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STUDIES ON PHYSICO-CHEMICAL PARAMETERS TO ASSESS THE WATER QUALITY OF RIVER BICHHIYA IN DISTRICT REWA (M.P.)

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ABSTRACT :-

Bichhiya river water is an important source of irrigation in major parts of the Rewaregion.A systematic study has been carried out to assess the water quality of River Bichhiya in RewaDistrict (M.P.). Water is one of the abundantly available substances in nature. It is an important and life sustaining drinks to human and is essential for the survival of all the organisms. Living organisms require large quantities of water for their sustenance. In this study we are analyzed to seasonal variation in physico-chemical parameters like Water Temperature, pH, Dissolved Oxygen, Total alkalinity, Total hardness, B.O.D. and C.O.D. inBichhiya River of Rewa (M. P.) in all months of year 2019.The analytical data of various physico-chemical parameters indicates that some parameters are found to be in excess than the prescribed limit in some water samples of the study areas.Suitable suggestions were made to improve the quality of river water.

KEYWORDS : *Bichhiya River, Physico-chemical parameterand Water pollution.*

INTRODUCTION:-

Water is a vital natural resources, rapidly becoming scare in quantity, quality and unpredictable supply in many places of the globe. The enormous quantity of water covers most of the globe and riddles the continents with lakes and river, water is the medium, participant in all of the chemical reactions occurring in the environment, including the life processes. Indeed water is an important condition of life. Water is essential for all socioeconomic development and for maintaining healthy ecosystems. Natural surface water bodies like rivers and streams are subjected to pollution comprising of organic and inorganic constituent.

Pollution of a river first affects its chemical quality and then systematically destroys the community disrupting the delicate food web. Diverse uses of the rivers are seriously impaired due to pollution and even the polluters like industry suffer due to increased pollution of the rivers. River pollution has several

dimensions and effective monitoring and control of river pollution requires the expertise from various disciplines1 .Pollution of river is a global problem. In India it is reported that about 70% of the available water is polluted. The chief source of pollution is identified as sewage constituting 84 to 92 % of the waste water. Industrial waste water comprised 8 to 16 %.

Rivers are the most important sources of water to global population. Rivers provide water for industry, agriculture, commercial, aquaculture and domestic purposes. Unfortunately this important source of water is being polluted by indiscriminate disposal of sewage, industrial wastes and plethora of human activities. The significant role played by river in almost in every development programm of country hardly needs many elaborations. Peoples living along bank of these rivers largely depends on them for their water needs for everyday for living.

An understanding of water chemistry is the bases of the knowledge of the multidimensional aspect of aquatic environmental chemistry which involves the source, composition, reactions and transportation of water. The quality of water is of vital concern for the mankind since it is directly linked with human welfare. It is a matter of history that facial pollution of drinking water caused water-borne diseases.

OBJECTIVE OF THE STUDY-:

The experiment was laid down with the following objectives:

1. The general survey of the Bichhiyariver and its climatic conditions.
2. To find out water quality of Bichhiya River, Rewa (M.P.) through the analysis of physico- chemical parameters.

REVIEW OF LITERTURE:-

The quality of surface water plays a significant role in the development of aquatic flora and Fauna. Many Hydro geochemical models (Ghalib, Yaqub& Al-Abadi, 2019) and water quality index method were used to assess the status of water quality. Water quality index is a single numerical value used for determining the quality of water for human consumption (Asadi, Vuppala&Anji, 2007; Hoseinzadeh, Khorsandi, Wei &Alipour, 2014).

The surface water being exposed to anthropogenic influences and atmospheric deposition of pollutants becomes a very sensitive and critical issue in many countries (Kumar and Singh 2018). Anthropogenic influences, geochemical factors, chemical composition of river basin and natural processes like interaction of water with lithogenic structure through which the river flows (Subramani et al. 2009) degrade surface water quality making it unsuitable for drinking, industry, agriculture and other purposes (Simeonov et al. 2003; Kazi et al. 2009).

According to Yaseen et al., (2020), Dams that break the river continuum play an important role in promoting economic and social development as well as providing important services such as flood control, agricultural expansion, domestic use and generation of electricity her ecologists have provided their valuable suggestion regarding such the study which are not cited here but, considered for the presentation of further study. After having studies on various literatures of river, ponds, springs and anthropogenic dams it becomes essential to have a long course study of all these natural resources with are being affected by human activities. Thus, present study is intended to bridge the gap.

MATERIAL AND METHODS :-

Study sites:-

The study area is situated between 81^0 -18, east longitude and 28^0 -32, north latitude and is situated on Vindhya plateau at the height of 318 meter above m. s. l. The climate is mainly sub-tropical and sub humid. The average annual rainfall of the region is 82.953 mm and relative humidity is 79.36 %. Two

water bodies namely Bichhiya River wasselected for study, because of their contribution to the development of fresh water culture fishery of Rewa district. Bichhiya River is located on 24^0 -10' N and 81^0 - 15' longitude east of Rewa town.

The present study was conducted over a period of one year from January 2019 to December 2019. Parameters like pH, temperature, were detected at sampling stations while water samples were collected in sterilized containers for remaining parameters and analyzed immediately after reaching in laboratory. The procedure for physic-chemical parameters was followed according to Trivedi and Goyal (1986), APHA (2005).

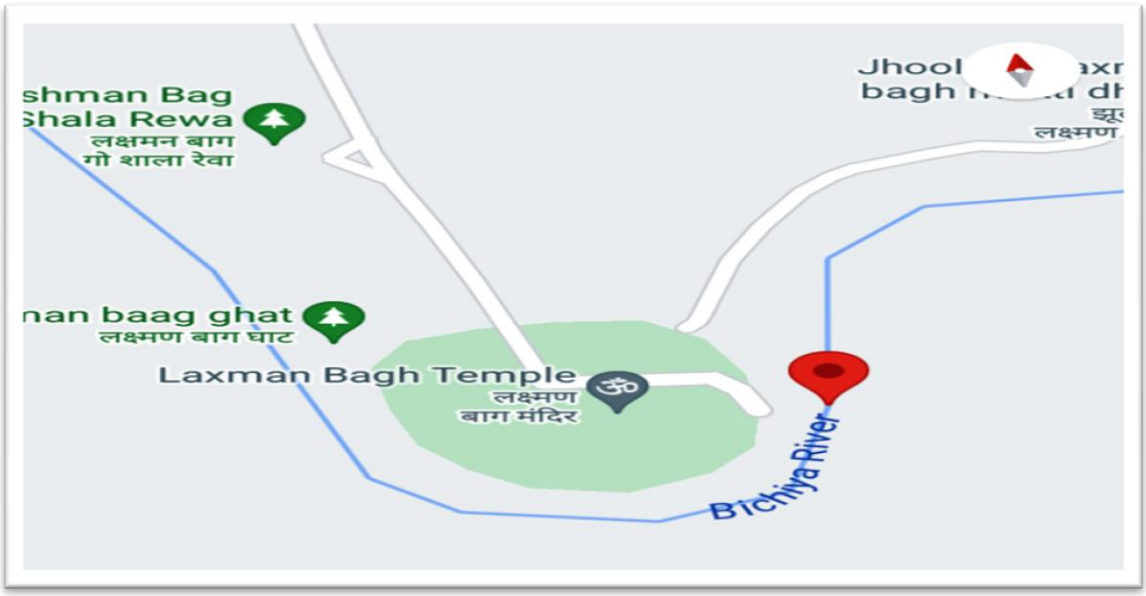


Fig. 1.Location Map of Bichhiya River Rewa M.P.

Sampling Station:-

Four sampling station were selected for chemical analysis of river. They are-

Station 1st - The Ist station was Gurh where the river Bichhiya originated. It is about 27k.m. away From Rewa town.

Station 2nd - The 2nd station was established at Laxman Bag Mandir 6 km away from Rewa District.

Station 3rd - The 3rd station was established before Rajghat the characteristics of the station is PHE Deptt. Pumping.

Station 4th - The 4th station was marked on Chhotipul which is half km from Old Rewa Bus Stand.

RESULTS AND DISCUSSION:-

The water quality parameters were analyzed with the help of samples collected from 3 different sampling stations S1, S2,S3 and S4. Such type of water quality parameters were also described by DattaMunshi, et al., (2006). The result of water quality analysis at three sampling stations of Bichhiya River is shown in table 1.

Water Temperature (^{0}C):-

The mean value of water temperature recorded was 25.5ºC, 21.5ºC, 24.30ºC at sampling stations S1, S2, S3 and S4. Temperature has been considered as an important factor in aquatic environment (Singh et. al., 2005).

Hydrogen ion concentration (pH):

The hydrogen ion concentration was determined by pH meter (systronics). The pH of the water samples studied was 7.58, 7.92, 7.82 and 8.25 at S1, S2 S3 and S4. High water values of pH during summer months may be due to utilization of bicarbonates and carbonates buffer system (Mishra et. al., 2011).

Total Alkalinity (mg/l) :-The value of total alkalinity was found158 mg/l, 165 mg/l 176 mg/l and 186 mg/l at S1, S2 S3 and S4.

Dissolved Oxygen (DO)(mg/l):

The value of dissolved oxygen was found 7.26mg/l, 6.72 mg/l, 4.85 mg/l and 5.78 mg/l at S1, S2 S3 and S4. Minimum DO was recorded at S3 at the influx site of municipal drainage. Similar result was shown by Banarjee and Ghosh (2016) for Damodar River.

Total Hardness(mg/l):-

The value of total hardness registered in the present study was 190 mg/l, 185 mg/l,189 mg/l and 194 mg/l at S1, S2, S3 and S4 stations.

Biological oxygen demand (BOD)(mg/l):-

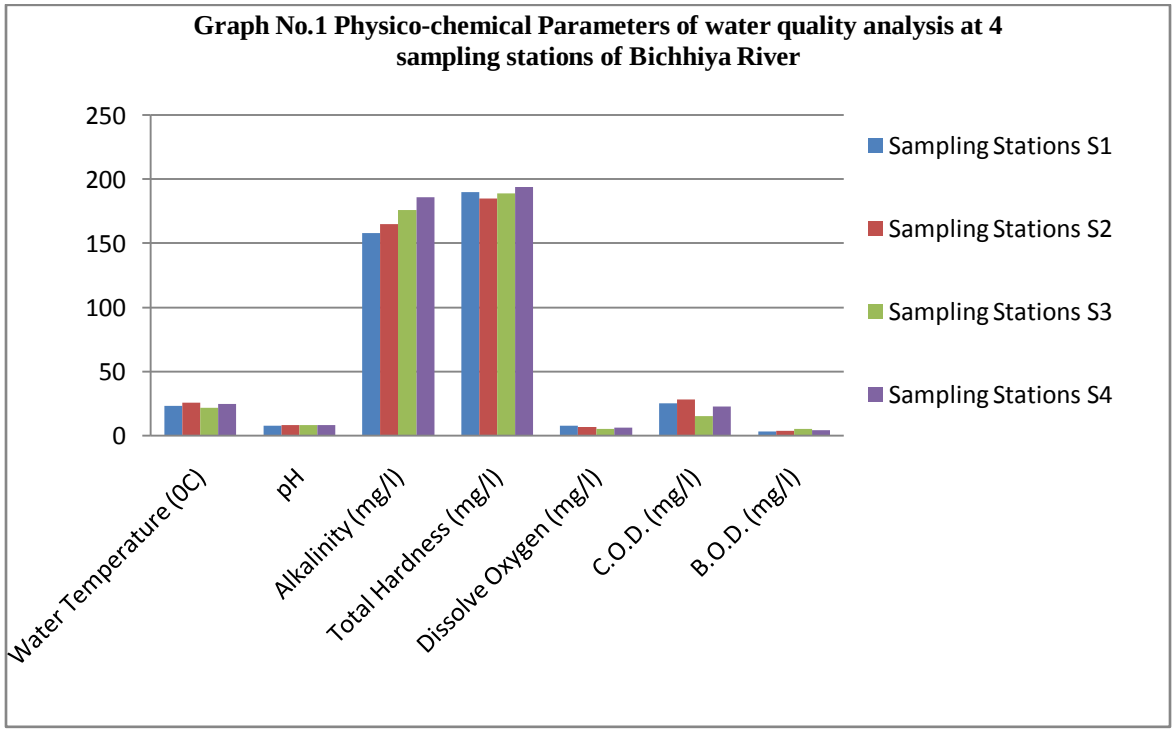
The BOD value of water sample under present investigation recorded as 3.25 mg/l, 3.5 mg/l, 4.85 mg/l and 3.78 mg/l at S1, S2,S3and S4 stations. Regular addition of organic of organic matter ion the surface water might have offered intense bacterial growth which consequently resulted in increased BOD level. BOD indicates the amount of Oxygen required for stabilizing biological decomposable organic matter in waste under aerobic condition by microorganism. The reason of high content of BOD in summer months could be due to the fact that several microbes accelerated their metabolic activities with concentrated amount of organic matter discharged due to human activities, and hence required more amount of oxygen (Kumar et. al., 2005).

Chemical oxygen demand (COD)(mg/l):

The COD value of studied water samples was recorded as 25.01 mg/l, 28.25mg/l, 15.25 mg/l and 22.35 mg/l at sampling stations S1, S2, S3 and S4. The sources of COD may be due to input of domestic drains and the use of soap and detergents for washing and bathing by common man, as suggested by (Mathur et al. 2008).

Table 1: Physico-chemical Parameters of water quality analysis at 4 sampling stations of Bichhiya River

Sr. No.	Physico-chemical Parameters	Sampling Stations				Value range	
		S1	S2	S3	S4	Min	Max
1.	Water Temperature (^{0}C)	23.02	25.5	21.50	24.30	21.50	24.30
2.	pH	7.58	7.92	7.82	8.25	7.58	8.25
3.	Alkalinity (mg/l)	158	165	176	186	158	186
4.	Total Hardness	190	185	189	194	194	185
5.	Dissolve Oxygen	7.26	6.72	4.85	5.78	4.85	7.26
6.	C.O.D.	25.01	28.25	15.25	22.35	15.25	28.25
7.	B.O.D.	03.25	03.50	4.85	3.78	3.25	4.85



CONCLUSION:-

Sampling stations S1, S2 S3 and S4 differ in physicochemical characteristics of water quality.The water studied is rich in nutrients with organic loading. It is most possibly due to influx of discharged domestic sewage which affects the water quality of the river and other aquatic biota. The river water is found suitable for agricultural purposes also. Further more detail study is recommended.

REFERENCES:-

1. Adoni A.D. (1985). Work book on Limnology. Indian Map Committee, Department of Environment, Govt. of India, 216.

2. APHA (2005). Standards Methods for examination of water and waste water.21st Edn., American Public Health Association Inc., New York.
3. Asadi, S. S., Vuppala, P., &Anji, R. M. (2007). Remote sensing and GIS techniques for evaluation of groundwater quality in municipal corporation of Hyderabad (Zone-V), India. International Journal of Environmental Research and Public Health, 4(1), 45–52.
4. Banerjee R. and Ghosh A.R. (2016). Identification and Quantification of aquatic macrophytes with ecological indices in Damodarriver. 2(6):275-281.
5. DattaMunshi J. and DattaMunshi J.S. (2006). Fundamentals of Freshwater Biology. NarendraPub.House. Delhi. 222.
6. Ghalib, H., Yaqub, M., & Al-Abadi, A. (2019). Hydrogeochemicalmodeling and isotopic assessment of the quaternary aquifer at Ali al-Garbi Area in Misaan Governorate, South of Iraq. In Advances in Sustainable and Environmental Hydrology, Hydrogeology, Hydrochemistry and Water Resources, 121–124. doi:10.1007/978-3-030-01572-5_30
7. Kazi TG, Arain M, Jamali MK, Jalbani N, Afridi HI, Sarfraz R, Baig J, Shah AQ (2009) Assessment of water quality of polluted lake using multivariate statistical techniques: a case study. Ecotoxicol Environ Saf 72(2):301–309.
8. Kumar A., Bohra, C. and A.K. Singh (2018)-Ecotechnology for limnological project of Kawarlake with special reference to biogeochemical cycles. In ecology and ethology of aquatic biota. Daya publishing House, Delhi, India, 1: 149-199.
9. Kumar P. and Sharma H. B. Physico-chemical characteristics of lentic water of Radhakund, district Mathura. Ind. J. Env. Sci.2005, 9: 21-22.
10. Mathur P., Agarwal and Nag M. Assessment of physicochemcial characteristics and suggested restoration measures for Pushkar Lake, Ajmer Rajashthan India, Proceeding of Taal 2007: The 12th world lake conference. 2008, 1518-1529.
11. R. P. Singh and P. Mathur. Investigation of variation in Physico-chemical characteristics of a fresh water reservoir of Ajmer city, Rajasthan. Ind. J. Env. Sci. 2005, 9: 57-61.
12. Rahashyamani Mishra, Rajesh Kumar Prajapati, Virendra Kumar Dwivedi and Arpana Mishra. Water quality assessment of Rani Lake of Rewa (M.P.), India. GERF Bulletin of Biosciences. 2011, 2(2), 11-17.
13. Simeonov V, Stratis JA, Samara C, Zachariadis G, Voutsa D, Anthemidis A, Sofoniou M, Kouimtzis T (2003) Assessment of the surface water quality in Northern Greece. Water Res 37:4119–4124
14. Subramani T, Rajmohan N, Elango L (2009) Groundwater geochemistry and identification of hydrogeochemical processes in a hard rock region, Southern India. Environ Monit Assess 162(1–4):123–137 Turkey) and management implications. J Afr Earth Sci 129(May 2017):481–491.
15. Trivedy R. K. and Goel P. K. (1986). Chemical and biological methods for swater pollution studies, Environmental Publication, Karad, Maharashtra, India, 247. McGrew-Hill, N.Y., 538 p.
16. Yaseen, Z. M., Ameen A. M. S., Aldlemy, M. S., Ali, M., Afan, H. A., Zhu, S.,. Al-Janabi, A.M.S., Al-Ansari, N., Tiyasha, T., Tao, H, (2020); State-of-the Art-Powerhouse, Dam Structure, and Turbine Operation and Vibrations Sustainability. 12, 1676.

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