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### STUDY OF PHYSICO-CHEMICAL CHARACTERISTICS AND HEAVY METALS IN RIVER SENGAR AT JASWANT NAGAR BRIDGE DISTRICT ETAWAH IN UTTAR PRADESH

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**Abstract:** Water samples from river Sengar at Jaswant Nagar Bridge District Etawah, U.P. were collected and physico-chemical parameters and heavy metals were determined using standard analytical procedure in 2012 pH 8.1, temperature 30°C and turbidity found to be 8.1 NTU (Nephelometric Turbidity Units). The chloride and sulphate contents of water samples were determined 20 and 18 mg/l, total hardness 135 mg/l, total dissolved 190 mg/l. Zinc and iron (Zn & Fe) were found 145µg/l and 440µg/l. Fluoride level was also high 20 mg/l. Copper and Chromium (Cu and Cr) were observed 10.8µg/l and 52µg/l. These results were said to their agreed with the limits set by World Health Organization (WHO) for drinking water except fluoride.

**Keywords:** Heavy metals, Turbidity, World Health Organization.

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## INTRODUCTION

Water the most essential requisites that nature has provided to sustain life on earth. About 80% earth surface is covered by water. The deteriorate quality of water create various problems for mankind. The growth in population, about 90% of which occur in urban areas, increases the demand for water for domestic and industrial uses. Water pollution from domestic and human waste is the main cause for human being water born disease. The industrial water pollution is due to inadequate measure adopted in the industry for the abatement of pollution. Inadequate disposal of water and open duping of garbage contaminates surface and ground water. It is need of time to protect environment for present and future generations.

## MATERIAL AND METHOD

North, Auraiya District in East, Bhind (M.P.) district in South, Etawah is 80km Etawah, district is situated between 27°00'-27°24' north latitude and 77°60'-70°04' of east longitude in the South-western corner of U.P. It is bounded by Firozabad district in West, Mainpuri district in away from Firozabad and 170km away from Kanpur and falls on the main broad guage NR Railway line between Delhi and Kolkata. The national high way (NH-2) passes through the city.

Water samples were collected in clean polythene bags and subjected to chemical analysis for measurement of different parameters such as temperature, turbidity, pH, DO, biological oxygen demand (BOD), fluoride, Chloride, Sulphate, total hardness, total dissolved, Mg, Pb, Cu, Fe, Zn and Cr by standard analytical method in 2012.

## RESULT AND DISCUSSION

The values of different parameters with respect to sampling station are given in table 1. The temperature of water was 30°C. The WHO (1992) did not recommend any definite temperature for drinking water. The pH value was 8.1 as compared to the values of ISI standard.

The total dissolved solids were 190 mg/l which is low from desirable values.

The total hardness of water was 135 mg/l. The levels of hardness are below the levels (300mg/l) as laid down by Indian standard and thus water is soft. Fluoride level was high as 20mg/l.

The Chloride contents of water was 20mg/l which is below the prescribed limit (250mg/l)

The DO value of water was 86mg/l which is permissible limit. The BOD values of water were 32mg/l.

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**Table 1.** Physico-chemical characteristics & Heavy Metals in river Sengar at Jaswant Nagar Bridge, Etawah District.

Characteristic	Value*
Water Temperature ( <sup>0</sup> C)	30 ± 0.5
Turbidity (NTD)	8.2 ± 0.3
pH	8.1 ± 0.3
TDS (mg/l)	190 ± 2.0
Total hardness (mg/l)	135 ± 3.0
Chloride on Chlorine (mg/l)	20 ± 1.5
Sulphate (mg/l)	18 ± 3.1
Mg (mg/l)	40 ± 2.2
Fluoride(mg/l)	20 ± 1.3
DO (mg/l)	86 ± 2.1
BOD (mg/l)	32 ±1.1
Pb (µg/L)	3.83 ± 0.11
Cu (µg/L)	10.81 ± 0.32
Iron (µg/L)	440 ± 4.1
Zn (µg/L)	145 ± 3.2
Cr (µg/L)	52 ± 1.1

\*All the values given in the table are means of triplicates determinations. Data presented as the mean ± standard deviation. (\*N=3 ± SD)

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