8	172.0	206	200	0.219	35.4776
Sept	16.7	8.0	180.0	210	150	0.286	24.5464
Oct	10.7	8.9	210.0	224	150	0.290	25.4345
Nov	14.8	9.2	217.4	242	200	0.378	29.9876
Dec	18.0	8.7	220.3	240	200	0.369	32.4626

Table-01:- Physical parameters of Mohanram Pond, Shahdol district.

Table-02:- Chemical parameters of Mohanram Pond, Shahdol district (values are in mg/l).

Month	Jan	Feb	Mar	Apr	May	June	July	August	Sep.	Oct.	Nov.	Dec.
E.coli count (E.coli/ml)	10 ³	10 ³	10 ³	10 ⁴	10 ⁴	10 ⁴	10 ⁵	10 ⁵	10 ⁵	10 ³	10 ³	10 ³
Total bacteria count (TBC/ml)	10 ²	10 ²	10 ²	10 ³	10 ³	10 ³	10 ⁴	10 ⁴	10 ⁴	10 ⁴	10 ²	10 ²

Table-03:- E.coli and Total bacteria count in different months of the year.

Climate

This area is a semidry zone, there is a rapid increase in temperature after the month of January and April is the hottest month. The climate of the year is divided into four seasons viz hot season from March to May; monsoon from June to September; Post-monsoon from October to November; winter from December to February.

Water Temperature

The water temperature plays an important factor which influences the chemical, bio-chemical characteristics of water body. The maximum temperature of 30 was recorded in May, June and a minimum of 20 was recorded in month of November, December. Water temperature in summer was high due to low water level.

Turbidity

The turbidity of water fluctuates from 001 to 005 NTU. The maximum value of 005 was recorded in the month of June; it may be due to decrease in the water level and Anthropogenic activities and minimum value of 001 NTU in the month of December, January.

Total Dissolved Solids

The total dissolved solids fluctuate from 960 mg/l to 310 mg/l. The maximum value was recorded in the month of June. It also may be due to decrease in the water level and Anthropogenic activities and the minimum value was recorded in the month of January.

pH

pH was alkaline values ranges from 8.6 to 7.4. The maximum pH value was recorded in the month of July (8.6) and minimum (7.4) in the month of November, December. Most of bio-chemical and chemical reactions are influenced by the pH. The low oxygen values coincided with high temperature during the summer.

Hardness

Hardness of water ranges from 287.7mg/l to 172.0mg/l. The maximum value was recorded in the month of June (287.7) during summer can be attributed to decrease in water volume and increase of rate of evaporation of water and minimum value was in the month of August may be due to heavy rain and dilution of water.

Dissolved Oxygen

The value of DO fluctuates from 10.4 mg/l to 3.4 mg/l. The maximum value was recorded in the month June and minimum values in the month of January. The high value in summer is due to increase in temperature and duration of bright sunlight has influence on the percentage of soluble gases as oxygen and carbon dioxide. The long days and intense sunlight during summer seem to accelerate photosynthesis by phytoplankton, utilizing CO₂ and giving off oxygen. (Krishnamurthy R., et al, 1990)

Free Carbon Dioxide

The value of free CO₂ ranges from 0.5mg/l to 18.0mg/l. The maximum value was recorded in the month of December and minimum was recorded in the month of February. CO₂ may fluctuate according to environmental condition, alkalinity and Hardness of water.

Alkalinity

Total alkalinity ranges from 356 mg/l to 205 mg/l the maximum value of 356 mg/l and minimum value of 205 mg/l were recorded in the month of May and August respectively. The alkalinity was maximum

value in the summer due to increase in bicarbonates in water. (Hujare, M. S. 2008)

Chlorides

The value of chlorides ranges from 300mg/l to 150mg/l. The maximum value was recorded in the month of June (summer) and minimum value in winter. In the present study, maximum value of chloride reaches in summer (Swarnalatha and Narsingrao, 1998).

Phosphate and Nitrates

There was no phosphate and nitrates in pond water may be because it is situated in the city not in open agriculture land.

E.coli and Total bacteria count

E.coli and Total bacteria was maximum in the months of summer and minimum during winter and rainy season. It may be due to decrease in the water level and Anthropogenic activities. E.coli is the indicator of faecal contamination even a 10² count is alarming as all standards, both national and international for this organism are zero.

CONCLUSION

According to results of this study conclusion is, pond water is not suitable for drinking because of contamination of bacteria and high value of TDS.

SUGGESTIONS

There is much human interference in respect to water degradation by which pollution are increasing as, Washing clothes, Taking bath, Worship for different spiritual purpose, immersion of statues etc. these activities should be banned by the authority because some peoples are using its water for drinking also, which is not good for their health as well as aquatic animals.

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