RESEARCH PAPER

Asian Journal of Bio Science, Vol. 4 Issue 2 : 296-297 (October, 2009 to March, 2010)

A comparative study of quality of river waters in the city of Allahabad, U.P., India

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(Accepted : September, 2009)

River water was assayed in the city of Allahabad. Amongst the parameters used were BOD, DO, pH, conductivity and heavy metals, *viz*., Cu, Cd, Cr, Fe, Zn, Pb, Ni, Mn. Site specific water samples were collected from the ghats of Ganga, Yamuna, Sangam and subjected to analysis. Physico-chemical characteristics of the water samples indicated a lower level of pollution in the water of Yamuna river whereas the confluence (Sangam) was found to be most polluted.

Key words : Physico-chemical, Heavy metals, Water samples, Pollution.

INTRODUCTION

Rivers are the most important water resource, but unfortunately the water quality of rivers is getting worse with the demand of water for domestic, municipal, agricultural and industrial purposes. Pollution of river first affects its physico-chemical quality and then systematically destroys the community, disrupting the delicate food web.

The waste water quality is conventionally assessed in terms of pH, DO, BOD and bacterial count (APHA *et al.*, 1992). The chemical criteria of water quality as suspended and dissolved solids, pH, electrical conductivity, DO and several cations were determined periodically at a number of representative sites (Reevan, 1999). The increasingly high percentage of heavy metals in waste sewage and the continuous use of these waste waters for irrigation results in the increment of the top soil with heavy metals (Larson *et al.*, 1975). Copper (most common among the heavy metals) is toxic to aquatic lives in trace amounts, if present in the water system (Moore and Ramamoorthy, 1984). Chromium is discharged into water through the effluents from tanneries, electroplating, textiles, mining etc., concentrate in the tissues of aquatic biota and is known for its deleterious effects (Abassi *et al.*, 1995). The total blood cholesterol, serum, acid and alkaline phosphatase levels increased significantly at all the concentrations of Cadmium with time (Srivastava *et al.*, 1993). The present study, which is a first attempt, was carried out to find out the impact of physico-chemical characteristics on the water quality of Ganga, Yamuna and Sangam.

MATERIALS AND METHODS

Samples of water were collected from the sites of Ganga, Yamuna and Sangam in sterilized polypropylene capped bottles. The collected samples were kept in ice-cold condition, brought to the laboratory and analyzed for various physico-chemical parameters by the standard methods. BOD, DO, pH and conductivity of water was done as per standard methods (APHA *et al.*, 1992; Trivedy and Goel, 1984). The metal concentration in water was determined by atomic absorption spectro-photometer using conventional flame.

RESULTS AND DISCUSSION

The values of BOD and DO are presented in Table. 1 which showed that the BOD was found to be maximum and the DO was minimum in the water samples obtained from Sangam. In case of Yamuna river, BOD value was lowest while DO value was highest. This indicates that the density of aquatic organisms is more at the Sangam site and less at the site of Yamuna river.

Table 2 shows the values of conductivity and pH.

Table : 1 BOD and DO of river waters

Source	BOD	DO
Ganga	5.6 ± 0.2	7.8 ± 0.2
Yamuna	3.5 ± 0.2	8.5 ± 0.2
Sangam	6.5 ± 0.2	5.3 ± 0.2

All values shown are Mean ± S.D. of 3 replications, Values are obtained after deduction from blank sample. BOD (Biological Oxygen Demand) and DO (Dissolved Oxygen) are expressed as mg lit $^{-1}$.