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# WATER QUALITY STATUS OF ESTUARIES AT KANYAKUMARI DISTRICT.

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**Abstract:** The water quality status was studied in four estuaries of Kanyakumari district. The purpose was to access the quality of water from the sources in three different seasons. Water samples were analyzed for physico-chemical parameters including pH, Electrical conductivity, turbidity, TDS, alkalinity, total hardness, DO, BOD, Nutrient elements, Major elements, Carbonate elements, Mobile elements. The concentration of most of the investigated parameters in the water samples from the Manakudy estuaries were exceeded the permissible limit of WHO and CPHEEO water quality guidelines and the water quality are very poor in Manakudy estuary than other estuaries.

**Keywords:** seasonal variations, Mobile elements, Nutrient elements, water quality index.

**Introduction:**

The sheltered waters of estuaries are home to countless plants and animals that like to live in water that is partly fresh and partly salty. Estuaries protect water quality by filtering out dirt and pollution. Mixing of fresh and salt water in estuaries create unique chemical and biological characteristics whose effects outweigh their small volumetric proportion of the hydrologic cycle. The mixing of fresh water with sea water contains high levels of nutrients in the water column and in the sediment column. The present study deals with the characteristics of nutrients in the four ecologically different estuaries in Kanyakumari District, Pantry estuary, Valliyar estuary, Manakudi estuary and Thengapattanam estuary in the south west coast of India. Among this, Manakudy estuary and Thengapattanam estuary abounds with fishery resources and has neighbouring fishing helmets.

## II. MATERIAL AND METHODS

Water samples were collected every month and preservation and transportation of the water samples to the laboratory were as per standard methods. The samples were analyzed for different parameters. pH was measured using a pH analyzer while dissolved oxygen was fixed immediately after collection and then determined by Winkler's method. Nutrients, were determined by standard photometric method. Turbidity was measured by Nephelometer. The alkali metals like sodium and potassium in water samples were determined by using flame photometer. The chloride content in the water sample was determined by Argentometric method. The results of these analysis were subjected to statistical assessment viz., correlation and two-way ANOVA to determine their significance. Water quality indices were calculated based on BIS/ICMR standards in order to assess the quality of water.

## III. RESULTS AND DISCUSSION

Water quality index (W.Q.I.) provides a single number that expresses overall water quality at a certain location and time, based on several water quality parameters. The overall Water Quality Index (W.Q.I.) was calculated by aggregating the quality rating with the unit weight linearly.$\therefore W.Q.I. = \Sigma qnWn / Wn$

**Table 1.Mean seasonal variation of physico-chemical parameters at Pantry, Valliyar, Manakudy and Thengapattanam estuary (All values except pH is in mg/l.)**

| Water quality parameters | Pantry estuary | Valliyar estuary | Manakudy estuary | Thengapattanam estuary |
|---|---|---|---|---|
| pH | 7.67 | 7.97 | 7.46 | 7.63 |
| Total alkalinity | 71.67 | 41.7 | 101 | 56.33 |
| Total Hardness | 737.7 | 997 | 5008 | 2571 |
| Total Dissolved solids | 2847 | 2214 | 6048 | 5929 |
| Calcium | 79.67 | 118 | 528 | 235.2 |
| Magnesium | 129.1 | 204 | 969 | 455.2 |
| Chloride | 1343 | 1118 | 6104 | 2809 |
| Nitrate | 4.83 | 3.02 | 5.83 | 5.03 |
| Sulphate | 82.92 | 34.9 | 110.3 | 110.3 |
| DO | 5.34 | 5.6 | 4.57 | 6.07 |
| BOD | 25.17 | 24.3 | 26.9 | 22.1 |

**Table 2. water quality index of Pantry estuary,Valliyar estuary,Manakudy estuary and Thengapattanam estuary**

| Estuaries | WQI |
|---|---|
| **Pantry estuary** | 210.64 |
| **Valliyar estuary** | 221.96 |
| **Manakudy estuary** | 353.68 |
| **Thengapattanam estuary** | 257.11 |

Water quality of any particular area (or) particular source can be assessed by physical, chemical and biological parameters. Water quality Index helps to describe the quality of water. The present study was focused to calculate water quality Index of an estuarine water body, which deals with the study on the influence of environmental parameters on the water quality of water body. WQI indicates the quality of water in terms of index number. In general water quality indices incorporate data from multiple water quality parameters into a mathematical equation that rates the health of a water body with number.

Table 1 indicates the mean seasonal variations of the physico-chemical parameters of the estuarine water at Pantry estuary, Valliyar estuary, Manakudy estuary and Thengapattanam estuary.

Water Quality index calculation during pre-monsoon, monsoon and post monsoon values indicates that the estuarine water body of Pantry estuary in polluted level.

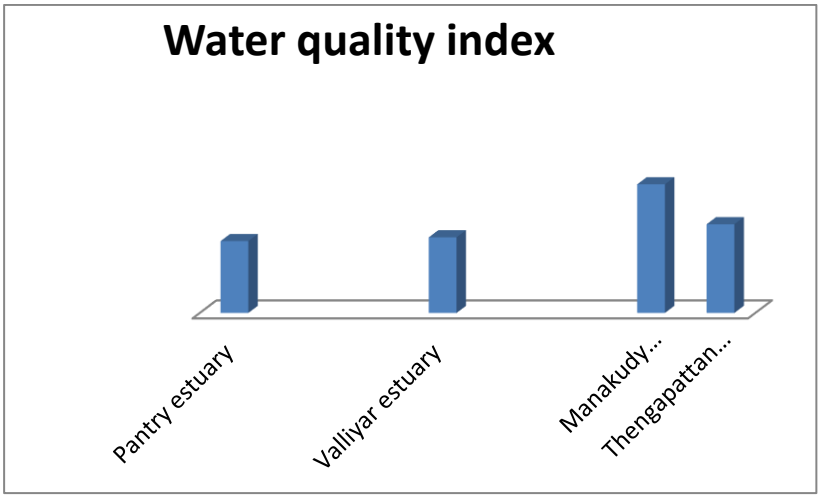
The water quality index values of Manakudy estuary during pre-monsoon, monsoon and post monsoon season indicated that the estuarine water is heavily polluted than Pantry and Valliyar estuary. Water Quality index value of Manakudy estuary revealed that in all the seasons water quality level is almost equal. This is due to the contamination of pollutants in Manakudy estuarine region. Thengapattanam estuary showed higher water quality index value in monsoon season. It is due to the fact that water containing more dissolved solids and high BOD content. Comparatively Thengapattanam estuary showed higher WQI value than another estuary during monsoon season. 210.64, 221.96, 353.68, 257.11 are the mean calculation value of WQI in Pantry, Valliyar, Manakudy & Thengapattanam estuary.

**Conclusion:**

A comparative study of water quality parameters between Pantry, Valliyar, Manakudy and Thengapattanam estuaries indicates that the Manakudy estuary is contaminated more due to the direct discharge of industrial effluents, agricultural wastages and domestic wastages. Manakudy estuary is situated nearby sand mining industry, coconut husk retting, lime shell dredging and salt pan industry on both sides. Among these four estuaries water quality rate is very low in Manakudy estuary than other estuaries. The major sources are land runoff through agricultural areas, monsoon floods over contaminated lands and urban, domestic wastages. To sum up, it was found that at Manakudy estuary, there is a wide fluctuation in the physico-chemical parameters and the pollution level has been increased by an uncontrolled disposal of waste water, industrial effulent discharges, improper sanitation, sand mining and urbanization.

The following suggestions are made to maintain / upgrade the health of the Manakudy estuary. Steps should be taken to stop / minimize the discharge of waste from the coir retting pits and the domestic sewage into the estuary. The sand mining operations should be stopped to prevent soil erosion.

1) Regular environmental monitoring should be carried out to have baseline information on the state of health of the estuary, which would not only be useful for effective management practices for sustainable utilization of estuarine resources, but also would help in any remedial action, if necessary.
2) Mangroves can be planted on the sides of the estuaries which will protect the coastal belt from natural calamities like Tsunami. Mangrove afforestation will inturn increase the fish production of the area.
3) Strict measures are to be taken to pretreat the wastages as per standard norms of state pollution control board, before discharging in to the estuary.

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