



Analysis of *Anchar* Lake Water, Kashmir, India

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ABSTRACT

Water is very crucial for surviving life of all human being and animals. Without water nobody can be survived. The existing manuscript associated with *Anchar* Lake water. Water is vulgarized by unwanted materials. Water quality tests and reevaluate of attributes. Scrupulous substances are: Dissolved Oxygen (DO), Total Alkalinity (TA), Electric Conductivity (EC), Potential of Hydrogen (pH), Phosphate (P), Total Dissolve Solids (TDS), Total Hardness (TH) and Chloride thereupon. The attributes are statistically interpreted using cluster analysis, correlation matrix, factor analysis and ANOVA techniques and interpret that the Lake water is unsuitable for drinking. Experimental data shows that most of the attributes does not satisfy the desirable limits prescribed by BIS. Hence the *Anchar* Lake water is not suitable for drinking purposes.

Keywords: *Anchar* Lake specimens, Selected locations, Cluster analysis, Analysis of Variance.

INTRODUCTION

Nobody can understand the value of water. The pivoting role of water never be refused. It is our imagination to know the value of water. It is the invaluable gift of creator for all living beings. Nobody can sustain without water. Human activities are the main reason for water pollution. Industry is also a fact for water pollution. The increasing industrialization, urbanization and developmental activities, to cope up the population explosion have brought inevitable water crisis. The health of lakes and their biological diversity are directly related to health. In freshwater bodies, nutrients play a major role as their excesses lead to eutrophication. Excessive macrophytic vegetation is indicative of the eutrophication status of any water body. Monitoring of water quality is the first

step that can lead to management and conservation of aquatic ecosystems. So major precaution must be needed for preservation of water¹⁻⁶.

MATERIALS AND METHODS

Selected Location

Anchar Lake persist near to Soura area, which is adjacent to the city of Srinagar, India. So many construction is occurred near the lake area⁷. The garbage are mixing with lake water. Hence the lake water is being polluted.

Assortment of Specimens

Specimens were brought from selected points in volatile carafe to ignore surrounding climate as per usual practice⁸⁻¹¹.



Expedition of Specimens

Preferred specimens were properly studied regarding different specimens namely Dissolved Oxygen (DO), Total Alkalinity (TA), Electric Conductivity (EC), Potential of Hydrogen (pH), Phosphate (P), Total Dissolve Solids (TDS), Total Hardness (TH) and Chloride involving prescribed techniques (APHA, 1998)¹². Approved conditions represented in Table 1.

Table 1: Proper conditions of specimen according to BIS

Specimens	BIS Limits
Dissolved Oxygen (mg/L)	5-6
Total Alkalinity (mg/L)	200
Electricity Conductivity Mho/cm	400
Potential of Hydrogen	6.5-8.5
Phosphate (mg/L)	0.1
Total Dissolve Solids (mg/L)	500
Total Hardness (mg/L)	200
Chloride	250

BIS-Bureau of Indian Standards

Dissolved oxygen was measured by *Winkler's* method. Total alkalinity was measured by titration method. Electric conductivity was measured by conductivity meter. pH was measured by water analysis kit by using hydrogen ion selective electrode. Phosphate photometer was used for measuring phosphate. A TDS meter was used for measuring total dissolved solids. Total hardness was measured by colorimeter. Chloride was measured by chloridometer.

RESULTS AND DISCUSSION

Specimens of *Anchar* tarn are listed in Table 2 and graphically recognized in Fig. 1. Interrelation model has performed by Microsoft Excel 13 and represented in Table 3 to establish the reciprocity of specimens.¹³⁻¹⁶ This measured water specimens (Table 3) show vigorous positive correlations between TDS-DO, TH-DO, Cl-DO and strong negative correlation between TA-DO. Like this we can analysis the relationship to other attributes also. Thus by using correlation matrix we have given the relationship between attributes that what kind of relationships occur among the attributes. Anova helps to recognize the trend with respect to sampling sites and its influence among the attributes. Anova indicates that there is a strong effect over parameters indicating a strong Spatio-temporal variation. Cluster procedure is wised up using Systat 13 and Dendogram is conferred in Fig. 2. Two significant clusters are milled. It displays physico-chemical properties of cluster 2 and cluster 1 are different. Factor analysis is cultivated and Fig. 3 represents Data matrix. Data matrix clearly mentions that specimens are not interdependent. PCA is developed using IBM SPSS 21 software shows that pH and TA are recorded for high positive loading in the first component. EC shows high positive loading in the second component. Cl, P, DO, TH, TDS shows high positive loading in third component (Figure 3).

Table 2: Anchar Lake Specimens

Sites name	DO(mg/L)	TA(mg/L)	EC(μ mhos/cm)	pH	P(mg/L)	TDS(mg/L)	TH(mg/L)	Cl(mg/L)
A1	3.5	110	210	7.4	0.14	124	110	3.2
A2	3.9	102	234	7.8	0.21	134	114	4.2
A3	4.1	106	224	8.5	0.12	145	122	3.2
A4	4.3	104	208	7.4	0.24	142	123	4.4

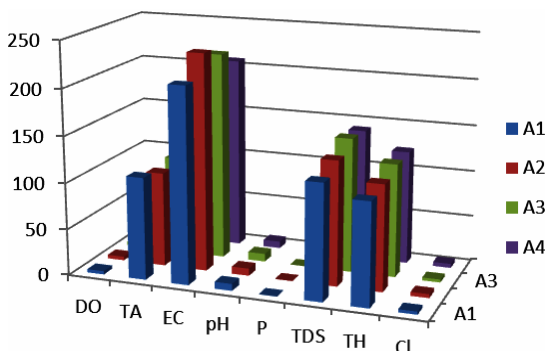


Fig. 1. Graphical representation of Experimental Data

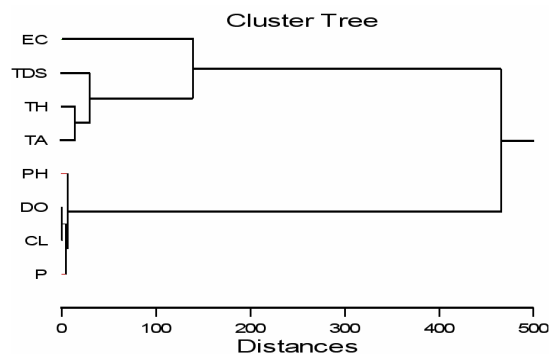


Fig. 2. Dendrogram using Ward Linkage

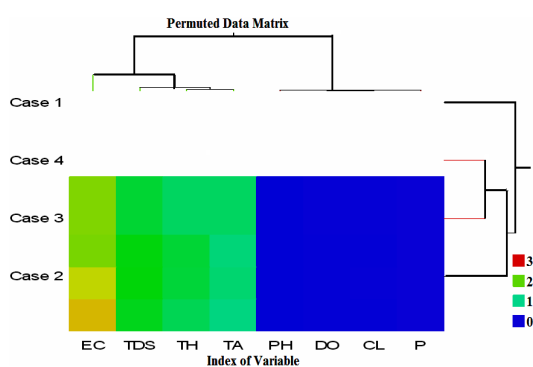
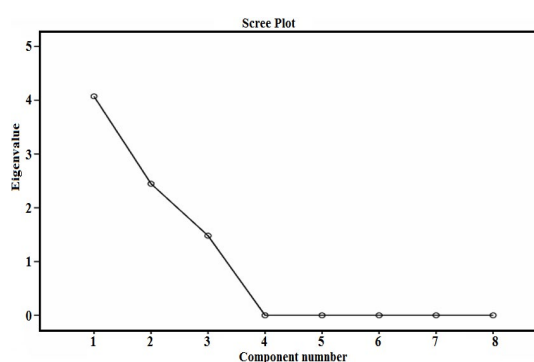
Table 3: Interrelationship of Specimens

	DO	TA	EC	pH	P	TDS	TH	Cl
DO	1							
TA	-0.65714	1						
EC	0.015901	-0.58834	1					
pH	0.272749	-0.15989	0.601946	1				
P	0.489762	-0.69598	-0.07173	-0.56851	1			
TDS	0.92976	-0.535	0.164774	0.596728	0.151519	1		
TH	0.953947	-0.42656	-0.09928	0.400822	0.23557	0.962999	1	
Cl	0.563917	-0.80777	0.07634	-0.42645	0.985441	0.257681	0.302012	1

Table 4: Two way ANOVA test

Anova: Two-Factor Without Replication				
SUMMARY	Count	Sum	Average	Variance
A1	8	568.24	71.03	6198.74
A2	8	600.11	75.01375	7312.748
A3	8	612.92	76.615	7208.778
A4	8	593.34	74.1675	6494.16
DO	4	15.8	3.95	0.116667
TA	4	422	105.5	11.66667
EC	4	876	219	150.6667
pH	4	31.1	7.775	0.269167
P	4	0.71	0.1775	0.003225
TDS	4	545	136.25	88.25
TH	4	469	117.25	39.58333
Cl	4	15	3.75	0.41

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Sites	132.3536	3	44.11786	1.251074	0.316559	3.072467
Parameters	189760.4	7	27108.63	768.7344	7.67E-24	2.487578
Error	740.5436	21	35.26398			

**Fig. 3. Data Matrix****Fig. 4. Eigenvalue of Specimens**

Eigen values are represented in Fig. 4 and component plot is represented in Fig. 5. So there is dissimilarities in load in case of factor analysis. This means physical and chemical factor involves regarding this. This shows that there is major factor for water quality to drink

purposes. Principal component analysis also shows that there is significant difference between the attributes. Experimental data shows that most of the parameters are out of desirable limits prescribed by BIS. So the *Anchar* lake water is not suitable for drinking purposes.

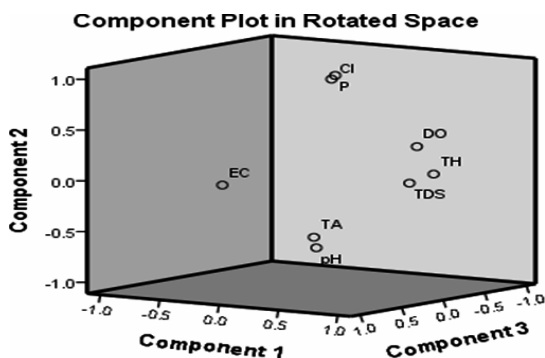


Fig. 5. Component Plot in Rotated Space

CONCLUSION

Experimental data shows that most of the data does not satisfy the prescribed limits given by BIS. So it is ensured that *Anchar Lake* water is

polluted and not suitable for consumable needs. It means that suitable procedure needed to tackle the situation. Important methods should be developed to clear the water properly so that it will be beneficial for consumable purposes.

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Conflict of interest

Author declares that there is no conflict of interest.

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