RESEARCH ARTICLE

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A physico-chemical assessment of the river Ganga at Varanasi, U.P.

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SUMMARY

Varanasi (25°18' N and 83°1' E) is an ancient city situated on the left bank of river Ganga. Various physico-chemical characteristics of river Ganga flowing in varanasi were studied in the summer, winter and rainy seasons. Ecological parameters like dissolved oxygen (D.O.), pH, nitrate, phosphate, biochemical oxygen demand (B.O.D.) and temperature were analyzed and compared with standard permissible limits to assess the best designated use of the river water for various purposes. The important sources of pollution in the river Ganga include discharge of raw sewage at different ghats, the disposal of dead animals and human bodies, the garbage coming from household activities, discharge of faecal matters etc. Raj ghat is the main sewage disposal point of the Varanasi city. The physico-chemical analysis shows higher value of B.O.D. and lower value of D.O. at Raj ghat and Assi ghat. Ganges water was found to be rich in nitrate and phosphate contents, Dissolved oxygen and biochemical oxygen demand were found to be two important parameters, which showed strong correlation with several other parameters and hence can serve as good indices of river water quality.

Key words : Water quality parameters, Ganga water pollution

G anges, the holiest of Indian rivers is highly polluted near many cities on its banks. The problem of pollution at many other places, is due to sewage inflow, industrial waste, animal carcasses, unclaimed human bodies, plastic bags etc. Ganges in her 2500 km long journey from the Gomukh in the Himalayas to Ganga Sagar in the Bay of Bengal passes through Varanasi. The seven km long river, face along the city of Varanasi extending from Assi to Varuna is a hallowed place. Today the famous ghats of Varanasi add to the grandeur of this holy riverface.

About 60,000 people take a holy dip in the Ganga at the ghats each day. River has always been the most important fresh water resources, along the banks of which our ancient civilizations have flourished and most developmental activities are still dependent upon them. River water has multiple uses in every sector of development like agriculture, industry, transportation, aquaculture, public water supply etc. However, since old times rivers have also been used for cleaning and disposal purposes. Huge loads of waste from industries, domestic sewage and agricultural practices find their way into rivers, resulting in large scale deterioration of the water quality. The growing problem of degradation of our river

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A.K. GUPTA, Department of Botany, Shri Baldev Post Graduate College Baragaon, VARANASI (U.P.) INDIA **D.V. SINGH**, Department of Botany, Udai Pratap Autonomous College, VARANASI (U.P.) INDIA ecosystem has necessitated our the monitoring of water quality for various rivers all other the country to evaluate their production capacity, utility potential and to plan restorative measures. In any system where organic matter is present, the organic matter can be broken down (biodegraded) to inorganic matter by the action of microbes, oxygen is utilized during the biodegradation process. It has been found that the rate of biodegradation of the organic matter at any given time is proportional to the amount of organic matter and also the microbial population present in the system at that time (Tchobanoglous, 1979, Ademoroti, 1987). Dissolved oxygen is the amount of oxygen in the gaseous form present in water available for aerobic organisms to carry out their life processes. A well balanced warm water where fish can thrive requires a dissolved oxygen level of not less than 5 mg/l. The dissolved oxygen in highly polluted waste water is used up by microorganisms (Ademoroti, 1996).

The parameter used as a measure of the amount of oxygen required by microorganisms is "Biochemical oxygen demand (B.O.D.). This parameter also measures the strength of any given waste water (Ademoroti, 1984). The B.O.D. is an empirical biological test in which the water condition such as temperature, oxygen concentration or type of bacteria plays a decisive role. These and other factors cause the reproducibility to be much less than that of pure chemical tests. Inspite of the disadvantage, the B.O.D. is of special importance in the assessment of pollution in waste water. A high D.O. is an indication of a high state of purity of water and a low D.O. is an indication of pollution. An estimated 6 million

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