

## POLLUTION ASSESSMENT THROUGH COMPARATIVE HYDROBIOLOGICAL STUDIES OF POND LAXMI TALAB LOCATED AT JHANSI

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**ABSTRACT:** Water is an extraordinary natural phenomenon, as it is a valuable resource to mankind from nature. It is impossible to substitute for most of its uses, difficult to depollute, expensive to transport. A laboratory study was conducted to evaluate pollution load of Laxmi talab, by examining the various physicochemical and bio chemical parameters. It was found temperature ,pH, conductivity, hardness, Ca, Mg, although not follow desirable limit ,but results are with in the permissible limit. Total dissolve solid(TDS), total suspended solid(TSS) and alkalinity exceeds the permissible limits. Low value of DO and high value of BOD and COD as well as total coaliform suggested highly contamination of organic pollutant.

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### 1. Introduction

In most parts of world the days are gone when rivers, lakes, spring and wells from one can directly drink and readily meet almost all needs for high quality water. But nowadays most of the water that is used for drinking, water supplies irrigation and industries are not fulfill their requirements. Energy and matter are carried through various spheres of the environment by water and depend upon the various chemical species in water. Substantial changes and the distribution of these chemical species in water depends on the various physicochemical as well as biochemical parameter(Eugene,2000).The redox reaction are virtually important to aquatic organism and have tremendous influence on water quality. Temperature, transparency, and turbulence are the main physical properties, very low water temperature results in very slow biological process whereas very high water temperature are fatal to most organism.

### 2. Material and Method

The study area Jhansi city gateway of Bundelkhand is located in U.P. The climate of the city is of various tropical nature and temperature varies from 6<sup>o</sup>c to 45<sup>o</sup>c. The normal annual rainfall of the land area is 14 sq Km. The area of Jhansi city within municipal limit is approximately 35.22 sq Km and altitude is 294 m sea level.

Laxmi talab is a very beautiful pond and cover area of about 32.52 hectare with an average depth of 2.5meter. It is rain feed tank and is finding into way through six drainage lines and depicted in (Fig-1) as S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub>, S<sub>4</sub>, S<sub>5</sub>, S<sub>6</sub>.

Samples for analysis were collected in sterilized bottle in triplicate in month of June 2010. P<sup>H</sup> was recorded at the time of sample collection by using P<sup>H</sup> meter (Sistronic Model). The DO of water samples were analyzed in the laboratory by Wrinkler's modified-azide method and analysis of BOD by incubating samples at 25-30<sup>o</sup>c for 5 days. Turbidity was recorded by turbidity meter. Hardness, chloride, alkalinity, acidity were estimated by titrimetrically by standard method maintained by APHA (1998) and microbial colonies of water samples was recorded by plating method and counted by colony counter.

### 3. Results and Discussions

The observed physicochemical parameters are controlling variables that strongly influence the behavior of many others constituents present in water and presented in Table-1. Surface water temperature shown significant rise, and challenges the survival of floral and faunal diversity of ecosystem as well as affect the TDS, DO, and BOD of the surface water. The observed average pH range 8.47 is higher than the global average of 8.179, but within the permissible range and suggest loss of CO<sub>2</sub> due to photosynthesis by algae(Hariharan,2006). Conductivity of pond water is with in permissible limit. Higher value of suspended solid are observed in pond water which is due to water disposal around the pond(Lohani *et al* 1982).High content of TDS is responsible for eutrophication of the aquatic ecosystem, and can be harmful because the density of water determines the flow of water in and out of an organism. In the present study the total hardness of all the station are within the limit of ISI

permissible value. Calcium is one of the most abundant substances of the natural waters. In the pond the calcium hardness values below and not within the standard limit of (WHO, 1997). Calcium carbonate index as calculated by Langelier index suggested chemical balance neither scale forming nor corrosive tendency (Kaul and Gautam,2000). Generally magnesium concentration remains lower than the calcium but in the pond water the magnesium hardness value is above the prescribed value of WHO. Alkalinity is important for fish and aquatic life because it protect or buffered against pH change, the leaching process through surface water might be responsible for higher value of alkalinity. The low DO value are associated with heavy contamination by organic

matter and in sampling station S<sub>2</sub> oxygen is totally disappeared from water. The high BOD value was observed due to high microbial activity because of high temperature. Bacteria are the most important catalyst by which molecular oxygen reacts with organic matter. Total coaliform is high as compare to state water standard for primary contact recreational.

It can be concluded Alkalinity is higher as recommended in land water parameter, important for fish and aquatic life and reduce actual photosynthesis, again correlates to low DO. It becomes very inevitable to manage the quality of pond and so there is a need to continuous monitoring of the physicochemical status of the pond. And after some treatment water might be used for drinking purpose.



FIGURE:1

**TABLE-1:** Water quality parameter at different sites of pond Laxmi Talab

Parameters	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>
Temperature	30.6	28.5	39.0	29.7	30.2	29.4
pH	8.61	9.83	8.78	8.59	8.75	8.56
TDS	756	590	768	832	647	828
TH	334	212	337	344	240	356
Ca	176	38.48	19.6	24.06	21.2	96.15
Mg	158	76.5	141	152	188	144
Alkalinity	506	560	577	508	830	515
Cl	128.4	142	126.7	138.4	237.9	136
DO	0.3	00	0.2	0.3	4.5	0.5
BOD	80	52	78	86.2	85	83
COD	308	400	320	704	234	560
Total coaliform	14401	13620	144260	14800	18160	14760
Conductivity	406	613	501	626	104	702
Total Suspended Solid(TSS)	126.1	100	125.6	143.4	142	141.6

(except pH, Tem, Conductivity, values expressed in mg/l).

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### 5. References

1. APHA. Standard methods for the examination of water and waste water. (1995). 2-179. American public health association.
2. Eugene R. Weiner, Application of Environmental Chemistry. Lewis Publishers Washington. (2000)
3. Hariharan A.V.L.N.S.H, Determination of water quality of Rushikonda Area Vishakapatnam.

Indian Journal of Environmental Sciences (2006); 10(1); 17-22.

4. Lohani BN, Thanh N.C, Muttamara S, Mathematical optimization model for water quality management: a case study of chao phraya river." ENV. Engr Div. Research report Asian institute of Technology, Bangkok Thailand, (1979).
5. WHO" Health and environment in sustainable development five years after the earth summit: Geneva, WHO, 133; (1997).

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