PHYSICOCHEMICAL PARAMETERS AND WATER QUALITY OF AMBONA LAKE

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ABSTRACT

An aquatic ecosystem provides all the necessities to the communities living in that area. These ecosystems also provide water and primary productivity on which number of other organisms survives. With increasing population the demand of food and water is increasing day by day. To meet the needs of freshwater we need to protect the freshwater resources. For preserving and protecting the world's freshwater ecosystem there should many more achievements in the study of these ecosystems. These water resources are polluting by many reasons, and polluted water is unavailable for human use. Water quality includes all physical, chemical and biological factors that influence the beneficial use of water. The following physico-chemical parameters were studied during the period of investigation i.e. from June 2017 to June 2018. Physical parameters such as Surface Water Temperature, Turbidity, Transparency, Chemical Parameters-pH (Hydrogen Ion concentration) Dissolved Oxygen, Free CO_2, Alkalinity, Chloride, Nitrogen. The analysis of physicochemical parameters indicates the water quality of the lake. The correlation showed that water temperature has an inverse relation with dissolved oxygen and positive correlation was noticed with pH, alkalinity and chloride.

KEYWORDS: Drinking water, Parameters, Temperature, Dissolved Oxygen, Turbidity, pH.

INTRODUCTION

The major threats to freshwater biodiversity are overexploitation, water pollution, degradation of the habitats. The wetlands are the natural ecosystem which constitutes rivers lakes ponds etc. variability and changes in these ecosystems can affects the life of those

ecosystems. In an aquatic ecosystem water plays an important role in regulation of atmosphere, lithosphere and biosphere by moving abiotic and biotic components within it. Biodiversity is essential for the health of aquatic environment and human use also. The study of planktons is very important for the assessment of water quality and also determine the productivity of any type water body (lentic water bodies) Pawar (2006).

Nowadays world is facing various problems like depletion of ozone layer, global warming, degradation in freshwater ecosystem. The mass of plants and animals in the lake indicate the quality of water in the lake. The trophic state is grouped into oligotrophic, mesotrophic and eutrophic lakes. Total life in the aquatic environment depends upon the nutrient level in the ecosystem. Bio indicators are the organisms that are used for monitoring the health of aquatic ecosystem. Planktons also play an important role in monitoring water bodies as they are indicating the quality of water in the ecosystem. The changes in the number of plankton communities used to determine the tropic level of water bodies (Pradhan et al 2008).

Water temperature

The temperature changes with depth of the lake, time and location of the lake. Temperature affects all the chemical and biological activities of the organisms in the ecosystem. Temperature also affects the factors such as growth, oxygen demand, food requirements etc. If the temperature varies too high or too low, the number of species decreases.

Turbidity

Suspended solids such as clay and silt particles in the water can cause turbidity in freshwater ecosystem. Water turbidity is important as it determines the amount of light penetration and this affects the growth of vegetation in that ecosystem

Transparency

Solar radiation is the only source of light energy in an aquatic system, which affects primary productivity. It measures light penetrating through the water body and is determined using sacchi disc. Light limitation is a dominant control of productivity in most reservoirs as it is in many productive natural lakes. In many reservoirs light limitation result primarily from inorganic clay and silt turbidity (Wetzel 2001).

Dissolved oxygen

Oxygen is necessary for respiration of all living organisms for their metabolism.. The life of aquatic environment is affected by the amount of oxygen present in the water.

Free carbon dioxide

In an aquatic ecosystem sources of CO2 are respiration and decomposition, while it is used for photosynthesis. Depending pH and other biological conditions CO2 is found in any one of three forms i.e. free CO2, CO3 or HCO3. Free CO2 usually combines with water to form carbonic acid. Carbon dioxide is highly soluble in water and is a product of respiration by all living organisms, it is found to be larger amount in polluted water compare to fresh water bodies. Decomposition of organic matter and diffusion of atmospheric carbon dioxide in water, contributes free CO2 in water. Carbon dioxide plays an important role in aquatic ecosystem as it influences the metabolic and developmental rates and distribution of some aquatic invertebrates.

Total alkalinity

The alkalinity of water body refers to the quantity and kinds of dissolved ions which collectively shift the pH to the alkalinity side of the scale. It is an indirect measure of the concentration of anions in water. The alkalinity water is measure of its capacity to neutralize acids.

Nitrate

In an aquatic ecosystem Nitrates are formed a biological oxidation of organic nitrogenous matter received from raw domestic sewage, agricultural runoff and industrial water containing organic waste matter. In addition to this metabolic waste, excretory products and decaying organic matter further add organic Nitrogen. Nitrogen is also fixed by bacteria and algae.

Chloride

The presence of chlorides in natural waters can mainly attribute to dissolution of salt deposits in the form of ions (Cl-). Otherwise high concentration may indicate pollution by sewage, industrial waste, and intrusion of inorganic anions in the water for aquatic life. High chloride content has adverse effects on agricultural plants. In natural freshwater, however its concentration remains quite low and generally less than sulphates and bicarbonates. The most important sources of chlorides in the water are the discharge of domestic sewage.

MATERIALS AND METHODS

The physico-Chemical parameters of waters studied were water temperature, transparency, color, turbidity, pH, Dissolved oxygen, alkalinity, free CO2, nitrogen and chloride. The analysis of water samples was done according to APHA (1998). The chemical parameters except pH (Units) were expressed in mg/lit.

RESULTS AND DISCUSSIONS

Lake water may be polluted by detergents, sewage, insecticides, animal waste etc. Various parameters such as pH, Water Temperature, Turbidity, Transparency, Chemical Parameters- pH (Hydrogen Ion concentration) Dissolved Oxygen, Free CO2, Alkalinity, Chloride, and Nitrogen were analysed to assess the water quality of Ambona Lake. The water samples at sampling stations were too much cloudy, whereas the unpleasant odour represents the bad quality of water. This indicates that the water is unsuitable for drinking. As water is the important resource of natural resource which is essential for fulfilling our basic requirement, we must act to protect and preserve it. Increasing urbanization, agricultural activities are some reasons that cause pollution of lake. Water may contain different types of floating, dissolved, suspended matter containing different types of microorganisms, which can cause many health problems for human and other animals also. Physical, chemical and biological factors may affect the quality of water quality. Excessive sewage, agricultural run-off, human waste, animal waste etc. that increases the nitrogen concentration and leads to eutrophication.

	WT	Turbidity	Transap.	pH		DO(mg/L)		CO2(mg/L)		Alk.(mg/L)		Chlor.(mg/L)		Nitr..(mg/L)	
WT	1.000	0.196	0.325	0.883	**	-0.946	**	-0.657	*	0.905	**	0.589	*	-0.494	
Turbidity		1.000	-0.319	0.114		-0.199		-0.384		0.280		0.640	*	-0.057	
Transap.			1.000	0.564		-0.432		-0.107		0.348		-0.296		-0.653	*
pH				1.000		-0.857	**	-0.670	*	0.853	**	0.428		-0.794	**
DO(mg/L)						1.000		0.650	*	-0.867	**	-0.582	*	0.572	
CO2(mg/L)								1.000		-0.708	**	-0.713	**	0.441	
Alk.(mg/L)										1.000		0.601		-0.541	
Chlor.(mg/L)												1.000		-0.110	
Nitr..(mg/L)														1.000	

W.T. = Water temperature; Transp. = Trasparancy; D.O.= Dissovled oxygen; CO2 = Carbon dioxide; Alk = Alkilinity; Chlor. = Chlorides; Nitr. = Nitrates

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