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Primary examination of seasonal variation in some physico-chemical water parameters from Mul Lake, Chandrapur (M.S.) India.

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Abstract

Mul lake named as Mul Talav and it is a famous due to picnic spot built municipal corporation, it is natural water body. Knowing the water quality requires a physicochemical analysis. By evaluating the physical and chemical characteristics, this research sought to monitor water quality in order to promote its sustainable use. The main objective of this study is to analyse the seasonal variation in some physico-chemical characteristics namely water temperature, total dissolved solid, electrical conductivity, turbidity, pH and alkalinity. There were seasonal changes in the physicochemical characteristics at different locations. The current study's findings have highlighted the need to increase public knowledge of water conservation and management.

***Keywords*:** *Mul Talav, Water quality, Seasonal variation and Conservation.*

Introduction

Lakes serve as important water sources. The water from lakes can be utilized for different activities like farming, fish farming, raising animals, and for household needs as well. Studies show that many researchers have explored the physical and chemical characteristics of lakes concerning different factors both in India and in other countries. Water is a vital necessity for living beings and is used in various ways, including personal and household use, drinking, farming, irrigation, industries, and fish farming. It is also essential for promoting a good quality of life and supporting economic and social growth (Ingale et al., 2015). Pollution in lake water can come from a variety of sources, including agricultural runoff, domestic sewage, industrial effluents, and atmospheric deposition (Wetzel, 2001). These pollutants can include nutrients, sediments, pathogens, and toxic substances, which can alter the chemical, physical, and biological characteristics of lake water (Carpenter et al., 2011).

Materials and Methods

Mul is a Taluka in Chandrapur District of Maharashtra State, India. Mul Taluka Head Quarters is Mul town. It belongs to Vidarbh region. It belongs to Nagpur Division. It is located 44 KM towards East from District headquarters Chandrapur. Mul Taluka is bounded by Pombhurna Taluka towards South. The Mul lake is situated between latitude 20.067482 N and Longitude 79.672169 E.

For the analysis samples were collected from Mul lake in the early morning between 8.30 to 11.00 a.m. in every month at regular interval during July 2021 to June 2022. The samples were collected from four station M1, M2, M3 and M4 in five litre container from a depth of 15-20 cm below the surface of water by holding the container upward. Temperature, conductivity, total dissolved solid, pH and alkalinity was analysed in the field by means of ELIKO makes a

digital water analysis kit at the spot of collection. Turbidity measured by Nephelometer. Standard methods were employed for the estimation of physico-chemical factors periodically tested by using standard methods given by APHA (1998).

Results and Discussion

Water temperature of Mul lake water is showing natural phenomenon and hence during the summer season (M1 31.06±0.602, M2 30.24±0.457, M3 30.71±0.563 and M4 29.91±0.481) higher temperature is noted due to Water's great specific heat capacity, together with higher air temperatures and solar radiation, contributes to its high specific heat capacity. Analogous finding were noted by Telkhede *et al.,* (2008) and Jambhule and Telkhede (2020). Similarly, TDS and EC maximum values reported in monsoon months due to runoff and inflow of rainy water into the lake all the waste materials and other particles come inside, anthropogenic activities, domestic waste from bus stop area, might be due to this the level increase EC and TDS of lake water. Data should be presented in table and figure form (table no 1-4 and figure no 1-4). Turbidity, pH and alkalinity values noted higher in summer months due increased photosynthetic activity of aquatic plants, driven by higher sunlight and temperatures in the summer, is the primary reason for the observed increase in lake water pH. Similarly Alkalinity and Turbidity values denoted maximum during summer season. Might be due to increased algal growth, higher temperatures, anthropogenic activities and increased runoff. Data should be presented in table and figure form (table no 1-4 and figure no 1-4). Parallel investigation reported by Ingale *et al.,* (2018) from Bhiwapur lake. Also, Values are corroborated with Khiradkar *et al.,* (2017) from Labhansarad dam in Warora dist. Chandrapur.

Conclusion

All six the physico-chermical parameters appear to fluctuate seasonally in the current investigation. The only reason for the decline in water quality is, as far as can be seen, human activity around the lake. To make sure that human actions have the least possible adverse impact on the lake located in Mul town, it is necessary to properly manage the lake in terms of waste input and keep an eye on human activity. To avoid environmental damage to Mul Lake, it is necessary to raise public awareness, have a thorough comprehension, plan, and manage environmental resources.

Table no. 1: Table Shows Seasonal Average Mean Values of Physico-chemical Parameters at Station - M1 from Mul lake, Mul, district Chandrapur during July 2021- June 2022.

Sr. No.	**Seasons → Parameters ↓**	**Monsoon**		**Winter**		**Summer**	
		MEAN	SE	MEAN	SE	MEAN	SE
1	Water temperature °C	26.99	0.724	22.7	0.937	**31.06**	**0.602**
2	Total dissolve solids	586.3	20.14	417.5	13.62	494.3	15.63
3	Conductivity (µmhos/cm)	638.8	13.34	459	13.34	533.8	13.84
4	Turbidity (NTU)	4.15	0.126	3.425	0.138	6.85	0.47
5	pH	8.35	0.104	8.125	0.085	9.275	0.217
6	Alkalinity (mg/L)	117.3	6.115	94	5.759	132.8	7.25

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Table no. 2: Table Shows Seasonal Average Mean Values of Physico-chemical Parameters at Station - M2 from Mul lake, Mul, district Chandrapur during July 2021- June 2022.

Sr. No.	Seasons → Parameters ↓	Monsoon		Winter		Summer	
		MEAN	SE	MEAN	SE	MEAN	SE
1	Water temperature °C	26.45	0.671	22.2	0.885	30.24	0.457
2	Total dissolve solids	529.5	21.12	353.5	13.29	442.5	16.04
3	Conductivity (µmhos/cm)	578	10.93	400.8	10.93	474.3	16.22
4	Turbidity (NTU)	3.925	0.111	3.2	0.091	6.475	0.425
5	pH	8.1	0.082	7.925	0.075	8.975	0.18
6	Alkalinity (mg/L)	95	5.313	76.75	5.313	110.8	4.553

Table no. 3: Table Shows Seasonal Average Mean Values of Physico-chemical Parameters at Station - M3from Mul lake, Mul, district Chandrapur during July 2021- June 2022.

Sr. No.	Seasons → Parameters ↓	Monsoon		Winter		Summer	
		MEAN	SE	MEAN	SE	MEAN	SE
1	Water temperature °C	26.64	0.704	22.38	0.914	30.71	0.563
2	Total dissolve solids	551.3	21.64	383.8	15.33	468	14.88
3	Conductivity (µmhos/cm)	608.5	13.08	429.5	13.08	504	15.86
4	Turbidity (NTU)	4	0.135	3.275	0.111	6.6	0.442
5	pH	8.2	0.108	8.05	0.087	9.1	0.196
6	Alkalinity (mg/L)	104.3	6.981	83.75	5.218	121.5	5.575

Table no. 4: Table Shows Seasonal Average Mean Values of Physico-Chemical Parameters at Station – M4 from Mul lake, Mul, district Chandrapur during July 2021- June 2022.

Sr. No.	Seasons → Parameters ↓	Monsoon		Winter		Summer	
		MEAN	SE	MEAN	SE	MEAN	SE
1	Water temperature °C	26.16	0.58	22.04	0.909	29.91	0.481
2	Total dissolve solids	489.5	19.47	323	10.3	413.8	16.68
3	Conductivity (µmhos/cm)	552	9.894	369.3	9.894	450.3	15.37
4	Turbidity (NTU)	3.8	0.129	3.025	0.085	6.1	0.408
5	pH	7.875	0.063	7.7	0.071	8.4	0.108
6	Alkalinity (mg/L)	88.25	8.664	69.75	5.483	104	4.528

Figure no. 1: Graph Shows Seasonal Average Mean Values of Physico-chemical Parameters at Station - M1 from Mul lake, Mul, district Chandrapur during July 2021- June 2022.

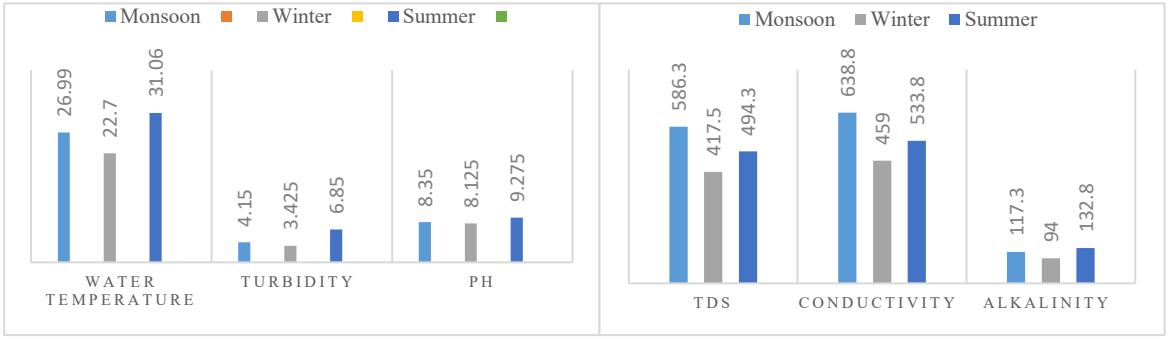


Figure no. 2: Graph Shows Seasonal Average Mean Values of Physico-chemical Parameters at Station - M2 from Mul lake, Mul, district Chandrapur during July 2021- June 2022.

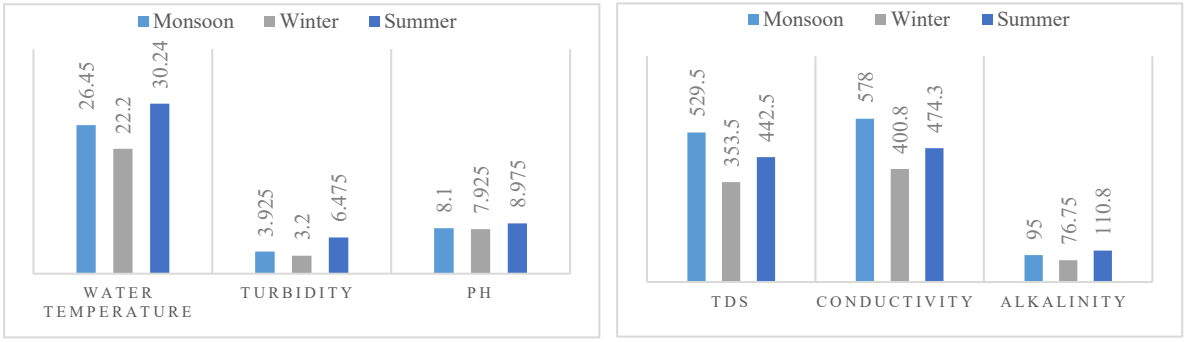


Figure no. 3: Graph Shows Seasonal Average Mean Values of Physico-chemical Parameters at Station - M3 from Mul lake, Mul, district Chandrapur during July 2021- June 2022.

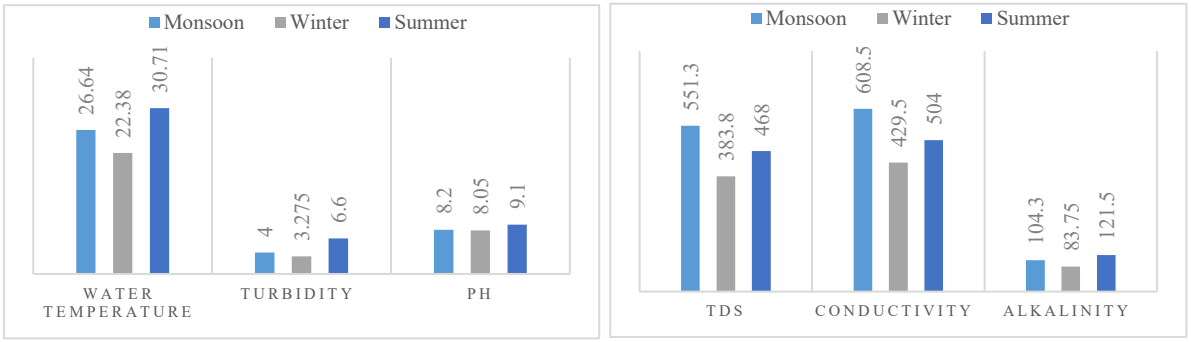
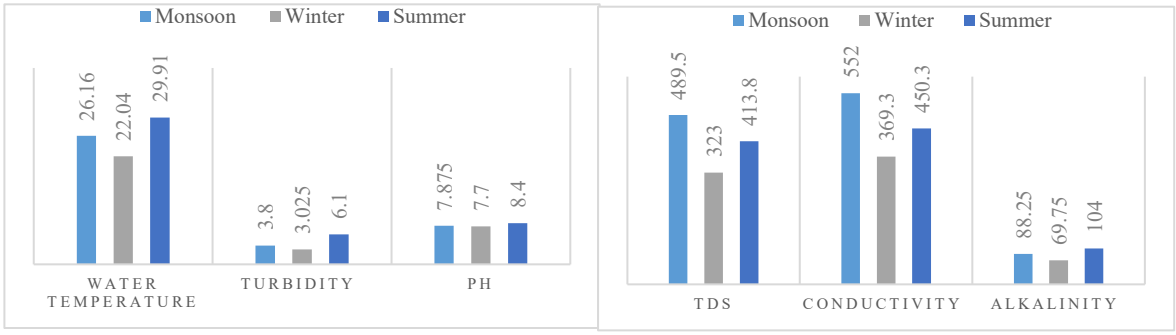


Figure no. 4: Graph Shows Seasonal Average Mean Values of Physico-chemical Parameters at Station - M4 from Mul lake, Mul, district Chandrapur during July 2021- June 2022.



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