



Hydrobiological Studies Of Keerat Sagar Pond At Mahoba District Of U.P., India

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Abstract

The hydrobiological studies of keerat Sagar pond at Mahoba district of U.P. by using physiochemical parameters. The samples were collected throughout the year from December 2021 to November 2022 and various parameters such as temperature, turbidity, pH, carbonate, bicarbonate, total alkalinity, chloride, DO and free CO₂ were analysed from the pond. The results obtained from all the parameters indicate that all the factors were within the permissible limits and the pond is suitable for fisheries.

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Keyword: *Hydrobiological studies, physiochemical parameters, pH, alkalinity.*

Introduction

Keerat Sagar pond is located at malakpura in Mahoba district 1060-1100 AD was established by 13th king Kirti Verman. It is situated at western side of the city, its geo location in 25° 01' 30" N- 25° 39' 40" N latitude and 79° 15' 00" E -80° 10' 30" N longitude.

Water is considered to be one of the essential factors for existence of life on the planet for all living organism. Each and every organism depends on water for their survival. About 1% of total water in Earth is present in aquatic resources such as ponds, rivers, dams etc which is used by mankind for the day today practices. Lakes and ponds are a diverse set of inland freshwater habitats that exist across the globe and provide essential resources and habitats for the both terrestrial and aquatic organism. Although widely distributed and vital for many species, including humans these habitats account for just over 3% of the Earth's surface (Downing [et.al.](#), 2006). [1]

Ponds are considered to be useful source since ancient time as an essential source of water for ancient people. In general, seasonal signal changes in the nature of the water results in the variation in the population of specific algae in the aquatic bodies (Sharma [et.al.](#), 2016). [2]

Material and Methods:-**Study Area - Keerat Sagar pond**

Sites: Three sampling sites was selected for study purpose

Site 1. It is located at the southern side and situated near the inlet.

Site 2. it is located at the eastern site which is deep, bathing and washing ghats with many trees on its embakemnt.

Site 3. it is located at the northern side which is also deep with thin aquatic vegetation on its bank

Sample collection – Water sample was collected from the pond during from December 2021- November 2022 was selected for data collection.

Experiment analysis -Various Physio-chemical parameters were analyzed by using standard method described by Trivedi and Goyal (1986) [3], kodarkar (1992) [4] APHA(2005) [5],and Jain and Jain(2007) [6].

Water temperature –

Water samples were analyzed with the help of Mercury thermometer.

pH- pH of the samples were determined by Equip-Tronics digital pH meter model EQ-610 using glass electrode.

Turbidity- Turbidity was recorded by Systronics Nepheloturbidity metre and expressed as NTU.

Carbonate and Bicarbonate- Bicarbonate 0.02N(N/50),sulphuric acid standard 0.02N (N/50) Na_2CO_3 and phenolphthalene alkalinity reagents were used in the for carbonate estimation. Phenophthlene alkalinity $\text{mg/l} = \text{number of ml of } 0.02 \text{ N } \text{H}_2\text{SO}_4 \text{ used} \times 10$

Bicarbonate alkalinity was determined by procedure with methyl orange as indicator .

Bicarbonate alkalinity $\text{mg/l} = \text{number of ml } 0.02 \text{ N } \text{H}_2 \text{SO}_4 \text{ used} \times 10$.

Dissolved oxygen- Dissolved oxygen was estimated by Winkler's method using alsterberg azide modification.

Result and discussion-

Water temperature - It was ranged from 14.1 to 32.8⁰C. Minimum temperature recorded in the month of January and maximum temperature recorded in month of June. Temperature is one of the most important factors in the aquatic environment B.K. Dwivedi (2002) [7]

pH - pH value of pond varies between 7.3 to 8.2 .According to Boyd and Pillai (1984) [8] better fish production could be possible in pond water with pH range 6.5 to 9.0.

Turbidity -it was ranged from 15.20 to 67.28 NTU. A Similar trend of fluctuation was also observed by Shimpi. B.et al., (2011). [9]

Carbonate and Bicarbonate- Carbonate values range from 6.30 to16.20 ppm which was due to the utilization of CO_2 during photosynthesis due to creating the carbonate. A similar results was also observed by George (1961) [10] while bicarbonate values range from 135.2 to 197.5 ppm . It is increase with addition of animal wastes.

Total Alkalinity - It was ranged from 147.5 to 209.4 ppm This range of alkalinity as favourable for standing crop of the pond. A similar result was also observed by Huzare M.S.(2008) [11] and Mishra et al (2016) [12]. The alkalinity is the buffering capacity of water.

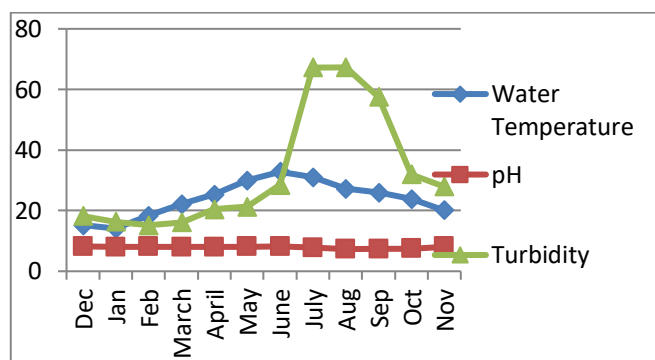
Chloride-The value of chloride varies from 9.42 to 42.5 ppm. The lower value was recorded in month of September and the higher value of chloride in the month of may. Similar trend is reported by Swarnalatha and Narsingh Rao (1998) [13].

Dissolve oxygen- The value of DO varied from 3.7 to 8.0 ppm. The higher value of DO is found in winter and lower value in summer season the study should hide you may be due to the increase solubility of oxygen at lower temperature. The same results observed by [Krishnamurthy.R.et al.,\(1990\)\[14\]](#).

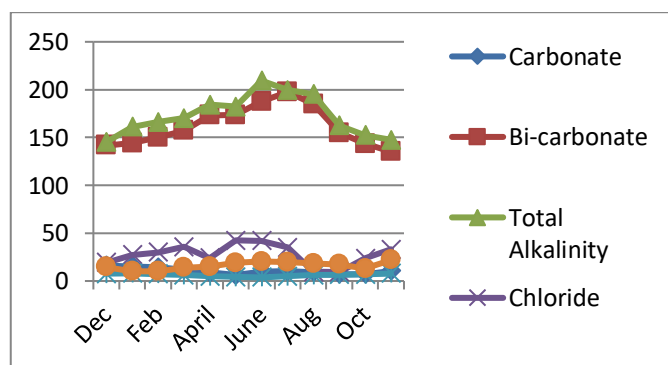
Free Carbon dioxide -The value of free Carbon dioxide varied from 10.00 to 21.90ppm.Higher value is found in month of November and lower value found in month of February.Similar results observed by [Shimpi.B.et al.,\(2011\) \[15\]](#).

Month	Water Temperature	pH	Turbidity	Carbonate	Bi-carbonate	Total Alkalinity	Chloride	DO	Free CO ₂
Dec	15.2	8.2	18.20	16.20	141.7	145.2	19.40	7.5	14.50
Jan	14.1	8.0	16.30	15.20	144.2	161.1	27.40	8.0	10.10
Feb	18.3	8.1	15.20	14.30	150.0	166.0	30.00	7.1	10.10
March	22.1	8.0	16.10	12.00	157.1	170.1	35.50	6.2	13.90
April	25.3	8.0	20.50	9.00	173.2	184.2	24.00	5.0	14.80
May	30.0	8.1	21.30	6.30	173.4	182.3	42.50	4.3	19.00
June	32.8	8.2	28.50	9.80	187.5	209.4	42.10	3.7	20.20
July	31.0	7.8	67.25	10.20	197.5	199.7	35.00	5.0	19.60
Aug	27.2	7.3	67.28	9.20	185.0	195.2	9.50	6.1	18.10
Sep	26.0	7.4	57.50	7.30	154.9	162.4	9.40	6.5	17.20
Oct	23.8	7.5	32.00	7.10	143.5	152.5	23.50	6.9	13.00
Nov	20.1	8.1	28.00	10.50	135.2	147.5	33.10	7.9	21.90

Table- Hydrobiological parameters of session December 2021 to November 2022.



Graph 01- Monthly variations in physical parameters



Graph 02 – Monthly variations in Chemicals parameters

Conclusion –

The study reveals that the hydrobiological parameters of keerat Sagar pond are within permissible and acceptable range hence the ecosystem and environment of pond was found healthy and suitable for purpose of fisheries.

References:-

1. Downing , J.A.et al.,(2006). The global abundance and size distribution of lakes, ponds and impoundments . *Limnology and oceanography* 51,2388- 2397.
2. Sharma , R.C., Singh,N. and Chauhan, A. (2016), *Egyptian Journal of Aquatic research* , 47,11- 21.
3. Trivedi, R.K and Goel, P.K. 1986.*Chemical and Biological methods for water pollution*, Environmental Publication, Karad, Maharashtra.
4. Kodarkar M.S. 1992. *Methodology for water analysis, Physico-chemical, Biological and microbiological* Indian Association of Aquatic Biologists, Hyderabad, 2, p.50.
5. APHA 2005. *Standard methods for the examination of water and waste water*, 21" Edi. Washington, DC.
6. Jain and Jain.2007. *Engineering Chemistry*, 15 Edition, Dhanpat Rai Publishing Company, New Delhi.
7. Dwivedi. B.K , and Pandey, G.C(2002) *Physico – Chemical factors and algal diversity of pond in faizabad, India* *Poll.Res* 21(3) , 361-370.
8. Boyd, CE and Pillai, V.K.1984. *Water Quality management in Aquaculture*. CIMFRI Spl pub. (22)1-96.
9. Simpi, B., Hiremath, S.M., Murthy, KNS., Chandrashekhara, K.N. Patel, A.N,Puttiah, ET. 2011. *Analysis of water quality using Physico-Chemical Parameters Hosahalli Tank in Shimoga District, Karnataka, India* *Global Journal of Science and Frontier Research*, 11 (3), p.30-34.
10. George, M.G.1961. *Observations on the rotifers from shallow ponds in Delhi*, *Curr. Sci.* p.268-269.
11. Huzare, M.S. 2008. *Seasonal variation of Physico-chemical parameters in the perennial tank Talsande, Maharashtra*. *Ecotoxicol. Environ Monit*, 18 (3) p.233-242.
12. Mishra, UK., Narayan, A., Kumar, P.2016. *Water analysis of Physico-chemical parameters from sajnani Dama Reservoir District Lalitpur U.P. India: Asian J. of Ag. and Life. Sci.*, Vol 1 (2) p.1-4.
13. Swaranlatha, S. and A. Narsingrao. 1998. *Ecological studies of Banjara lake with reference to water pollution*. 1. *Envi. Biol.* 19(2): p.179-186.
14. Krishnamurthy, R.1990. *Hydrobiological studies of wobar reservoir Aurangabad, Maharashtra state, India*.*J. Environ Biol.* 11(3), *Hydrobiological studies of wobar reservoir Aurangabad, Maharashtra state, India*.*J. Environ Biol.* 11(3), p.335-343.
15. Simpi, B., Hiremath, S.M., Murthy, KNS., Chandrashekhara, K.N. Patel, A.N,Puttiah, ET. 2011. *Analysis of water quality using Physico-Chemical Parameters Hosahalli Tank in Shimoga District, Karnataka, India* *Global Journal of Science and Frontier Research*, 11 (3), p.30-34.