

PHYSICO-CHEMICAL STUDY OF POND WATER S.M. COLLEGE BHAGALPUR

Dr.Madhulika Sahay (Head of Dept. of zoology, S.M. College, Bhagalpur),

Dr.Mousumi Dey (research scholar, Dept. of zoology, S.M. College, Bhagalpur)

ABSTRACT

Physico-chemical properties of pond water of S.M. College were investigated during March 2019 to May 2019. The temperature was high in the month of May and the highest dissolved oxygen was found in the month of March and the alkalinity was observed within range. The production of Zooplankton and Phytoplankton were also favourable as the food of fish.

INTRODUCTION

The objective of the study of the pond water is to test the quality of water for the rearing of fishes and the growth of phytoplankton and zooplankton. Fish is an important and cheap source of protein, a vitamin for the human being. It is our duty to examine the water bodies for rearing them in the present study we have chosen the water of very small pond of S.M. College Bhagalpur. Microscopic studies were done for identifying phytoplankton ..i.e...cyanobacteria, dinoflagellates and zooplankton..i.e.. Molluscs, volvox, crustacean...And its clarity and pH were measured by using Ph paper. Dissolved oxygen was measured by using the Winkler Method. The water was rich in zoo and phytoplankton and the Do₂ was 4.8mg/l. So the result shows that ten pair of fish can be reared in the pond. The will enhance the research activity on fishes. The present study shows even the small ditches of water can be observed in different places and may be used to grow the fishes.

Much of the dissolved oxygen in water comes from the atmosphere after dissolving of the surface. Oxygen is depressed by current and turbulence. Algae and rooted aquatic plants also deliver oxygen to water through photosynthesis. The major factor contributing to changes in dissolved oxygen levels is the buildup of organic wastes. The decay of organic wastes consumes oxygen and is often concentrated in summer when aquatic animals require more oxygen to support higher metabolism depletion in dissolved oxygen can cause major shifts in the kinds of aquatic organism found in water bodies. Temperature, pressure and salinity influence the dissolved oxygen capacity of water. All these factors play a vital role in controlling the sewage. These control the nature of vegetation and fauna of the aquatic body. The present study carried out in pond water in S.M. College Bhagalpur. The maintenance of a healthy aquatic ecosystem depends on the Physico-chemical properties of water. Lots of works have been performed on the seasonal changes in the Physico-chemical properties of rivers, lakes, ponds, reservoirs and streams in India by several workers as Priyanka Yadav, V.K. Yadav, A.K. Yadav and P.K. Khare(2013), Banerjee and Ghosh(1967), Munawar(1970), Mathew(1978), Pillai et.Al.(1999), Sinha(1985,2002), Wetze(1991), Prasad(2002), Pandey and Mishra(1991).

MATERIAL AND METHOD

We investigated this process by WINKLER METHOD. Uses titration to determine dissolved oxygen in the water sample. A sample bottle is filled completely with water. The dissolved oxygen in the sample is then fixed by adding a series of reagent that forms an acid compound that is then titrated with a neutralizing compound that results in the colour change. The point of colour change is called the endpoint.

Reagent list-2ml Manganese sulphate, 2 ml alkali iodide-azide, 2ml concentrated sulphuric acid, 2ml starch solution, sodium thiosulphate.

Table: Average monthly variation in Water Temp(C), pH, Dissolved oxygen(mg/l), Odour, Zooplankton, Phytoplankton and Alkalinity of pond water S.M. College Bhagalpur.... 2019.

Month	Water Temp.	pH	Do2	Colour	Odour	Zooplankton	Phytoplankton	Alkalinity
March	20.5	7.00	4.8	Slightly green	Odour less	Molluscs Volvox	Dianoflagelates Cyanobacteria	90mg/l
April	23.5	6.40	3.8	Slightly green	Odour less	Molluscs Volvox	Cyanobacteria Dianoflagelates	90mg/l
May	25.5	6.40	3.8	Slightly green	Odour less	Crustacean	Dianoflagelates	90mg/l

RESULT

The fluctuation in the physico-chemical properties of pond water has been depicted in table. The water and air temperature were found to go more or less hand in hand, ambient air temperature varied from 20.75 C to 30.5 C where as water temperature was found to vary between 20.5 C in month of March and 25.5 C in month of May. The pH values varied from 7.00 to 6.40. It is moderate is dissolved oxygen content that value ranged from 4.8mg/l in month of March to 3.8mg/l in month of May... Bicarbonate alkalinity range was recorded 90mg/l by alkalinity titration method (by using methyl orange indicator and phenophthelene indicator). Water showed normal value of alkalinity.

DISCUSSION

TEMPERATURE: Temperature is an universal factor and slight change in it effect the hydrobiology of the water bodies. Water temperature is affected by ambient temperature as well as plant species in the water body. The lowest and highest values of water temperature were due to variation in the intensity of incident sunlight and high metabolic rate. Temperature was negatively correlated with dissolved oxygen which shows that increase in temperature evolve O₂ from water.

pH (hydrogen ion concentration) : pH measurement gives the intensity of acidity or basic character of water. pH of water has significant role in survival of aquatic plants (Sinha, 1995). pH shows no significant variation throughout the study period (7.00 to 6.40) and it was circumneutral in nature but mostly in slight acidic range. According to Banerjee and Ghosh(1967) 6.5-7.8 pH water range is most favorable for fish production and 7.5 to 8.5 for average for fish production.

DISSOLVED OXYGEN: Dissolved oxygen is the main regulator of metabolic processes of plant and animal communities. The volume of dissolved oxygen in water at any given time is dependent on the temperature of the water, the extent of contact between the water and the circulation of water and the amounts produced and consumed within that system. With adequate circulation by wind the oxygen level remains at just below saturation levels and may lead to a clear stratification of oxygen itself. The dissolved oxygen was in lower range during summer due to low volume of water and increase in the number of animals per unit area which consumes oxygen for their respiration and also due to rapid decomposition in which O₂ is consumed.

Higher values of dissolved oxygen were observed in primarily due to high photosynthesis activity by the phytoplankton and macrophytes. Similar results we observed by Mathew(1978), Verma(1979) and Sinha(1995,2002).

ALKALINITY: Alkalinity in water is mainly due to carbonates, bicarbonates and hydroxide. It is the index of nutrient status of water body. Bicarbonate alkalinity ranged showed similar range in monthly interval is 90mg/l. It can be safely termed as not hard water showed normal value, which suitable for rearing fish.

CONCLUSION

The physico-chemical analysis of water levels that water of pond of S.M. College Bhagalpur is very rich in nutrient content and is highly suitable for supporting of phytoplankton and zooplankton. The data also revealed that the important parameters were within favorable range for fish culture. The maintenance of a healthy aquatic ecosystem is dependent on the physico-chemical properties of water and biological activity.

ACKNOWLEDGEMENT

Second author is thankful to Dr. Madhulika Sahay (HOD of zoology department Bhagalpur) for encouragement and is grateful to the management of S.M.P.G. College for providing facilities and for their constant encouragement.

REFERENCES

APHA(American Public Health Association) 2012. American Water Works Association and Water Pollution Control Federation. Standard methods for examination of water and waste water. 14th edition. APHA, Washington U.S.A.

A.K. Dixit, S.K. Pandey, R. Mehta, Niyaz Ahmad, Gunjan, Jyoti Pandey:2014.
Study of physico- chemical Parameters of different Pond water of Bilaspur District, Chattisgarh, India.

Mr. Ankita Pradhan, Ankita Pradhan, Nachiketa Bandyopadhyay, International Journal of Zoology and Applied Bioscience: Jan 2018, seasonal variation of water quality parameters and zooplankton in water bodies of purulia district, West Bengal, India.

Surajit Mjumdar, Anupam Tanusree Dutta, Akash Acharyya, Rituparna Gouswami: 2014 vol.2 Issue 7, 1146-1157: Physico-chemical Parameters influenced Zooplankton diversity in some ponds of south western part of Bankura.

Jyoti Choudhary, S.N. Singh and Sunita Singh: 2014: Physico-chemical and Biological Parameters of the three Rurel Ponds of Sasaram of Bihar.vol.2(2):206-210.

Hemant Pathak, Deepak Pathak and S.N. Limaye:2012: Studies on the physico-chemical status of two water bodies at sagar city under anthropogenic influences. Adv.Appl.Sci.Res, 2012,3(1):31-44.

Mousumi Dey:2018 Assessment of seasonal variation of physico-chemical status of Kamla Dhar of Koshi Zone(Bihar) proc.zool.soc.INDIA.17(2):89-95(2018).

Baruah,A.1995: Assessment of primary and secondary productivity of Kawar Lake(Begusarai), Bihar.Ph.D thesis, Bhagalpur University, Bhagalpur.

Pandey , B.N. and Mishra, R.D. 1991-Hydrobiological features of river Saura. Bio.J., 2(2):337-342

Pillai, A. Pandey, P. Shukla, A. Shukla, A.V. 1999. Physico-chemical studies of drinking water of drug municipality. Poll.Res.18(1):49-51.

Prasad, S. 2002:Limnobiological study of Bagarbeel Wetland (Katihar, Bihar) with special reference to its productivity. Ph.D thesis B.N. Mandal University, Madhepura.

Priyanka Yadav, V.K. Yadav, A.K. Yadav and P.K. Khare;2013. Physico-chemical characteristics of a Fresh Water Pond of Orai, U.P., Central India.Octa Journalof Biosciences.Vol.1(2):177-184