

Physico - chemical analysis of Vaitarni pond water of Gaya district in Bihar

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ABSTRACT

Water is the most important abiotic factor of our ecosystem to sustain life on earth. With due course of modernization, industrialization and other man made factor, this vital resource has been exploited both qualitatively and quantitatively. It is one of the abundantly available substances in nature which man has exploited more than any other resources for the sustenance of life. Water of good quality is required for living organisms. The chemistry of water is influenced by the input of material containing minerals, their solubility and chemical equilibrium prevailing in the aqueous solution. Any water is capable of assimilating certain amount of pollutants without serious effect due to dilution and self-purification factors. The present paper deals with physico - chemical analysis in three seasons of Vaitarni pond water of Gaya district in Bihar. A regular and frequent survey was done to analyze different kinds of physical and chemical parameters.

Key Words - water, physico - chemical, pollutants, Gaya, Bihar.

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INTRODUCTION

Water is one of the essential components for the sustenance of life on earth. Among the various source of water, ground water is considered to be the safe for drinking purpose. Ground water is ultimate, most suitable fresh water, resource with nearly balanced concentration of the salt for human consumption. Good drinking water quality is essential for the well being for all people. It is one of the abundantly available substances in nature which man has exploited more than any other resources for the sustenance of life. Water of good quality is required for living organisms. The chemistry of water is influenced by the input of material containing minerals, their solubility and chemical equilibrium prevailing in the aqueous solution. Any water is capable of assimilating certain amount of pollutants without serious effect due to dilution and self-purification factors.

The physico-chemical characteristics of any aquatic ecosystem and the nature and distribution of its biota are directly related to and influenced by each other and controlled by a multiplicity of natural regulatory mechanisms. However, because of man's exploitation of the water resources, the normal dynamic balance in the aquatic ecosystem is continuously disturbed, and often results in each dramatic response as depletion of fauna and flora, fish kill, change in physico- chemical character etc. Artificial changes which lead to such ecological responses are referred to as pollution and pollutional stage may reach a stage when these valuable aquatic resources are no longer safe for human use. Everything originated in the water and water sustains everything. All life on the earth depends on water. Water is significant source of habitat for plants, animals, and is found in every

section of ecosphere. Source of water are atmospheric, with surface water, stored water and ground water.

Stored water present in ponds, reservoirs, lakes or oceans is important features of the earth landscape. Water quality can have great influence on ability of aquatic organism to exist and to grow in a stream, pond or lake. It is well known that pollution of water cause adverse effect on fish and other aquatic organisms. Water polluted by industrial effluents decreased the amount of protein, Glycogen and lipids in fresh water organisms. Numerous anthropogenic activities like disposal of sewage and industrial water, recreational activities, excess fertilization of land and use of pesticides has threatened environmental health of both surface and ground water.

Water pollution is now a day is considered not only in the term of public health but also in terms of its conservation, aesthetics and preservation of natural beauty and resources. Water pollution has however threatened to reduce the quantity in ponds, lakes and rivers and reservoirs due to disposal of sewage, industrial water and due to other human activities.

The present work deals with physical and chemical analysis of water with reference to Vaitarni pond in Gaya district of Bihar. This is a famous fishing pond used for household purposes also resulting change in the original set up of limnetic habitat.

MATERIALS & METHODS

The present work was done in the Vaitarni pond of Gaya district, which is geographically situated at 24.75°N and 85.01°East. The physico-chemical analysis of water was done in the laboratory in addition to field water testing kits. Some of the characters like, colour, temperature, smell etc. were measured at the sampling site. The study was done in all the three seasons, summer, rainy and winter to know the change of water quality due to environmental factors.

The parameters used in the analysis of water are as follows:

pH	:	pH Meter or pH paper
Transparency	:	Seechi disc
Turbidity	:	Turbidometer
Conductivity	:	Conductivity meter
Dissolved solids:		Conventional methods
Total Hardness:		Conventional methods
Sodium	:	Water Testing Kit
Magnesium	:	Water Testing Kit
Fluoride	:	Water Testing Kit
Nitrate, Phosphate & Sulphate:		Water Testing Kit

RESULT & DISCUSSION

All samples were collected in high density plastic bottles. During sampling sample bottles were cleaned with ambient water before taking the samples. During whole study chemicals of standard quality were used. The analysis is based on APHA (2005) and WHO guidelines.

The result obtained by doing physico- chemical analysis of water in three different seasons has been shown in table 1.

The result shows that the value of pH is overall within the permissible limit in all the seasons. It has also been seen here that the dissolved salts has exceeded the permissible limit mostly in summer or winter season due to lesser availability of water in the pond. The presence of fluorides is an alarming threat both for limnetic habitat as well as for mankind.

CONCLUSION

On the basis of above mentioned facts, it has been seen here that water is the basic need or we can say elixir of life which should be kept pollution free and it's human responsibility to restrict it's exploitation and to keep it free from harmful chemicals both for conservation of biodiversity, keeping our environment pollution free and for future generation.

Table 1- Physico- chemical analysis of water in three different seasons

PARAMETRES	SUMMER SEASON	RAINY SEASON	WINTER SEASON
Colour	Slightly muddy	Muddy	Slightly Muddy
Odour	Not good	Overall odorless	Not good
Transparency	Clear	Slight clear	Clear
Water Temperature °C	36	28.5	18
Turbidity	5.2	1.8	3.9
pH	8.0	7.5	7.3
Total Hardness in (ppm)	125	205	169
Calcium Hardness in(ppm)	105	192	163
Magnesium Hardness in (ppm)	20	13	18
Conductivity	427	455	420
T.S.S in Mg/l	245	408	475
D.O. in Mg/l	5.8	5.1	7.2
B.O.D. In Mg/l	12.5	11	21
C.O.D. in Mg/l	185	505	432
Nitrogen In Mg/l	1.10	1.0	1.1
Phosphate in Mg/l	0.25	0.28	0.23
Sulphate in Mg/l	2.5	3.0	6.0
Chloride in Mg/l	22	19	12
Fluoride	0.96	0.6	1.2
Iron	0.6	0.5	0.7

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