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Hydrobiology of the River Pazhayar at Kanyakumari District, Tamilnadu

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This paper deals with a profile of physicochemical quality of Pazhayar river from September 2000 to August 2001 in the context of pollution. The parameters such as water temperature, salinity, pH, dissolved oxygen, hardness and hydrogen sulphide concentration were dealt with in detail. Almost all stations exhibited significant seasonwise fluctuations indirectly indicating the discharge dependency.

Key Words: Hydrobiology, Pazhayar river, Seasonal variation.

Kanyakumari, a tiny coastal district, is located at the southernmost tip of Tamilnadu. Pazhayar is one of the perennial rivers flowing for a distance of 35 km and confluences with the Arabian sea through the Manakudy estuary. The mixing up of rubber factory effluent in the upstream, coconut husk ret liquor in the downstream, paddy fields along the banks of the river and sewage disposal increase the pollution load. This river is mainly fed by rainwater which carries the wash off and waste discharge from the neighbouring areas and seems to be a drainage river. The present work involves the monitoring of the physicochemical parameters of Pazhayar river during all seasons of the year to investigate the extent of water pollution.

For the study of physicochemical parameters, surface and bottom water samples were collected from seven fixed stations along the longitudinal sections of the river from the place of origin towards downstream, Stations I and II in the coastal zone and the other five stations in the riverine zone.

Water samples were collected monthly in fresh polythene bottles from all the stations separately. The water temperature was recorded in the field itself. The salinity and dissolved oxygen were estimated¹. Hydrogen sulphide and hardness were also estimated².

The annual average values of physicochemical parameters are given in Table-1. The monthly variation in temperature showed that the surface water temperature was always higher than that of the bottom water. The difference in temperature gradient between the surface and bottom water was marginal. At station VII the water temperature was lower when compared with other stations as is characteristic of the tropical hill streams, but significantly high which might be due to discharge of rubber factory effluent³. The water temperature did not exhibit much variations in different seasons but there exist seasonal variations thereby following a set pattern dictated by the seasonal cycle.

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TABLE-I
PHYSICO-CHEMICAL PARAMETERS (MEAN \pm S.D)

Parameters	I	II	III	IV	V	VI	VII	
Temp. ($^{\circ}$ C)	SW	28.2 \pm 2.54	27.2 \pm 1.66	27.9 \pm 1.73	28.1 \pm 2.02	27.9 \pm 2.59	26.9 \pm 2.04	
	BW	28.38 \pm 2.63	27.68 \pm 2.59	26.78 \pm 1.68	27.23 \pm 1.59	27.51 \pm 2.07	27.32 \pm 2.68	26.79 \pm 1.79
Salinity (g/L)	SW	8.3098 \pm 3.95	6.3211 \pm 2.73	0.0959 \pm 0.02	0.0817 \pm 0.02	0.0854 \pm 0.02	0.0770 \pm 0.02	0.0409 \pm 0.01
	BW	9.6360 \pm 4.3711	6.7410 \pm 2.4938	0.0889 \pm 0.0231	0.0738 \pm 0.0180	0.0821 \pm 0.0289	0.0775 \pm 0.0217	0.0399 \pm 0.0149
pH	SW	7.55 \pm 0.8077	7.64 \pm 0.4795	7.52 \pm 0.2703	7.50 \pm 0.3664	7.41 \pm 0.4007	7.51	7.02
	BW	7.59 \pm 0.7120	7.43 \pm 0.6195	7.48 \pm 0.2650	7.53 \pm 0.4520	7.39 \pm 0.5026	0.6694	0.4501
DO (mg/L)	SW	4.44 \pm 0.7886	4.40 \pm 1.0950	4.27 \pm 0.8490	4.30	4.44	4.36	5.29
	BW	3.99 \pm 0.5827	4.16 \pm 1.2484	4.02 \pm 0.8652	0.9617	1.2311	1.7019	1.0804
Hardness (mg/L)	SW	1516.2	503.0091	126.2 \pm 42.1645	121.3 \pm 47.8694	90.8 \pm 28.5110	166 \pm 133.9114	37 \pm 16.3975
	BW	1701.2	662.3026	128.1 \pm 36.6850	117.4 \pm 33.2223	106.2 \pm 32.9521	117.2 \pm 161.6902	36.4 \pm 15.8485
H ₂ S	SW	3.69 \pm 3.2812	15.25 \pm 4.4225	0	0	0	0	0
	BW	1.84 \pm 2.0657	4.49 \pm 3.5972	0	0	0	0	0

The salinity profile showed that the salinity diminished progressively from station I to stations II and III and reached the lowest value at station VII on the riverine zone. A clear stratification between surface and bottom waters at two coastal stations was observed which may be due to the penetration of saline seawater through the bottom. The riverine side indicated approximately low values of salinity due to the distribution of salt deposits and discharge of irrigation drainages. The seasonal variation in salinity was highly significant. The mean salinity during premonsoon period was high due to higher rate of evaporation and absence of river discharge.

The pH range showed that the surface and bottom waters were alkaline invariably at all the stations except for a brief acidic phase at stations I and II in July and August 2001, which was due to the release of hydrogen sulphide from coconut husk ret liquor. Station VII at the fresh water zone showed acidic pH in monsoon seasons due to the mixing up of acidic effluents. Seasonal variations were highly significant. The low pH during monsoon season could be due to the influence of fresh water and low photosynthetic activity⁴.

The survey revealed that the concentration of dissolved oxygen in the surface water was higher than that of bottom water. The coastal stations recorded lower dissolved oxygen content which may be due to shallowness, high salinity and utilization of oxygen by bottom living organisms. The seasonal mean value indicates that pre-monsoon was particularly a period of intense pollution resulting in low oxygen value.

The total hardness of bottom water was found to higher than that of the surface water. The decomposition of bottom deposits by microorganisms and increased concentration of calcium carbonate lead to higher level. The hardness was maximum at the coastal stations due to saline water intrusion. The seasonal range indicated higher values during pre monsoon season due to evaporation.

The existence of hydrogen sulphide was recorded at the two coastal stations I and II. This was due to retting activity⁵. The concentration of hydrogen sulphide was low during monsoon season due to freshwater inflow which sweeps away the hydrogen sulphide.

Conclusion

The river Pazhayar seems to be losing its innate nature due to the entry of untreated drainage effluents. So regular monitoring of water quality at identified localities is a pre-requisite to provide ample scope for the proper management of this valuable ecosystem.

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