

# Estimation of Trace Metals in Godavari River Water at Paithan, Aurangabad District, Maharashtra (India)

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**Abstract**— The water is very crucial liquid mainly used for agriculture and industrial activities. Water is the basic necessity for the functioning for all life forms that exist on the Earth. It will not be wrong to say that water is the reason behind regulation and maintenance of Earth. It is one of the most plentiful and essential of compounds. Present study was aimed at investigating important trace metals like Iron, Copper, Manganese, Lead, Cadmium, Zinc and Fluoride. The present research work was carried in January to December 2021 at Paithan city which is one of the holy places located in Aurangabad (district), Maharashtra. In the present research work samples were collected standard methods and analyzed by using the Spectrophotometer. Samples were collected in the plastic cans which are cleaned before sample collection with nitric acid and distilled water. The average values of the trace metals found in the suitable range. The average value of Iron was 0.40, Copper 0.37, Manganese 0.21, Lead 0.39, Cadmium 0.02, Zinc 0.17 and Fluoride was 1.57 ( $\mu\text{g/L}$ ). It is observed that water quality of river as partially suitable for drinking purpose further, it is suggested that the water used in the of form river need to be purified, treated and used. The present research work will be very helpful for future researcher.

**Keywords:** River, Water, Trace, Godavari, Spectrophotometer, Analysis

## I. INTRODUCTION

Waste release from mechanical, technological and agricultural origin containing metallic admixtures is become a common practice [1]. The present research work was aimed to analyze study for the trace metals Fe, Cd, Cu, Mn, Zn, Pb, F etc. [2]. The problem of water pollution by trace metal is now well known all over the world and especially in a developing country in the countries like India. Everybody is facing the problem of threat of water pollution due to modern technology, industrialization and civilization transformations. Industrial effluents contribute to aquatic contamination containing very toxic substances [3,4]. Surface water contamination remains a major issue worldwide, caused by both natural processes and artificial activities [12]. While development aims at bringing about positive changes in the human life, uncontrolled consumption of natural resources both in the developed and developing countries have inadvertently led to the ecological degradation, pollution, incurable diseases, poverty and social conflicts [13]. Higher metal concentrations in natural waters might cause numerous deleterious effects on aquatic organisms [14]. Heavy metal is major pollutant in water bodies because of industrial and municipal waste discharge into the environment without proper treatment [15,16,17]. Heavy metals generally tend to be accumulated in the human organs, the nervous system and interfere with its normal functions.

The available ground water covered only 1% of the total requirement of water [18]. Water is needed to all forms of life and makes up 50-97% of the weight of all plants and animals and approximately 70% of the human body [19]. The studies on physical and chemical parameters of various water reservoirs have been carried out in various countries [20]. It has been found that obstructing the flow of running water commonly by means of dams and reservoirs has unfavorably affected almost all of the world's major riverine systems [21].

## II. MATERIAL AND METHODS:

Aurangabad city is the head quarter of district with Marathwada region, located on the latitude of  $19^{\circ}53'50''$  north and the longitude of  $75^{\circ}22'46''$  east which covers area of approximately 138.5 sq. kms. Aurangabad lies very crucial position on the Deccan Plateau [6]. Samples were carefully collected by considering all the aspects on monthly basis. Collection of samples done by using the proper scientific methods. Samples were systematically collected in plastic cans which were cleaned before sample collection with nitric acid and distilled water [5]. The heavy metals Fe, Cd, Cu, Pb, Mn, F and Zn were assessed by using Spectrophotometer and the results were given as  $\mu\text{g/L}$  [7].



Fig. 1: A satellite map showing location of Maharashtra



Fig. 2: A satellite map showing location of Aurangabad city and study area

III. RESULTS AND DISCUSSION:

The Amount of traces of metals in the river water could cause significant harm to life of people due to accumulation of the

harmful metals they. Present research work was carried out at Paithan of Aurangabad District of Godavari River to analyze the traces of metals present. The observed values have been tabulated in table1 and graphically represented in graphs.

Station No.	Iron (Fe)	Copper (Cu)	Manganese (Mn)	Lead (Pb)	Cadmium (Cd)	Zinc (Zn)	Fluoride (F)
January	0.34	0.40	0.22	0.41	0.02	0.18	1.58
February	0.41	0.38	0.2	0.39	0.01	0.17	1.56
March	0.64	0.42	0.24	0.41	0.01	0.18	1.66
April	0.24	0.30	0.17	0.35	0.01	0.16	1.48
May	0.24	0.34	0.18	0.39	0.01	0.17	1.52
June	0.31	0.31	0.2	0.39	0.01	0.18	1.66
July	0.31	0.42	0.19	0.35	0.01	0.16	1.52
August	0.42	0.38	0.20	0.41	0.02	0.16	1.66
September	0.41	0.41	0.21	0.40	0.02	0.17	1.57
October	0.51	0.40	0.20	0.37	0.02	0.17	1.52
November	0.51	0.30	0.24	0.40	0.02	0.18	1.52
December	0.49	0.41	0.22	0.38	0.02	0.17	1.58
Average	0.40	0.37	0.21	0.39	0.02	0.17	1.57
Max.	0.64	0.42	0.24	0.41	0.02	0.18	1.66
Min.	0.24	0.30	0.17	0.35	0.01	0.16	1.48

Table 1: Estimated result values observed in the study area (µg/L)

The recorded values from the analysis carried out in the present research work tabulated in the table no:1. The average Iron(Fe) recorded from the study area was 0.40. The minimum (Fe) was 0.24 and The maximum (Fe) was 0.64. The average Copper (Cu) recorded from the study area was 0.37. The minimum (Cu) was 0.30. and The maximum (Cu) was 0.42. The average manganese (Mn) recorded from the study area was 0.21. The minimum value (Mn) was 0.17. and the maximum (Mn) was 0.24. The average Lead(Pb) recorded was 0.39. The minimum (Pb) was 0.35. and the (Pb) was 0.41. The average cadmium (Cd) was 0.02. The minimum (Cd) was 0.01. and the maximum (Cd) was 0.02. The average Zinc(Zn) recorded was 0.17. The minimum (Zn) was 0.16. and The maximum (Zn) was 0.18. The average Fluoride(F) recorded was 1.57. The minimum (F) was 1.48. and the maximum (F) was 1.66.

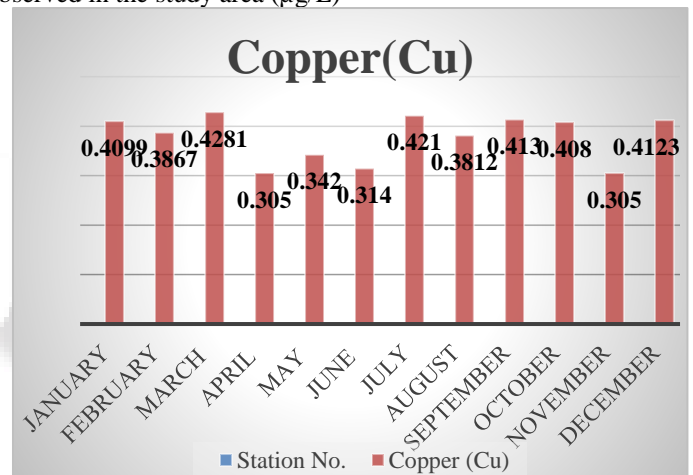


Fig. 2: Graph showing Copper values

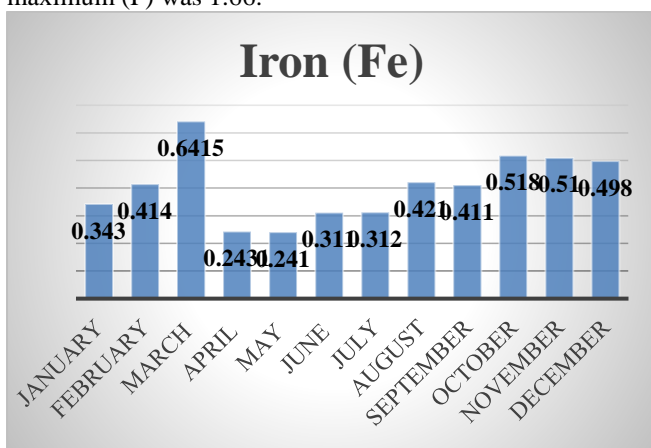


Fig. 1: Graph showing Iron values

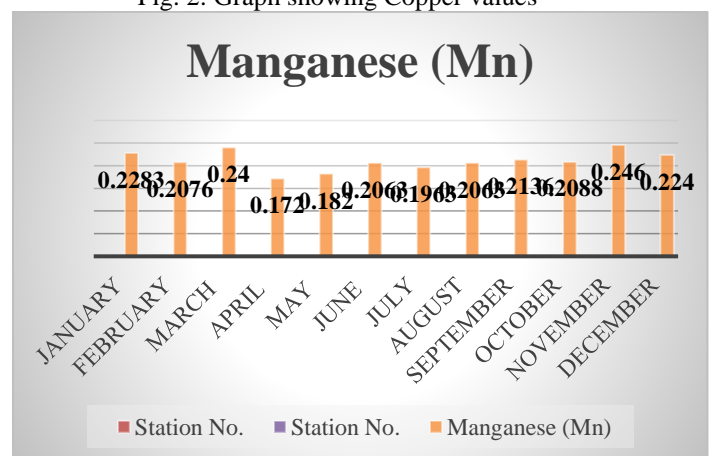


Fig. 3: Graph showing Manganese values

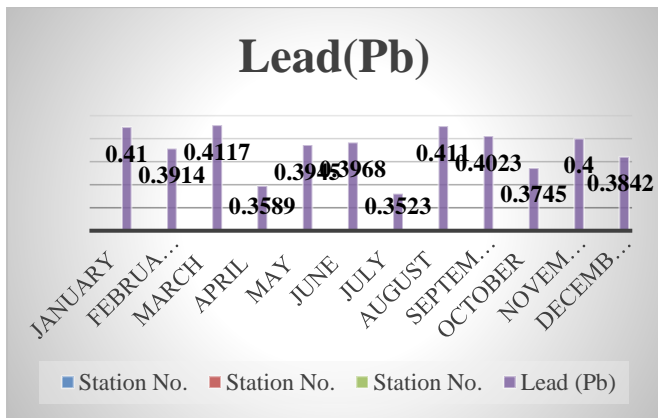


Fig. 4: Graph showing Lead values

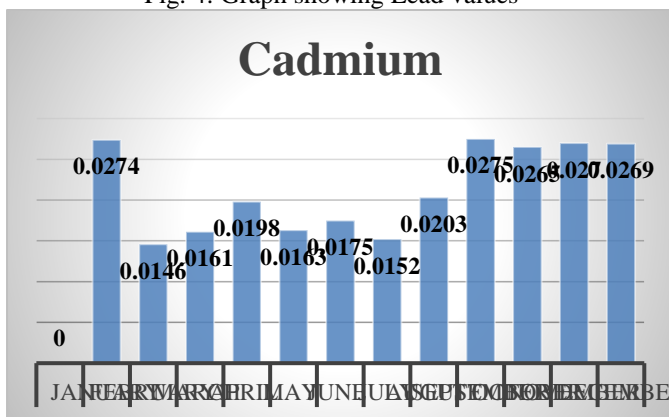


Fig. 5: Graph showing Cadmium values

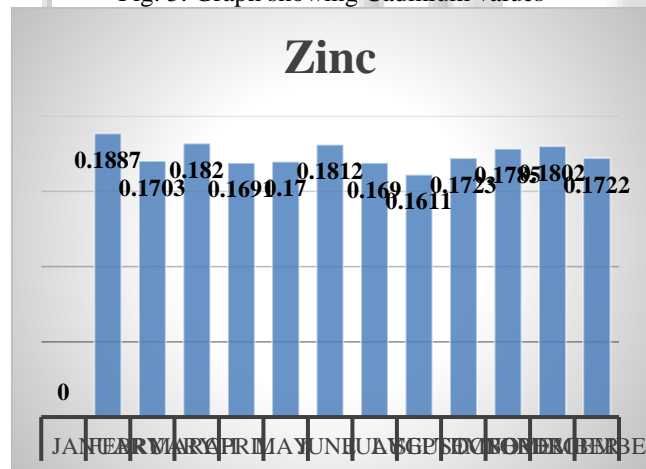


Fig. 6: Graph showing Zinc values

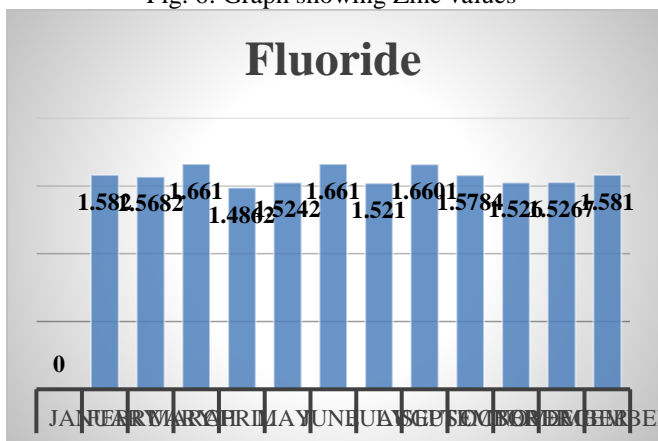


Fig. 7: Graph showing Fluoride values

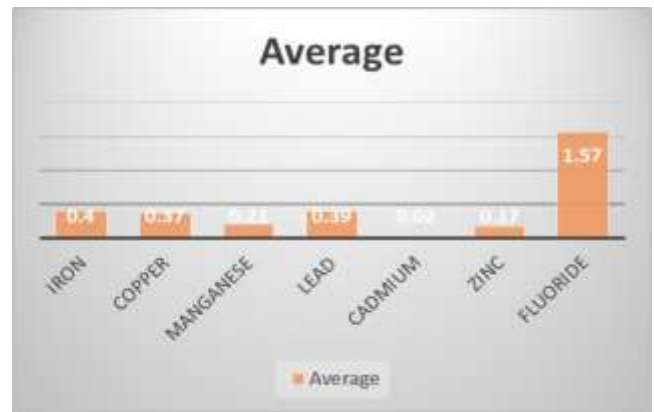


Fig. 8: Graph showing Average of the trace metal values

Lead is very toxic for aquatic organism but less than Cd and Hg. It is the most dangerous heavy metal pollutant to human, but mainly as air pollutant. Leaded gasoline, pipes, fittings, solder and the service connections of some of the household plumbing systems having lead that pollutes the drinking water primarily with lead and cadmium. It is the detrimental element, it is very harmful even in the small amounts [8]. The higher levels of Cd metal estimated in the sample is might be due to the contribution from numerous sources such as agricultural runoff where fertilizers are commonly used, leaching of Ni-Cd based batteries and other types of wastes [9]. The presence of zinc increases cadmium toxicity and accumulation in the aquatic plants. The highest mortality with cadmium is observed when Zn: Cu ratio is one which has been studied by given a sublethal chronic load of zinc metal to aquatic organisms by uptake from river water [10]. It is also observed that the concentration of serum cholesterol is severely correlated with presence of chromium in the drinking water [11]. Sources of cadmium resulting in pollution in river water system may include produced from many industrial activities, discharge of the domestic wastewater, application of the agrochemicals along the river bank and air pollution due to open burning of solid waste [22,23].

#### IV. CONCLUSION

Water is considered as life on the Earth. A tasteless and odorless liquid at room temperature, it has the important ability to dissolve many other substances. The present research work was carried out in at Paithan city in January to December 2021. For the present research work collection of samples were collected by using the proper scientific methods. The average values of the trace metals found in the suitable range. The average value of Iron was 0.40, Copper 0.37, Manganese 0.21, Lead 0.39, Cadmium 0.02, Zinc 0.17 and Fluoride was 1.57 ( $\mu\text{g/L}$ ). The trace metals like Iron, copper, Manganese, Lead, Cadmium, Zinc and Fluoride were estimated by using Spectrophotometer and the results were given as  $\mu\text{g/L}$ . Trace metals found in water found in the suitable range it is concluded that water quality of river sample was not suitable for drinking purpose further it is suggested that water used for river sample need to be treated and used.



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