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STUDY OF PHYSICO-CHEMICAL CHARACTERISTICS OF THE ACCUMULATED WATER OF POND OF LOHARA, AT YAVATMAL(M.S.)

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ABSTRACT

Physico-chemical characteristics of water of the Pond of Village Lohara, at Yavatmal were studied . The duration of study was March 2006 to February 2007. Three sampling points were selected for the study. The parameters studied were total alkalinity, TDS, chloride, sulphate, pH , temperature, turbidity, temporary and permanent hardness , and metals like Fe, Ni, Zn, Cu. The concentrations of the parameters like total hardness, chloride, sulphate, Zn were found in excessive amounts.

Key Words: *Lohara Village Pond, Turbidity , Hardness, Heavy metals.*

INTRODUCTION

It has been known that the Earth is unique Planet in the Solar system and in the Universe to originate and flourish living creature on it due to one of the very important factors i.e. Water. But it is polluted more or less at every nook and corner of the World. Water Resources in India has no exception for this phenomenon[1-2].

There are various sources of water like ponds, lakes, rivers, dams etc. available for the use of Industrial, Domestic and Agricultural purposes. These water bodies get polluted due to the discharge of effluents from the Industries, Domestic waste, land and agricultural drainage. This results in the degradation of water quality of these water resources[3-4].Among the various means of pollutions of water bodies, the main causes for the pollution of lohara pond are washing of the clothes, cleaning of animals, dumping of the waste by unauthorized small scale units functioning in the surrounding to this pond at Lohara.

This water source is vital for maintaining the ground water level of this area. Also this became a very good source of water for Gram-Panchayat , Lohara .

Gram-Panchayat has got a main source of supplying water to Lohara , which has located near to this pond. Hence it is very important for quantitative study of Physico-chemical characteristics of Lohara Pond at Yavatmal[5-6]. From the analytical study , concentrations of parameters like chloride, turbidity, sulphate, total hardness were shown beyond minimum permissible limits[7-13].

EXPERIMENTAL

Water samples were collected in cleaned polythene container and preserved according to standard methods[14-18] at monthly intervals form the selected sampling sites (L_1, L_2, L_3) between 8 a.m. to 11 a.m. from March 2006 to February 2007 and brought to the laboratory for study of Physico-chemical characteristics. Temperature of the water then was measured at the sampling place by Celsius thermometer.

For analysis Qualigen (AR Grade) reagents, double distilled water and borosil glasswares were used throughout the work. Turbidity and pH were measured by digital digital nephelo-turbidity

meter (type-132) and pH-meter (type-335) respectively. Chloride was estimated by Mohr's method using $AgNO_3$ solution. Sulphate was estimated by UV-VISIBLE Spectrometer (type-11). Total hardness was determined by volumetric titration (EDTA method). Alkalinity was determined by volumetric titration. TDS was estimated by digital TDS meter (METZ-701). Metals Fe and Cu were estimated by titrating with Potassium dichromate using sodium diphenylamine sulphonate indicator and Iodometric method respectively.

RESULTS AND DISCUSSION

Results obtained during the analysis were shown in the *Table 1*.

WHO standards for drinking water are given below.

Sulphates	:	250mg/lit.	Zinc	:	5mg/lit.
Fe	:	0.1mg/lit.	Chloride	:	250mg/lit.
Cu	:	0.05mg/lit.	Total Hardness	:	100mg/lit.

The concentration of sulphates and chloride were found in the range 287-310 mg/ litre and 233-278 mg/litre respectively. High chloride content has poisonous effect on animals and plants.

The pH of the water was ranged between 7.65 to 8.57, indicating slightly alkaline nature of pond water, probably due to contamination of water by soap used for washing clothes.

Turbidity was one of the common form of pollution. This prevents growth of the aquatic plants by reducing rate of their photosynthesis. This has became obstacle for self purification of water. Values of Turbidity 183 to 197 N.T.U.

Total hardness was found in the range 505-557 mg/litre. The value of TDS were found in the range 516-625 mg/litre.

The value of Fe found between 0.0052-0.0069mg/litre.Its maximum concentration was found in the month of February due to contamination of sewage and garbage of the small scale industry working in this areas.

The concentration of Cu were found to be 0.055-0.073 mg/litre .

CONCLUSIONS

The concentration of chloride, sulphate, total hardness, TDS, Ca and Mg and metals like Cu, Fe were found beyond minimum tolerance limit. Most of the constituents showed maximum concentration in samples S_4, S_5, S_6 due to mixing of rainy water from the surrounding region in the Pond. The data showed brutal contamination of pond water probably due to dumping of domestic sewage, garbage and use of detergents by the washer-women.

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TABLE-1:PHYSICO-CHEMICAL ANALYSIS OF THE ACCUMULATED WATER IN THE POND OF LOHARA, AT YAVATMAL (M.S.)

Sample code.	Total Hardness (mg/L)	Permanent Hardness (mg/L)	Temporary Hardness (mg/L)	Ca^{++} Hardness (mg/L)	Mg^{++} Hardness (mg/L)	Total Fe (mg/L)	Fe^{++} (mg/L)	Fe^{+++} (mg/L)	pH
S_1	505	261	244	220	283	0.0114	0.0057	0.0058	7.72
S_2	509	268	241	218	289	0.0113	0.0058	0.0059	7.65
S_3	514	284	230	212	304	0.0118	0.0053	0.0057	7.82
S_4	557	308	249	257	292	0.0119	0.0055	0.0060	8.25
S_5	541	299	242	251	303	0.0117	0.0052	0.0059	8.57
S_6	551	295	256	254	288	0.0122	0.0063	0.0067	8.26
S_7	552	294	258	241	282	0.0121	0.0054	0.0067	7.69
S_8	534	293	241	232	278	0.0119	0.0058	0.0067	7.65
S_9	538	290	248	251	286	0.0121	0.0069	0.0069	7.81

Sample Code.	SO_3^{--} (mg/L)	SO_4^{--} (mg/L)	DO (mg/L)	TDS (mg/L)	Cu (mg/L)	Cl^- (mg/L)	Zn (mg/L)	NO_3^- (mg/L)	BOD (mg/L)	Turbidity (NTU)
S_1	0.57	296	5.0	579	0.069	233	3.8	25	1.42	185
S_2	0.61	289	4.6	585	0.055	255	3.2	33	1.57	188
S_3	0.65	303	4.7	526	0.073	266	4.5	29	2.96	197
S_4	0.58	218	4.2	625	0.069	270	3.9	36	3.05	184
S_5	0.63	315	4.1	592	0.066	278	3.7	39	2.96	195
S_6	0.67	319	5.6	612	0.058	269	4.2	28	2.58	188
S_7	0.55	316	4.9	566	0.059	276	4.1	27	1.95	192
S_8	0.65	311	4.0	552	0.061	254	3.3	48	2.37	186
S_9	0.69	320	3.9	516	0.063	262	3.6	50	3.01	196

S_1 , S_2 , S_3 :- Samples collected in March 06 to June 06
S_4 , S_5 , S_6 :- Samples collected in July 06 to October 06
S_7 , S_8, S_9 :- Samples collected in November 06 to February 07.

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