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Analysis of Seasonal Variation and Correlation Coefficient of Physico-chemical Parameters in Por River, Near Haramba, Chamorshi, Dist. Gadchiroli, Maharashtra, India

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Abstract

This study was conceded out for a period of March 2023 to February 2024 in Por River find the actual readings of a few physico-chemical parameters and their correlation to each other. At 4 different locations, the readings of Electrical Conductivity, Total Dissolved Solids, Dissolved Oxygen, Biochemical Oxygen Demand, Temperature and pH were recorded. Also, their seasonal values and correlation among them via Pearson's coefficient of correlation (r-values) were determined. Our values that we recorded and later calculated show that two different locations are lowering the quality of river water which was good at first location. Our investigation clearly hints the indulgence of human's society to be responsible for influencing water quality of the river.

Keywords: *Por river, Physico-chemical parameters, Correlation and Water quality.*

Introduction:

One of the major sources of fresh water, rivers are on the top in India. For agriculture, settlements, and pisciculture, humans followed rivers since ages. This fresh water from rivers has always been used for household works, drinking purposes, in industry, agricultural irrigation. Hence, water quality maintenance is of prime importance even for the riverine ecosystem's stability. There has been serious concerns regarding pollution at it is seen to lower the quality of river water which eventually affects the purposes for which it is used. Among various rivers in India, many are getting affected due to pollution, and some are on the brink of getting completely polluted.

Various earlier reports have shown the water pollution in rivers and its reasons. A moderate pollution in Kolar river with respect to some physicochemical parameters was determined by Watkar et al., (2017). Similarly, Gadhavi river was found to be affected by pollution by human activities as noted by Bidwai et al., (2019). Additionally, human activities in the nearby region found to be moderately polluting the Vena river as reported by Gharpure et al., (2017). Sharma et al., (2022) have discussed at length many reasons of how Indian rivers get polluted.

This current task has been taken into consideration to determine the water quality of Por river in respect of a bunch of physicochemical parameters and to identify if there has been any sign of considerable changes that point out the pollution in river water.

Materials and methods:

This study was conducted between March 2023 to February 2024. 4 locations were decided in Por River to take the sample of river water. Electrical Conductivity, Total Dissolved Solids, Dissolved Oxygen, Biochemical Oxygen Demand, Temperature and pH were decided for this study. Collection of samples and the readings of physicochemical parameters were noted by the standard methods as are prescribed by APHA, AWWA and WEF (1992). Calculation of the seasonal values and the Pearson's coefficient of correlation of tables and graphs was carried out in Salsat2 Software.

Results and discussion:

Electrical conductivity and total dissolved solids were reported in all the season's lowest at station P1, and were high at station P2 and P3, slightly lowered at station P4, and still higher compared to station P1. In all seasons, they both were strong positively correlated with each other. pH and dissolved oxygen were reported in all season's highest at station P4 and were lowest at station P2. pH and dissolved oxygen were strong

positively correlated with each other. Biochemical oxygen demand was reported in all season's lowest at station P4 and was highest at station P2. Biochemical oxygen demand and dissolved oxygen demand were reported strong negatively correlated with each other. Moreover, biochemical oxygen demand and pH were reported strong negatively correlated with each other. pH and dissolved oxygen were reported strong negatively correlated with total dissolved solids and electrical conductivity. In all seasons and at all stations, river water temperature was found moderate and was reported of not creating any significant impact on other physico-chemical parameters (table no. 1, 2 and figure no. 1 to 6).

From this discussion, it appears that the most polluted ones are station P2 and P3. At station P1, water of the river was good, but later it was moderately polluted further, as river flows from station P1 to station P2 to station P3 and then to station P4. Nearest to human settlement are station P2 and P3 and are directly within the reach of people in the vicinity. So, the pollution by human interference is most likely to be the reason behind changes in physicochemical parameters at station P2 and P3. Similar findings have also been reported by Singh et al., (2022), Sawant et al., (2023) and Krishan et al., (2022).

Table No. 1: Seasonal values of physicochemical parameters at station P1, P2, P3 and P4 in Por river, Near Haramba, Chamorshi, Dist. Gadchioli, Maharashtra.

	P1			**P2**		
	Summer	**Monsoon**	**Winter**	**Summer**	**Monsoon**	**Winter**
TDS	322.925	250.775	124.325	339.075	266.9	140.325
EC	518.075	405.425	207.75	529.425	416.75	218.975
Temp	26.25	24	21.65	26.25	24	21.65
DO	5.625	5.85	6.9	5.325	5.55	6.65
BOD	5.7	4.45	3.525	5.9	4.675	3.725
pH	7.975	8.15	8.675	7.675	7.85	8.375
	P3			**P4**		
	Summer	**Monsoon**	**Winter**	**Summer**	**Monsoon**	**Winter**
TDS	325.375	253.1	126.65	319.025	247.075	120.975
EC	520.5	407.75	210.1	515.4	402.925	205.6
Temp	26.25	24	21.65	26.25	24	21.65
DO	5.525	5.75	6.825	5.725	5.95	6.975
BOD	5.8	4.575	3.625	5.475	4.25	3.3
pH	7.875	8.05	8.575	8.075	8.25	8.775

Table No. 2: Pearson's coefficient of correlation physicochemical parameters in Por river, Near Haramba, Chamorshi, Dist. Gadchioli, Maharashtra.

	TDS	**EC**	**Temperature**	**DO**	**BOD**	**pH**
TDS	1					
EC	0.999998	1				
Temperature	0.915931	0.915869	1			
DO	-0.93213	-0.93227	-0.89798	1		
BOD	0.89229	0.89206	0.913794	-0.87564	1	
pH	-0.92433	-0.92443	-0.89191	0.983641	-0.86395	1

Figure no. 1: Showing seasonal values of TDS at station P1, P2, P3 and P4 in Por river.

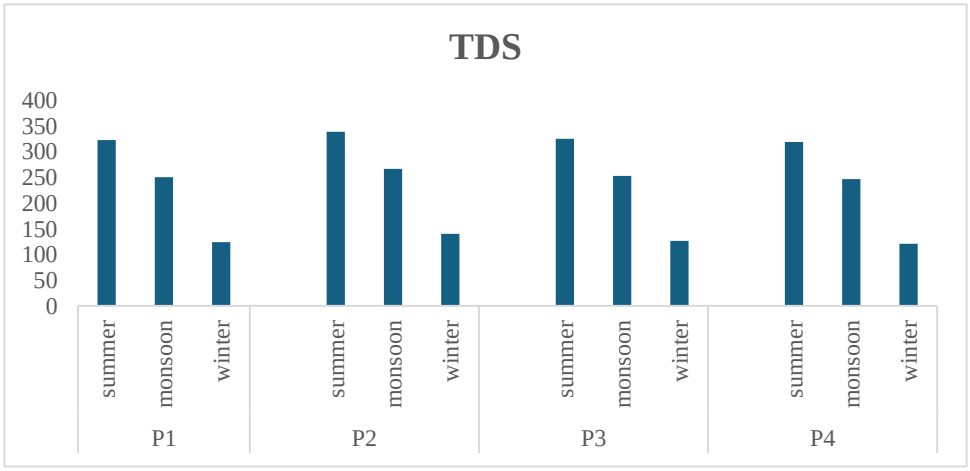


Figure no. 2: Showing seasonal values of EC at station P1, P2, P3 and P4 in Por river.

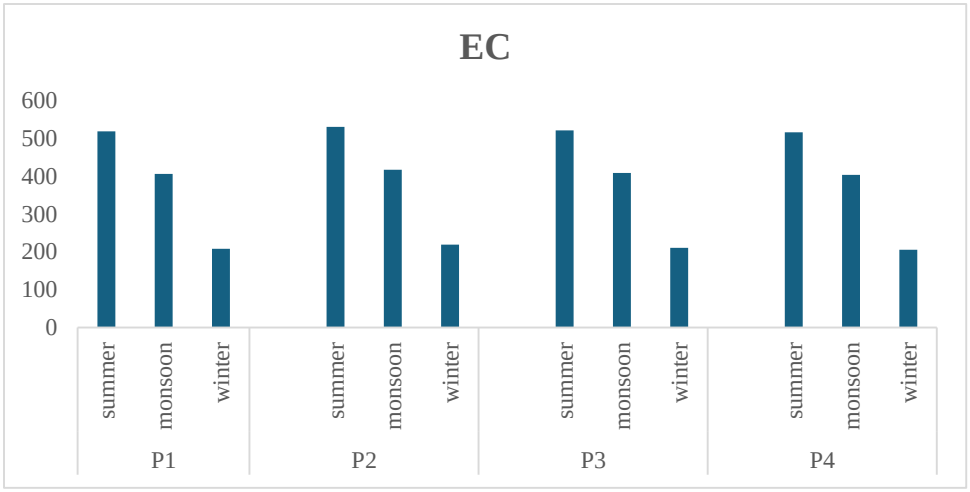


Figure no. 3: Showing seasonal values of Water Temperature at station P1, P2, P3 and P4 in Por river.

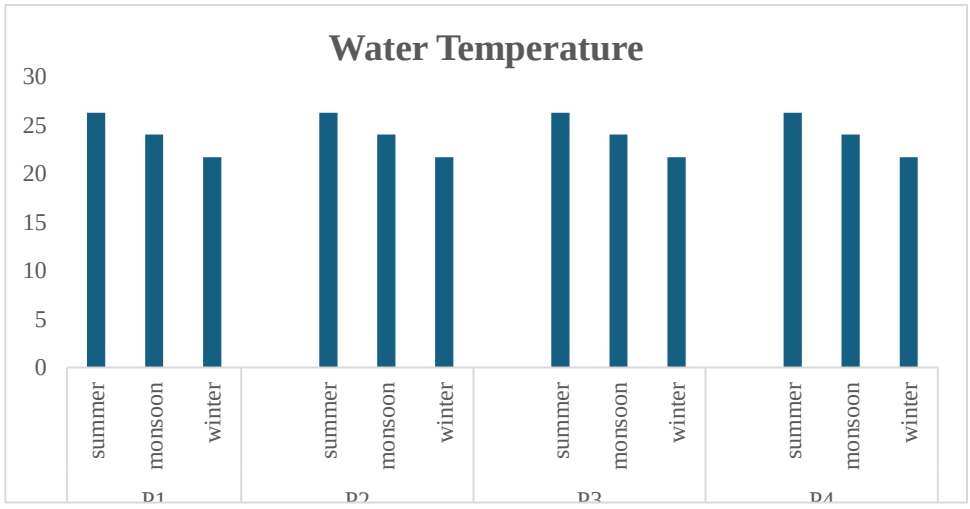


Figure no. 4: Showing seasonal values of DO at station P1, P2, P3 and P4 in Por river.

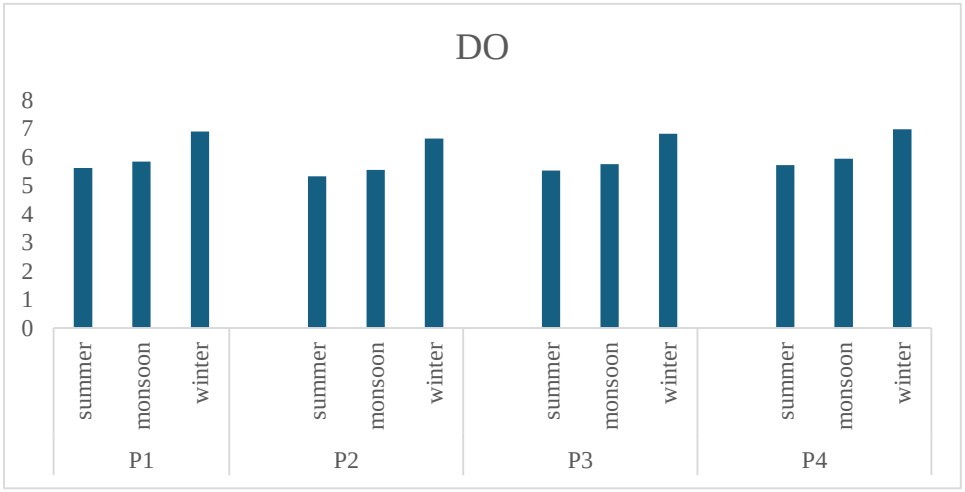


Figure no. 5: Showing seasonal values of BOD at station P1, P2, P3 and P4 in Por river.

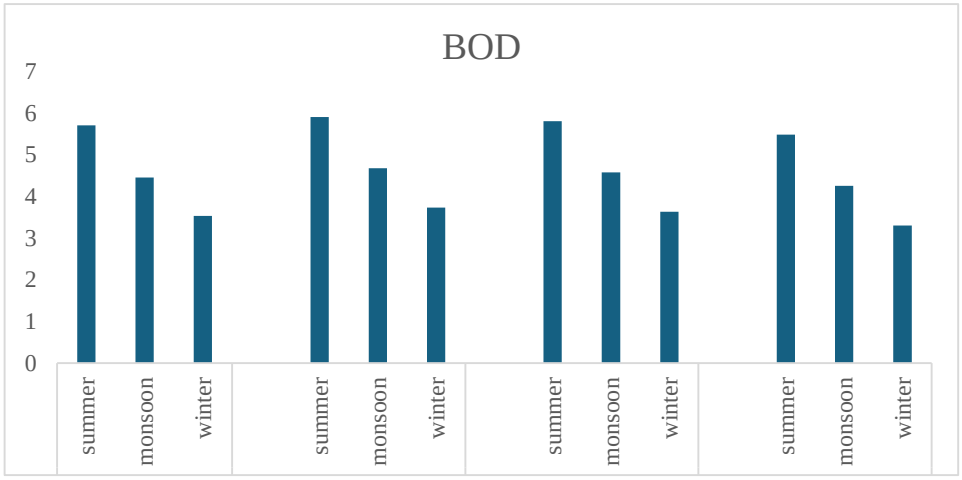
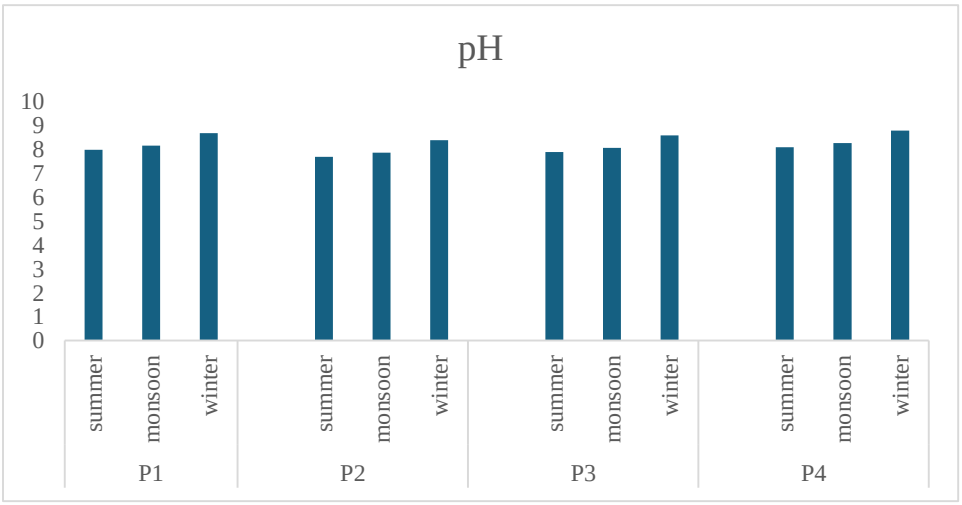


Figure no. 6: Showing seasonal values of pH at station P1, P2, P3 and P4 in Por river.



Conclusion:

Water quality lowering at station P2 and P3 is most likely because of human interference and is not because of the chance factor. Overall, the Por river seasonal values is within permissible limit. Still need of regular monitoring of water quality of Por river is important task for aquatic flora and fauna.

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