Studies on Physico Chemical Characteristics and Level of Sewage Pollution in Krishna River at Wai, Dist: Satara

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Abstract

Fresh water is essential for agriculture, industry and human existence. It is a finite resource of earth. Fresh water resource are becoming deteriorate day-by-day at the very faster rate. Now water quality is a global problem and river Krishna is no escape to this. It originates at Mahabaleshwar in the Western Ghats at an elevation of about 1337 and flows for about 1400 km and outfalls into the Bay of Bengal. Wai city is situated nearly 25 km down the stream with Dhom dam constructed on the summit point of river Krishna and Kamandalu about 7 km upstream of Wai. The present investigation reveals the drastic changes occurring the physicochemical characteristic of river water within a span of 2 km down the stream when it passes the rough the city area. The parameters like pH, conductivity, TSS, TDS, TS, DO, BOD show sudden increase at the exit point of the river as compared to the entry point. The major human activities along with addition of city sewage throughout the span of river in huge quantity shows high levels of fecal contamination and phytoplankton diversity during different seasons of the year. In conclusion, the large numbers of drains with organic loads are mainly responsible for pollution in Krishna river and needs safe disposal technique with strict implementation of sewage treatment plant along with constant monitoring of the river water quality within the municipal corporation area. The restriction of human activities will also play some role in controlling the pollution problem.

Keywords: Physico-chemical parameters, sewage pollution, Krishna River

Introduction :

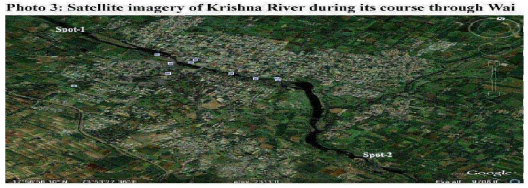
Water is one of the most important compounds to the ecosystem. Without adequate quantity and quality of fresh water sustainable development will not be possible (N. Kumar, 1997, Mahananda, M.R, 2010). Fresh water resource are becoming deteriorate day-by-day at the very faster rate. Now water quality is a global problem (Mahananda M R, 2010). The healthy aquatic ecosystem is depended on the biological diversity and Physico-chemical characteristics (Venkatesharaju K. *et al.*; 2010). Better quality of water is described by its physical, chemical and biological characteristics. But some correlation was possible among these parameters and the significant one would be useful to indicate quality of water. Water supply systems are important, but at the same time wastewater treatment systems are also equally important. Approximately 80% of water turns to waste water after its utilization. As a result in India there are sufficient evidences available related with the mismanagement of industrial wastes (Khurshid S., 1998, Singare P.U. 2011, Singare P.U., 2010, Lokhande R S, 2011,). This wastewater should be properly treated before discharging into any water body. Niranjan Babu (13) has explained health problems identified in developing urban areas. In case of river as a receiving body, when waste water is discharged on upstream side of river, downstream community uses the same water from the river for its day to day needs. Hence it is very much important that wastewater should be properly treated before discharging into river and maintaining sanctity of river. The sewage either seeps into the soils or pollutes ground water or it flows through streams and rivers and pollutes surface water. The Krishna River flowing through Wai city is the second largest eastward draining, Perennial River in the Peninsular India. The River Krishna drains an area of 258,948 km2, which is nearly 8% of the total geographical area of the country. The predominant soils in the area are sandy loams and loams.

The present studies of physico-chemical parameters were carried out to determine the level of pollution in the Krishna river at Wai during June -December2010.

Photo1: Human activities near river water ar Ganapati temple ghat

Photo 2: Mixing of sewage and used plastic waste in Krishna River water

Photo 3: Satellite imagery of Krishna River during its course through Wai



Material And Methods

The water samples from entry point (Spot No.1- Gangapuri) and exit point (Spot No.2- Bhadreshwar Temple) of Krishna River through Wai were collected from two different stations in the morning hours between 9 to 11am, in polythene bottle regularly for very month. The water samples were immediately brought in to laboratory for the estimation of various Physico-chemical parameters like water temperature; transparency and pH were recorded at the time of sample collection, by using Thermometer and Pocket Digital pH Meter. Transparency was measured with the help of Secchi disc. While other parameters like DO, TS, TSS and TDS, were estimated in the laboratory by using standard methods as prescribed By (APHA 1998) and (Trivedy R. K. and Goel 1986)

Results And Discussion

Temperature showed marked variation from June to Dec at both spot No.1 and 2. (23.5 - 24.5 and 23.5 - 24.0) The rise or fall in temp correlate with Conductivity, TS, TDS and TSS values.

There was no significant change in pH value at both the spots but slight inclination was obtain towards alkalinity (8.2) at the spot No. 2.

The conductivity showed increasing trend at spot No.2 than spot No.1. Increasing levels of conductivity and cations are the products of decomposition and mineralization of organic materials (1).

The transparency of river water gradually decreased at spot No.2 (25.3 -20.4) compared to (24.5- 28.1) at spot No. 1. The values show positive correlation with pH, conductivity, TSS and TDS values.

Total Solids, showed increased values from spot No.1 compared to spot No.2

The higher values of Total suspended solids at spot No. 2 might be due to presence of high organic matter along with carbonates and nitrates of calcium, magnesium, organic matter, salt and other particles. It might be due to run off from many bathing Ghats, drain water discharge.

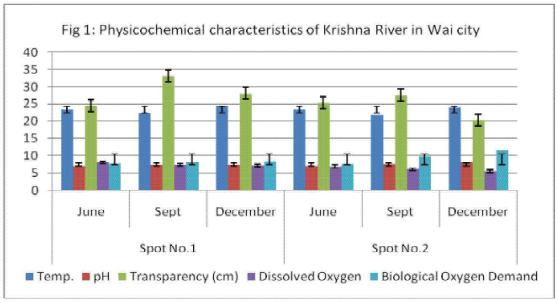
The present study shows comparatively increasing level of Dissolved Solids at spot No.2 than Spot No.1. In water, total dissolved solids are composed mainly of carbonates, bicarbonates, chlorides, phosphates and nitrates of calcium, magnesium, sodium, potassium and manganese, organic matter, salt and other particles (Mahananda, M.R, 2010). Variations revealed slightly higher values in Post monsoon season.

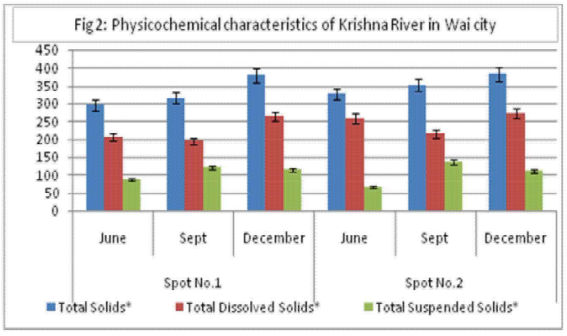
The amount of dissolved oxygen was initially well above the standards but showed decrease in lean season at spot No. 1 but drastic results were found at spot No.2 which may be ascribed to high biogenic activities (Abida B. and Harikrishna, 2008).

High amount of BOD supported the decrease in dissolved oxygen. Such condition would make survival of organisms difficult and will destabilize the ecosystem. This condition may be attributed to regular outfalls of more than 126 drains of city sewage from various Ghats along the run of river through the city area.

Conclusion And Suggestions :

1. The deterioration in water quality is found due to the regular outfalls of more than 126 drains only in Wai city.
2. The river water is under fluctuation in concentration of various parameters during different seasons.
3. The main cause of the sewage pollution is the total absence of the wastewater treatment system for Wai city situated along side of Krishna River.
4. The conductivity, TS and TDS is very high at exit point due to heavy organic pollutants discharged through sewage waste of city area. High BOD values indicate biogenic pollutants in river water.
5. This shows that, even though all the parameters are within the permissible limits of drinking water standards (IS: 10500, 1992), there is a need to take appropriate measures of pollution control by the concerned authorities to keep the water quality parameters within the permissible limits as the population and industrial activities in the area are increasing.
6. There will a strong suggestion not to dump sewage in river water unless it is given primary treatment to avoid organic and fecal contamination of river water.





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