



Short Communication

A study on lower lake water in Bhopal region of Madhya Pradesh, India

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Abstract

Lake Water samples were preserved from six (06) parts during pre rainy season and post rainy season. The physico-chemical attributes such as Total Alkalinity, Total Hardness, Chloride, Sulphate, Nitrate, total suspended solid, total dissolved substance, Fluoride, Dissolved oxygen, Biological Oxygen Demand and Chemical Oxygen Demand were examined to understand the present status of the lower lake water quality. After statistical analysis it was cleared that the positive co-relationship occurred between some of attributes and also negative co-relationship occurred between some of attributes.

Keywords: Life of earth, progressive analysis, waterproofs.

Introduction

Water is very necessary resource on earth¹. Water is very important for life on earth. Water is the source of all biological lives and their nourishment too. Water status has become a major global matter due to growing human developmental activities².

Water is also usually introverted for floricultural, burghal, and factory made use³. Water is contaminated due to exonerated of unprepared or perlustrated garbage, industrial gargage, ludicrous nonrural garbage discarding, leachate from landfills, organic pollutants etc^{4,5}.

A correlation matrix is a table which exhibits correlation coefficients between variables^{6,7}.

Materials and methods

Study area: The Nether basin is situated opposite to the upward basin. A mud milldam disconnects both the basin. Both the basins are made in a retraced presence; nethermost precise of the Upward Basin is aloof beneath the top-notch of the nethermost basin. The nethermost basin in not connected to any fresh water basin; it collects discharge water from top-notch basin.

Sample collection: Sampling site consists of lower lake area. Samples were taken from six (06) parts during pre rainy season and post rainy season.

Samples were taken in waterproof bottle to bypass ambiguous diversify in attributes according to canonical method (APHA)⁸⁻¹².

Investigation of nethermost basin: The preserved specimen were determined considering different attributes such as Total Alkalinity, Total Hardness, Chloride, Sulphate, Nitrate, total suspended solid, total dissolved substance, Fluoride, Dissolved oxygen, Biological Oxygen Demand and Chemical Oxygen Demand as per the standard methods (APHA, 1998)¹³.

Statistical Treatment of data: Correlation matrix was adapted within the studied attributes in pre rainy season and post rainy season and tabulated in Table-3 and Table-4 for determining the relationship between the physico-chemical variables^{14,15}.

Results and discussion

After analysis the condition of water quality of the lake water sources is presented in Table-1 and 2. From Correlation matrix it shows that maximum attributes are positively correlated to each other. In some cases negative relationship also has occurred. Very strong positive relationship has occurred between total alkalinity and total hardness in both cases that is pre and post monsoon season.

Very week negative relationship has occurred between BOD and total dissolved solids in both cases that is pre and post monsoon season. Moderate positive relationship has seen between Nitrogen and Chloride¹⁶. Like this other relationship can be measured.

Conclusion

Result of showed that lower lake water is polluted and not totally safe for drinking purpose¹⁷. Maximum Numbers of attributes showed interchangeable trend in seasonal fluctuation. It indicates that the amount of impurity appeared because of industrial acquittal, domestic discharge and other anthropogenic¹⁸.

Table-1: Water Quality at different locations of Lower Lake in pre monsoon season (Laboratory Analysis) Units mg/l.

Name of Area	Total Alkalinity	Total Hardness	Chloride	Sulphate	Nitrate
Neelam Park	678	684	195	228	48
Jahangirabad	675	680	191	231	53
Khatlapura Temple	672	669	185	227	47
Ginnory Temple	670	666	186	225	46
Karishma Park	672	669	187	225	45
Police Control Room	670	668	188	224	46

Total suspended solid	Total dissolved substance	Fluoride	Diffuse oxygen	Biological Oxygen Demand	Chemical Oxygen Demand
60	2	0.67	2.4	3.8	88.4
56	2.3	0.69	2.3	3.4	87.1
55	2.1	0.67	2.2	3.3	86.4
54	1.9	0.70	2.1	3.1	85.9
55	2.1	0.69	1.9	3.2	86.0
53	1.9	0.69	1.9	3.1	87.2

Table-2: Water Quality at different locations of Lower Lake in post monsoon season (Laboratory Analysis) Units mg/l.

Name of Area	Total Alkalinity	Total Hardness	Chloride	Sulphate	Nitrate
Neelam Park	678	684	195	228	48
Jahangirabad	677	685	195	234	53
Khatlapura Temple	674	670	187	229	49
Ginnory Temple	672	668	188	227	48
Karishma Park	674	670	189	228	47
Police Control Room	671	669	187	226	48

Total suspended solid	Total dissolved substance	Fluoride	Diffuse oxygen	Biological Oxygen Demand	Chemical Oxygen Demand
60	2	0.67	2.4	3.8	88.4
58	2.2	0.70	2.4	3.6	87.2
56	2.3	0.68	2.1	3.4	86.6
56	1.9	0.72	2.3	3.3	86.9
57	2.2	0.71	2.4	3.3	86.2
55	2.2	0.69	1.9	3.2	87.3

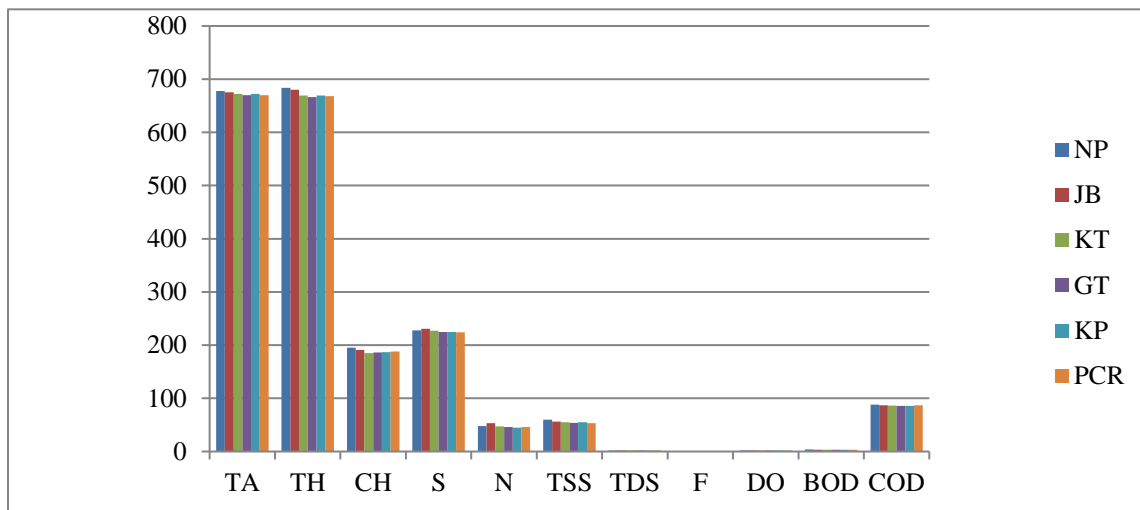


Figure-1: Graphical representation of data (Premonsoon Data).

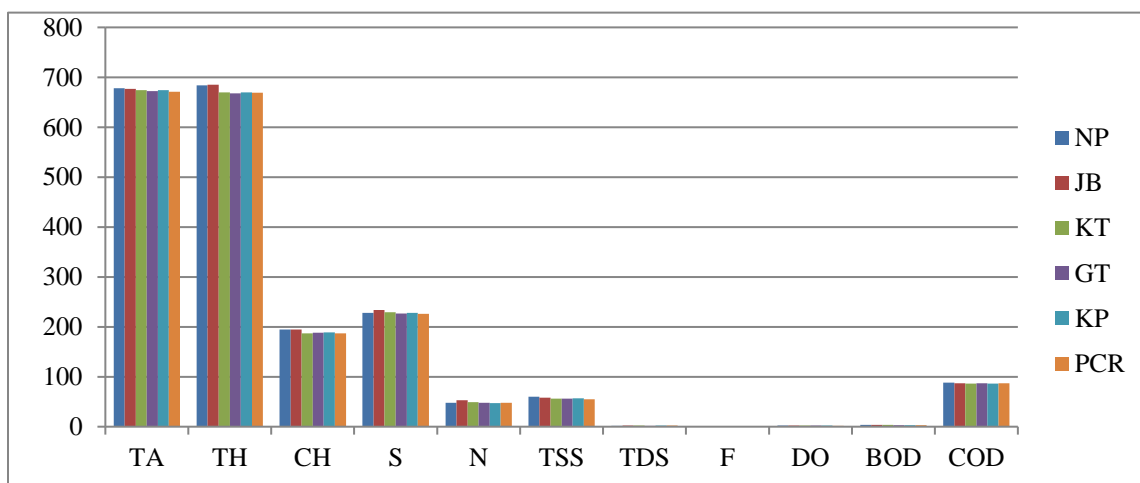


Figure-2: Graphical representation of data (Postmonsoon Data). NP: Neelam Park, JB: Jahangirabad, KT: Khatlapura Temple, GT: Ginnory Temple, KP: Karishma Park, PCR: Police Control Room.

Table-3: Pearson Correlation Matrix for pre monsoon.

	TA	TH	CH	S	N	TSS	TDS	F	DO	BOD	COD
TA	1										
TH	0.971646	1									
CH	0.887935	0.936074	1								
S	0.735311	0.786355	0.547766	1							
N	0.566445	0.692274	0.503348	0.941033	1						
TSS	0.961665	0.887666	0.840237	0.574014	0.357252	1					
TDS	0.44308	0.462056	0.177072	0.817206	0.755285	0.244316	1				
F	-0.60091	-0.48413	-0.35082	-0.31623	-0.08502	-0.63868	-0.16151	1			
DO	0.815865	0.804622	0.641372	0.8125	0.672166	0.797241	0.383065	-0.5534	1		
BOD	0.97389	0.922404	0.861418	0.626068	0.433973	0.982657	0.2748	-0.71149	0.831497	1	
COD	0.771998	0.828102	0.901333	0.417734	0.399012	0.727417	0.014037	-0.55621	0.590873	0.811904	1

Table-4: Pearson Correlation Matrix for post monsoon.

	TA	TH	CH	S	N	TSS	TDS	F	DO	BOD	COD
TA	1										
TH	0.918424	1									
CH	0.914116	0.977494	1								
S	0.643697	0.690594	0.641461	1							
N	0.456673	0.630537	0.543564	0.923192	1						
TSS	0.941065	0.861522	0.908106	0.398621	0.209274	1					
TDS	-0.03241	-0.07831	-0.22044	0.315754	0.269376	-0.29704	1				
F	-0.46948	-0.43214	-0.29411	-1.3E-16	-0.02501	-0.41833	-0.28403	1			
DO	0.705931	0.560448	0.694942	0.481425	0.203099	0.754829	-0.38437	0.231993	1		
BOD	0.953821	0.912891	0.900172	0.496307	0.388066	0.943729	-0.21639	-0.56992	0.599878	1	
COD	0.514717	0.667099	0.639681	-0.00946	0.111763	0.637895	-0.44066	-0.62413	0.089582	0.719158	1

TA: Total Alkalinity, TH: Total Hardness, CH: Chloride, S: Sulphate, N: Nitrate, TSS: Total suspended solid, TDS: Total dissolved substance, F: Fluoride, DO: Diffuse Oxygen, BOD : Biological Oxygen Demand, COD: Chemical Oxygen Demand.

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