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Study of water Quality in upper lake, Bhopal

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Abstract

The upper lake of Bhopal is main source for providing drinking water. The monthly average of temperature, pH, total suspended solids, chloride, sulphate, turbidity and heavy metals were analyzed for the water samples taken from the upper lake. Water quality parameters were analyzed and were evaluated according to the WHO Standards. The water quality may be affected in various ways by pollutants. Polluted water is nearly as bad as no water. Water pollution is mainly done by heavy metals like Cr, Cd, Ni and Pb.

Environment is the representative of physical components of the earth where in man is the important factor influencing his environment" **1**Water is the internal medium for all organisms and principal external medium for several organisms, A large proportion of about 70% of the body weight of most organisms including man is constituted of water. since it is one of the constituents in the reaction of photosynthesis all the biochemical reactions in the body of the organisms takes place in the water medium water consists of an exceptional quality of dissolving a number of substances without changing their chemical nature and therefore plays an important role in transporting materials in the body. which captures energy from the sun, it is also n important substance in directing the energy flow in the living systems. In fact life on this planet has been possible only because of the presence of abundant water. **2**All the organisms use water for there metabolic processes and all the biochemical reactions in the body of the organisms takes place in the water medium .**3**The quality of water is of vital concern for mankind since it is directly linked with human welfare. It is a matter of history that faecal pollution of drinking water caused water borne diseares which wiped out entire populations of cities. At present the menace of water bone diseases and epidemics still forms large on the horizons of developing countries polluted water is the culprit in all such cases. The water need by ma is primarily from surface water and ground water. In acid regions a small traction of man's water supply comes from the arena, a source which is likely to become more important as the world's supply of fresh water dwindles relative to demand. Saline or brackish ground water may also be used in some area .4 & 5Ground water and surface water are having appreciably different characteristics. Many substances either dissolve in surface water or get suspended in it on its path to the ocean.

Surface water collected in a lake or reservoir and having the mineral nutrients essential for algae growth may support a heavy growth of algal. Surface water having a high level of bio degradable organic material normally contains a high population of bacteria. All there factor are having a profound effect upon the quality of surface water[6].

Bhopal the capital city of Madhya Pradesh, is situated on 23°16' N latitude and 77°26' E longitude on hard pink red sandstones of Vindhyan zone. It is about 498.07 m above the mean sea level. Most of the plain area of the region consists of black cotton soil. Water quality is often grouped into physical, chemical and biological components. Qualitative and quantitative study of these components are the two major issues, involved in the use of water Abundance, survival and distribution of organisms are directly controlled by physico chemical parameter. Sampling for physico-chemical studies was done six monthly. Water samples were taken with the help of glan bottle samples from help lakes. The physico chemical characteristics such as temperature, pH, tree CO_2 and alkalinity were analyzed at site itself as they are liable to change soon. However parameters viz. conductivity, total solids, DO, BOD, COD, chlorides, sulphate, Hardness, sodium, potassium Nitrate and Nitrite were analyzed in the laboratory after Trivedi & Goel[6], & APHA[1] in the following two three days during which samples were in cold storage. Relevant literature has been consulted for the preparation of this manuscript[2-5,7].

Table 1. The Physico-chemical observations

S. No.	Physcio-Chemical Parameters	Units	Physico-chemical examination of Upper lake											
			Jan.	Feb	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	Colour		Dusky	LG	LG	LG	LG	Dusky	Dusky	Dusky	LG	DG	DG	DG
2	Temperature	0°C	20.4	25	30.6	31.6	33	34	31.8	30.6	2.8	2.5	22	19.2
3	Turbidity	NTU	20	22	28	40	44	50	54	52	48	23	22	20
4	Conductivity Mhos	Micro	238	240	242	280	284	286	220	200	200	210	215	218
5	Hardness	Mg/l	228	236	228	238	240	210	212	214	210	224	230	226
6	Alkalinity	Mg/l	216	220	222	218	216	202	204	208	206	214	210	212
7	Chloride	Mg/l	1638	166	170	182	186	162	168	164	160	171	174	170
8	Fluoride	Mg/l	0.41	0.4	0.39	0.42	0.43	0.38	0.36	0.36	0.37	0.39	38	0.40
9	Nitrate	Mg/l	2.1	2.2	2.3	2.6	2.5	2.6	2.8	2.4	22	1.8	1.6	20
10	Phosphate	Mg/l	0.02	0.02	0.02	0.02	0.03	0.03	0.028	0.02	0.02	0.03	0.06	0.03
11	D.O.	-	7.0	7.1	5.0	5.1	5.0	61	6.4	64	6.8	6.8	6.6	6.4
12	pH	-	7.0	7.1	7.1	7.2	7.3	7.2	8.2	8.1	8.0	7.8	7.2	7.2

Quantity and quality are two major issues involved in the use of water. The main purpose of analyzing physical and chemical characteristics of water is to determine its ecological status. Abiotic components such as water and sediment not only control the quantity of biota but also affect the quality, particularly their energy status. Since the water contains dissolved and suspended constituents in varying proportions it often has different chemical properties along with biological variations. The water quality may be affected in various ways by pollutants. They physico chemical characteristics of water are recorded to be affected by rain fall, temperature, availability of light and nature of the pond bed. Impact of social development and human activities greatly accelerate eutrophication. It may be called as cultural eutrophication. Also analysis of physico chemical factors in lake waters is of fundamental importance. Temperature of both air and water plays an important role in physico-chemical and metabolic behavior of aquatic ecosystems. Its fluctuation in water bodies can alter the existing aquatic community. pH expresses the intensity of acidity or alkalinity of water and affects chemical and biochemical reactions taking in it. The quantity of solids, in general, is positively proportional to the degree of pollution. Water body receiving pollution may undergo changes in alkalinity because of rainfall, sewage input, washerman's activity and photosynthesis etc. Dissolved oxygen is one of the most important parameter in water quality assessment and reflects the physical and biological processes prevailing in the natural waters. The importance of dissolved oxygen in aquatic ecosystem in bringing out various biochemical changes and its effect on aquatic organisms has been discussed by many ecologists. Total number of organisms present are directly related to pH and dissolved oxygen concentrations. BOD is also an important parameter to study intensity or pollution power of sewage and industrial waste. Hardness is also used for the assessment of water quality. Calcium has been implicated in numerous ways in the growth and population dynamics of fresh water flora and fauna. Magnesium is required universally by chlorophyllous plants as the magnesium porphyrin and a micronutrient in enzymatic transformations of organisms, especially in transphosphorylations of algae, fungi and bacteria. Phosphorus is of great importance in determining the biological productivity in aquatic systems. Zutshi & Khan (1988) found orthophosphate concentration of inshore sites quite high because of the discharge of domestic refuge and human waste. Nitrate is an important plant nutrient. The presence of metals and metalloid in drinking water is a subject of serious concern due to the toxic properties of there materials. They affect public health to a large extent, waste water treatment systems and the biological systems of water India. The impact of heavy metals in drinking water containing traces of heavy metals is dangerous for health in the long run. The greatest cause of altered water chemistry in natural waters is pollution from human activities. Sewage, agricultural run off and industrial input. Many water ways receive industrial and domestic waste together with this chemical pollution which is responsible for increasing eutrophication of many lakes and reservoir. Balanced physico-chemical activities of aquatic life is surface waters are essential for the maintenance of healthy water conditions. In last few years, awareness in Indian scientists for such studies on fresh water lentic formation has also been noticed. Polluted water is nearly as bad as no water at all perhaps is worst. So

today national water resource focus on water quality to achieve a desired standard of it.

Suggestion :

1. Upper lake water is suitable for irrigation purpose.
2. Lake water can also be used for aquaculture.
3. Bathing washing and boating of human beings and animals must be prohibited.

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