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STUDY OF FRESHWATER QUALITY OF CHOBA NIMGAON LAKE BY USING PHYSICO-CHEMICAL PARAMETERS

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Abstract

A Physico-Chemical study of freshwater collected after rainy season is carried out to assess the water quality of Choba Nimgaon lake which is located in Ashti Tehsil of Beed district of Maharashtra in year 2017. Various parameters has been studied such as Colour, Temperature, pH, Conductivity, TDS, Dissolved Oxygen, Total Alkalinity, Hardness, Ca – Hardness, Mg- Hardness, Chlorides, Nitrates and Phosphates. Samples from various part of lake are collected to increase the correctness of assessment.

Keywords - Physico-Chemical study, freshwater, Choba Nimgaon lake.

Introduction

Physico-Chemical analysis of water is interesting and important topic as it shows its effect on all living things. Water is called as life because it is a highly essential and basic thing for healthy development of living things. Water is mainly used by human being for irrigation and drinking purpose. In irrigation quality of water enhances or reduces the productivity of soil. High TDS due to the excess amount of salt or unessential minerals make the soil unproductive. Limited amount of healthy minerals in water make the soil highly productive, same thing happen with drinking water. Good and pure water is important for healthy life of human being and bad water shows its worse effect. Human being and animals are highly dependent on

water reservoir and lake but most of the rivers are polluted by various activities of human being such as growing urbanization, industrial waste and domestic sewage. Good and pure water is highly essential for sustainable living of animal and human being also to keep balance of ecosystem. The freshwater collected in lake and reservoir is in danger because of various activities of humans, so physic- chemical analysis is important topic for study.

Study Area

Choba Nimgaon lake selected for study. This lake lies in eastern side of western Maharashtra (west of Beed district). It is situated at 75^0-5'-0"(E) longitude and 18^0-51'-0"(N) latitude. This is an irrigation project on river Kadi in Ashti tehsil. The river Kadi tributaries of river Bhima in Krishna basin. It is near to village Choba Nimgaon. This lake is constructed for Agriculture purpose but with time this water is used for various activities.

Materials and Methods

Samples were collected in clean 2.5 liter inert plastic container from different part of lake in last week of October 2017 for four days and labeled them from Sample 1 to Sample 10 avoiding floating material. Plastic container is rinsed with distilled water and then with lake water before collecting samples.

Some parameters such as Colour, Temperature and pH are measured at sampling site while other parameter such as Conductivity, TDS, Dissolved Oxygen, Total Alkalinity, Hardness, Ca – Hardness, Mg- Hardness, Chlorides, Nitrates and Phosphates are analyzed at laboratory. Method used for estimation of various parameters are listed in table 1.

Table 1 - Methods used for estimation of various parameters

Sr. No.	Parameter	Method Used
1	Colour	Visually

2	Temperature	Thermometric (by using 1/10th thermometer)
3	pH	pH-Metrically
4	Conductivity	Conductometrically
5	TDS	Gravimetrically
6	Dissolved Oxygen	Winkler Method
7	Total Alkalinity	Titration Method
8	Hardness	EDTA Titration Method
9	Ca - Hardness	EDTA Titration Method
10	Mg- Hardness	(Total hardness – Ca-Hardness) x 0.243
11	Chlorides	Titration Method
12	Nitrates	Spectrophotometrically
13	Phosphates	Spectrophotometrically

Chemicals used for analysis is of A.R. grade. Solutions are prepared in double distilled water. Glassware were cleaned with dil. HCl followed by distilled water, these weighed glassware were rinsed with methanol followed by acetone and dried in air oven at 80^{o}C.

Result and Discussion

A colour of sample varies from pale yellow to brown because of early rainfall. Temperature is recorded between 22.3 ^{o}C to 27.3^{o}C. pH of the water is slightly alkaline and varies from 7 to 8.6. Electrical conductivity is found to be 0.32µ mhos to 0.37 µ mhos. TDS value is found to be varies from 200 to 450 mg/L. Dissolved oxygen is important parameter for assessment of water quality as non polluted water is normally saturated with dissolved oxygen. The value of dissolved oxygen content is found to vary from 7.2 to 8.5 mg/L. the mean value of total alkalinity ranged between 160.2 to 194.6 mg/L. Hardness value is measured and observed in between 82.3 mg/L to 115 mg/L, calcium hardness is ranged between 12.8 to 16.2 mg/L. the

chloride value is varied from 15.9 to 19.4 mg/L. Nitrates range is varied from 0.098 mg/L to 0.112 mg /L. Phosphate value is found to be varies from 0.1 mg/L to 0.14 mg/L.

Table 2 - Physico-Chemical Parameters of Chobha Nimgaon Lake

Parameters	Colour	pH	EC	TDS	DO	TA	Hardness	Ca^{2+}	Mg^{2+}	Cl^{-}	NO_3^{-}	PO_4^{3-}
Expressed in			µ mhos	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Sample 1	Pale yellow	7.9	0.32	230	8.5	182.1	88.8	12.9	18.4	16.2	0.098	0.12
Sample 2	Pale yellow	7.4	0.37	200	8.4	176.2	86.3	13.0	17.8	16.0	0.098	0.12
Sample 3	Pale yellow	7.0	0.33	220	8.4	160.2	82.3	12.8	16.8	16.2	0.099	0.14
Sample 4	Pale yellow	7.9	0.33	350	8.3	165.1	89.9	14.1	18.4	19.4	0.100	0.14
Sample 5	Brown	8.1	0.34	450	7.2	187.1	114.7	16.2	23.9	19.1	0.099	0.1
Sample 6	Pale yellow	8.1	0.35	360	8.3	179	97.1	15.3	19.8	18.8	0.112	0.11
Sample 7	Pale yellow	8.0	0.35	340	8.2	190	104	15.2	21.5	17.6	0.112	0.11
Sample 8	Brown	8.5	0.33	410	7.3	192.4	111.6	16.1	23.2	18.6	0.112	0.14

Sample 9	Pale yellow	8.3	0.37	390	8.5	187	106.5	15.9	22.0	16.9	0.114	0.12
Sample 10	Brown	8.6	0.37	420	7.3	194.6	115	15.9	24.0	18.1	0.114	0.14

Conclusion

The present investigation of freshwater of Chobha nimgaon Lake collected after rainy seasons shows that the quality of water is going to down side day by day because of pollution and other activities of human being. Most of the parameter are above limit indicate that quality of water for drinking and irrigation purpose is not so good.

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