

HYDROBIOLOGICAL STUDY OF GOPAD RIVER, SIDHI (M.P.)

Surendra Kumar Dwivedi and Dr. A. K. Tiwari
Department of Zoology
Govt. S. G. S. P.G. College, Sidhi (M.P.)

ABSTRACT:- The water quality has become a major concern due to over increasing human development activities that over exploits and pollute the water resources. Present investigations were carried out on the hydrobiological aspects of Gopad river in Sidhi district (M.P.). Many of the parameters were found below the permissible limits for drinking water as suggested by WHO. parameters were analyzed and their seasonal variations in the year 2018-2019 were discussed.

KEYWORDS:- Water, hydrobiological and Gopad river.

INTRODUCTION:-

Water is abundant in living organisms because of its special properties that have an intimate relationship to the functioning of the living matter, the relationship is so crucial that life is not possible without water. All the interactions of the molecules involved in living take place in a watery solution and water is the most versatile of solvents as more substances dissolve in it than in any other solvent. this is due to the water molecules being polar with a slight positive charge of their oxygen ends. So other molecules with unequal charges are attached to one or the other end of the water molecules. This is hydrogen bond. Water forms the major part of the living matter and its proportion varies from organism to organism and from tissue to tissue in the same organism. In present chapter of the thesis various characteristics of the water has been analyzed. Water causes ionization molecules, such ionic dissociation is of great importance to many process in life, like the contractions of molecules, transmission of nerve impulses and membrane activities. A certain percent of water molecules themselves dissociate into hydrogen ions and hydroxyl ions. There is also re-association of them into waste molecules, thus maintaining a dynamic equilibrium, substances that increase or decrease the hydrogen ion concentration make the water medium more or less acidic. But the acidity is well regulated in the living system as it is of crucial importance for

macromolecules that are highly sensitive to changes in the acidity of the medium. The nature of water in relation to heat is of great importance to life. It is good conductor of heat and that helps to distribute heat in the body and prevent excessive heating of some part of another, water also helps by preventing any sudden rise in temperature as the latent heat of water is high and also absorbs heat without corresponding rise in temperature. Moreover, water is not only a solvent and medium of reaction but forms part of the structural and working machinery of life. Limnology is a discipline that concerns the study of inland aquatic ecosystem (whether freshwater are saline, natural or manmade) including the biological, physical, chemical, geological ecological and hydrological aspects of lakes, reservoirs, ponds rivers, wetlands and ground water. At time and historically, limnology is more specifically defined as the study of lakes and open reservoirs (International year of fresh water 2003, Marcus 1959) or as the study of fresh water system European Environment Agency, (2006), or is limited to the study of physical and chemical elements but not the biological elements (Strom 1929). However, the broader and generally accepted conception of limnology involves the study of al inland aquatic ecosystems including the biological aspects (Brezonik 1996 and Strom 1929).

MATERIAL AND METHODS:-

Sidhi is the Distt. of old Vindhya Pradesh. Presently it is one of the very important Distt. of Madhya Pradesh. Sidhi is situated on the North-East border of the state. The geographical location is 23⁰15'N - 24⁰15'N latitude and longitude 81⁰45'E- 82⁰45'E. The town is located on a plateau and is situated 65.7 meters above the mean sea level. The gopad, Gopad, and Mahan rivers surround the town from almost three sites and mark its Northern, Southern and Western boundaries. Hills mark the Eastern boundary. To study the water quality and its seasonal variations, the water samples are collected from the surface at a depth of 22 cm. from four different points, integrated and a representative sample was taken.

Water samples were collected during morning hours in between 8.30 to 10.30 a.m. with one liter containers from the river in three seasons i.e. during summer, monsoon and winter seasons from April 2018 to March 2019. Sampling was done at four sites. Some of the results were recorded at the sampling sites whereas the others were recorded in the laboratory. The parameters observed were water temperature, Temperature of water (°C), Turbidity (NTU), pH, Alkalinity mg/l, Total Hardness mg/l, Chloride mg/l, DO mg/l, BOD mg/l and COD mg/l of the gopad river. Samples of the water for physicochemical characteristics were analysed according to standard methods of APHA (1998).

RESULT & DISCUSSION:-

The results of physicochemical analysis of three seasons. The pH of the Gopad river is 7.20, 6.60 and 6.53 during the summer, monsoon and winter seasons. The highest value was noticed in summer season and lowest in winter season. Decline in pH during monsoon and winter seasons were attributed to the rains as it increase the amount of carbonic acid to the lake water (Khan and Chaudhary 1994, Kaushik et al. 1989). Hutchinson (1975) stated that if any aquatic system is neither higher alkaline nor highly acidic, the pH of the water is principally governed by the CO₂ - bicarbonate-carbonate system. The variation was observed in the water temperatures in three seasons whereas a well marked seasonal variation in recorded. The temperature remained comparatively low throughout the study, which may be due to the presence of thick forest around it. Martin (1972) stated that the clarity of water, presence of vegetation etc. are the factors mainly responsible for the daily fluctuations in water temperature. The alkalinity varied from 122 mg/l to 166 mg/l in three seasons, during which minimum value (122 mg/l) was observed in monsoon and the maximum (166 mg/l) in Winter season. The alkalinity of water is usually caused by the presence of carbonates, bicarbonates and hydroxyl ions and less frequently by borates, silicates and phosphates (APHA 1998). Total dissolved solids of the gopad river were 6.3 mg/l in summer, which is the highest value and the lowest values 5.4 mg/l was noticed in winter. Total hardness value of the gopad river was 199 mg/l to 230 mg/l of which higher value was in monsoon while the lowest in summer season. The maximum permissible limit for this parameter for drinking water standards is 500 mg-l . Chloride values were found ranging between

86 mg/l to 190 mg/l of which maximum value was noticed in summer and the lowest value in monsoon may be due to dilution effect in post winter period. Total BOD value of the gopad river was 8.1 mg/l to 22.3 mg/l of which higher value was in summer while the lowest in monsoon season. The COD varied from 32 mg/l to 166 mg/l in three seasons, during which minimum value (32 mg/l) was observed in monsoon and the maximum (166 mg/l) in Winter season. Chourasia and Adoni (1985) also found similar behaviour of chlorides in their studies on Sagar lake with summer maxima and winter minima. Cole (1975) noted that free CO₂ supply rarely limits the growth of phytoplankton. It was quite opposite in relation to dissolved oxygen and phytoplankton population. Many earlier workers have also reported similar findings (Marshall and Falconer, 1973; Meckenzie and Gillespie, 1986; Ghavzan et al., 2006; Bhadja and Vaghela, 2013).

REFERENCES:-

1. Marcus MG. Limnology: Its growth and evolution. *Annals of the Association of American Geographers*. 1959; 49(40) :46 -470.
2. European Environment Agency. Limnology European Environment Information and 7 Observation Network. Retrieved. 2006; 12 :207.
3. Strom KM. The study of Limnology. *Journal of Ecology*. 1929; 17(1):106 -111.
4. Brezonik PL. Limnology, now: A paradigm of planetary program: book reviews. *Ecology*. 1996 .
5. APHA. Standard methods for the estimation of water and waste water. American public health association. American waste water association and water pollution control federation. 20th Edition Washington. D.C. 1998 .
6. Khan MAG , Chowdhary SM. Physical and chemical limnology of the lake Kaptai, Bangladesh. *Tropical Ecology*. 1994; 35:35 -51.
7. Kaushik S, Sharma S, Saxena MN. Aquatic insect population in relation to physico -chemical characteristics of Chandanpura pond, Gwalior (M.P.). In: *Environmental Risk Management* (Eds: Y.N. Sahai, P.B. Deshmukh, T.A. Mathai and K.S. Pillai) Academy of Environmental Biology, India, Muzaffernagar. 1989, 243 -254.
8. Hutchinson GE. *A Treatise in Limnology*. John Wiley and Sons Inc. New York. 1975, 1015 .

9. Martin NA. Temperature fluctuations with in English lowland ponds. *Hydrobiologia*. 1972; 40(4):455 - 470.
10. Chourasia SK , Adoni AD. Zooplankton dynamics in a shallow eutrophic. *Limnology Bot. Soc. Sagar*. 1985; 32 :30 -39.
11. Cole GA. Text book of limnology. C.V. Mosby. Co., St. Lois, Sanfransisco. 1975.
12. Marshal BE , Falconer FC. Eutrophication of tropical African impoundment lake (Me ilwaine, Rhodesia). *Hydrobiologia*. 1973; 43(1 -2) :109 - 123 .
13. Meckenzie AL , Gillespie PA. Plankton ecology and productivity nutrient chemistry and hydrography of Tasman bay. Newzeland, 1982 - 1984. *N.Z.J. Mar. Fresh Water, Res*. 1986; 20 :365 -395.
14. Ghavzan NJ, Gunale VR, Trivedy RK. Limnological evaluation of an urban fresh water river with special reference to phytoplankton. *Pollut. Res*. 2006; 25(2) :259 - 268.
15. Bhadja, Poonam , Ashok Kumar Vaghela. Hydrobiological studies on fresh water reservoir of Saurashtra Gujrat India. *Journal of Biology of Earth Science*. 2013; 3 :E12 -E17.
16. WHO (World Health Organization). Guideline for drinking water quality, 2nd ed., Health criteria and other supporting information, World Health organization, Geneva. 1997; 2:940 - 949.