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Water Quality Analysis of Lilour Lake, Bareilly, Uttar Pradesh, India

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ABSTRACT

The most precious thing for human being is water. This research manuscript is deals with Lilour lake water. Lilour Lake water is contaminated by unwanted materials. Water condition analyzes as well as reconsiders and has performed considering multifarious physico-chemical characteristics. The particular contents are: potential of Hydrogen (LpH), Total Hardness (LTH), Dissolved Oxygen (LDO), Total Alkalinity (LTA), Chemical Oxygen Demand (LCOD), Biochemical Oxygen Demand (LBOD), Copper (LCu), Zinc (LZn), and Lead (LPb). The attributes are statistically explained using Two way analysis of variance, Pearson Correlation matrix, and reliability analysis involving Cronbach's α and McDonald's ωt. The obtained values of each attributes has compared with the standard values set by the World Health Organization(WHO) .The results attained show that most of the attributes does not satisfy the permissible limit recommended by WHO.

Key words: Lilour Lake, Cronbach's a, McDonald's, Corelation heatmap, APHA.

INTRODUCTION

Water is the precious gift of nature[2-4]. For existence of life water is the most crucial thing in the world. For maintaining the sustainability of life water is very essential. The condition of lake water and its organic variegation are precisely associated to salubriousness. Lilour Lake water is vitiated over the unsolicited activity of humanoid and animals. The main thing is to identity the causes of pollution of lake water and after that to develop the suitable method so that it will be reliable for drinking and domestic purposes and also suitable for water born species.

MATERIALS AND METHODS

Study Area

Lilaur lake is one of the beautiful lakes situated in district Bareilly of U.P, India. Its length is 5 km. Once it was very useful for drinking and

agriculture purposes but due to human activities its water is polluted and unsuitable for drinking purposes. The condition of the lake is reported to be precarious and needs urgent remedial measures for conservation.

Selection of Samples

Sampling site consists of Tupilipalem coast area. Samples were taken from ten (10) samples site. Samples were taken in waterproof bottle to bypass ambiguous diversify in attributes according to canonical method (APHA)[1].

Exploration of Samples

The preserved specimen were determined considering different attributes such as potential of Hydrogen (LpH), Total Hardness (LTH), Dissolved Oxygen (LDO), Total Alkalinity (LTA), Chemical Oxygen Demand (LCOD), Biochemical Oxygen Demand (LBOD), Copper (LCu), Zinc (LZn), and Lead (LPb) for a period of one month as per the standard methods (APHA, 1998)[7-8]. The empirical standard of the parameters of water condition are shown in Table 1. The attributes of the Lilaur lakes are distinctly presented in Fig 1 and Fig 2. In Fig 1 Correlation Heatmap are represented and in Fig 2 Cluster Column Line are represented.

RESULTS AND DISCUSSION

Table 2 represents Reliability analysis of potential of Hydrogen (LpH), Total Hardness (LTH), Dissolved Oxygen (LDO), Total Alkalinity (LTA), Chemical Oxygen Demand (LCOD), Biochemical Oxygen Demand (LBOD), Copper (LCu), Zinc (LZn), and Lead (LPb) of lake water . Table 3 is associated with scrutiny of discrepancy. Scrutiny of discrepancy is done by Microsoft Excel 21. From analysis of variance table, it shows that the parameters are associated with different station point. There measurement in different station is different. It seems that the measurement of parameters is dependent of

Table 1. Water Quality at of Lilour Lake water

Name of Station	LpH	LTH (mgL^{-1})	LDO (mgL^{-1})	LTA (mgL^{-1})	LCOD (mgL^{-1})	LBOD (mgL^{-1})	LCu ug/ml)	LZn ug/ml)	LPb (ug/ml)
S1	**7.05**	**122.8**	**5.2**	**130.6**	**16.2**	**2.74**	**0.9**	**0.62**	**0.9**
S2	**7.08**	**126.4**	**5.8**	**134.2**	**15.8**	**2.42**	**0.45**	**0.58**	**1.24**
S3	**8.42**	**120.5**	**6.2**	**124.4**	**13.5**	**1.92**	**0.24**	**0.56**	**0.72**

Table 2: Reliability Analysis

	Component Accuracy Demography			In case component released	
	Average	**Standard Deviation**	**Component-motionlessness interrelationship**	**Coefficient** α	**Coefficient** ω
LpH	7.517	0.7825	-0.924	0.688	0.907
LTH	123.233	2.9738	0.934	0.249	0.835
LDO	5.733	0.5033	-0.543	0.637	0.910
LTA	129.733	4.9571	0.997	0.211	0.793
LCOD	15.167	1.4572	0.800	0.459	0.753
LBOD	2.360	0.4133	0.669	0.569	0.777
LCu	0.530	0.3372	0.389	0.587	0.832
LZn	0.587	0.0306	0.433	0.601	0.830
LPb	0.953	0.2641	0.955	0.571	0.843

Table 3. Scrutiny of discrepancy

Scrutiny of discrepancy						
Brief	**Numbering**	**addition**	**Mean**	**Discrepency**		
S1	9	287.01	31.89	2916.518		
S2	9	293.97	32.66333	3090.737		
S3	9	276.46	30.71778	2724.942		
LpH	3	22.55	7.516667	0.612233		
LTH	3	369.7	123.2333	8.843333		
LDO	3	17.2	5.733333	0.253333		
LTA	3	389.2	129.7333	24.57333		
LCOD	3	45.5	15.16667	2.123333		
LBOD	3	7.08	2.36	0.1708		
LCu	3	1.59	0.53	0.1137		
LZn	3	1.76	0.586667	0.000933		
LPb	3	2.86	0.953333	0.069733		
Analysis of Discrepency						
Origin of Discrepency	SS	df	MS	F	P-value	F crit
Rows	17.27201	2	8.636004	2.456487	0.117391	3.633723
Columns	69801.33	8	8725.166	2481.849	2.91E-23	2.591096
Error	56.24946	16	3.515591			
Total	69874.85	26				

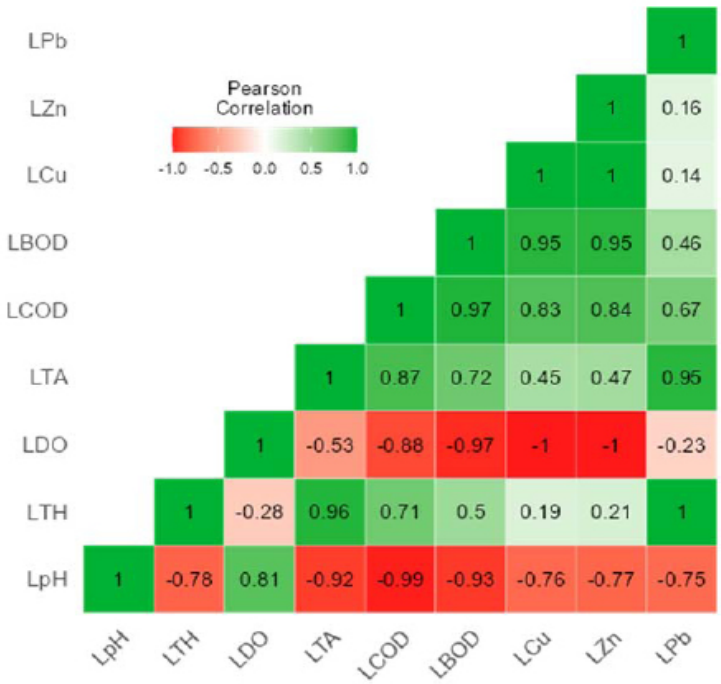

Fig 1: Correlation Heatmap

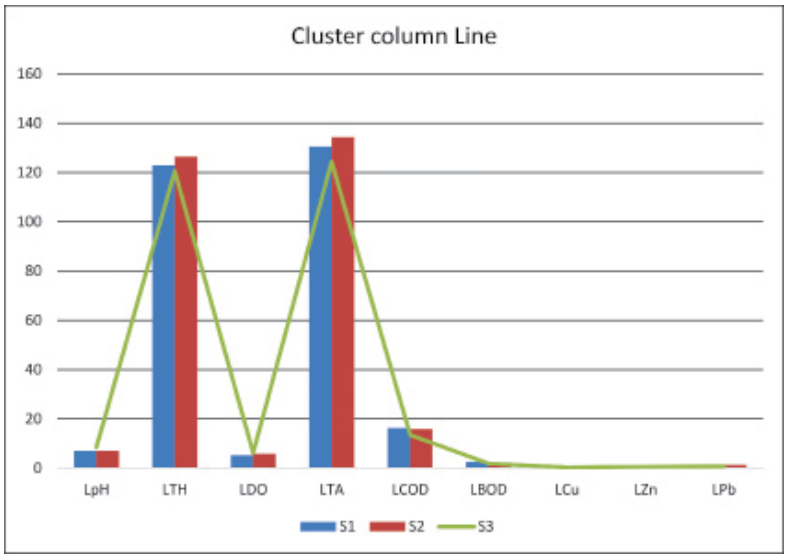

Fig. 2. Cluster Column Line

Station point. Also, we find from analysis of variance that the parameters do not depend to each other. We have analysis the reliability of water using Jamovi 2.6.44 software. Jamovi is a statistical Analysis software which is used to analysis the data. Here we analysis Coefficient Alpha and Subjective bendability of water for reliability. We have also analysis of Correlation between the parameters which is given in fig 1. From the correlation heatmap, it shows that strong negative correlation happened between some parameters and in some cases strong positive correlation happened. From Cronbach's , it shows that Total Hardness, Total alkalinity, and LCOD are not acceptable for reliability purpose. According to reliability condition LBOD, LCu and LPb are also poor. Hence, it is clear that the water condition of Lilaur lake is not reliable. This means the water of the lake is not suitable for drinking as well as domestic purposes. Hence precaution should be needed to make the lake water reliable.

CONCLUSION

Here, So any parameters of the lake water are are out of permissible limits and also failed to satisfy the condition of reliability according to Cronbach's Alpha test. Hence the lake water is not perfect for consuming as well as domestic use purposes. Hence some suitable measurement should require to make the lake water suitable for use purposes.

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Conflict of interest

There is no conflict of interest regarding this research paper.

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