

# Analysis of Water Quality Using Physico-Chemical Parameters of Krishna River at Karad, Dist -Satara, (Maharashtra)

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**Abstract**— The main focus of this study is to assess the suitability of river water quality for drinking and irrigation purposes in vicinity of rural area of Karad Tahsil of Satara District of Maharashtra. The contamination of rivers, lakes, streams, and surface water by substances harmful to living things is nothing but water pollution. Water is necessary for the life on earth. Water plays an important role in domestic and industrial usage. The quality of drinking water is a powerful environmental determinant of health. Assessment of water quality of drinking water supplies has always been paramount in the field of environmental quality management. Assurance of drinking water safety is a foundation for the prevention and control of water borne diseases. The suitability of drinking water has many requisite potable conditions. Krishna River has a special significance and needs greater attention of all concerned since it is the only major source for domestic consumption. The various parameters for quality of Krishna river water are analyzed and these are compared to established standards. The obtained results indicate that the quality of water slightly deviate from the potable conditions at some stages. The analysis was carried out for the parameters like pH, DO, BOD, COD, Chlorides, Sulphate, Calcium, Magnesium and Hardness, etc.

**Keywords**— Water analysis, Krishna river, drinking water, etc.

## I. INTRODUCTION

Water is a prime natural resource and is considered as a precious national asset. It is a major constituent of all living beings. Water is available in two basic forms i.e. Surface water and Ground water. Water is used for various purposes ranging from domestic, agricultural, Industrial & allied purposes [2-4]. The water quality criteria have been prepared by taking into consideration various designated uses. In order to assess the quality of water, various water quality parameters must be considered [5]. Water is used for industrial purposes and for municipal supply. To ensure the right quality and quantity of water for these purposes it is necessary to study water Supply thoroughly taking all the aspects into consideration. Water has a unique ability to dissolve any soluble matter that comes in contact with it [6].

## II. CASUES OF POLLUTION

The major causes of water pollution are,

- Dissolved gases.
- Micro-organisms
- Suspended particles
- Dissolved organic compounds
- Dissolved inorganic materials

Suspended particles- Generally, water contains silt, pipe work debris and colloids as suspended particles. Colloidal particles present in water give rise turbidity [7]. Turbidity is a measure of the relative clarity of water, the greater the turbidity, the murkier is the water. Turbidity increases as a result of suspended solids in the water that reduce the transmission of light. With higher levels of turbidity, water loses its ability to support a diversity of aquatic organisms. Water becomes warmer as suspended particles absorb heat from the sunlight and cause oxygen levels to fall [8].

Organic impurities in water arise from the decay of vegetable matter, mainly, organic acids and from farming, paper making, domestic and industrial waste. These include detergents, fats, oils, solvents and residues from pesticides and herbicides. In addition, water –borne organics may include compounds leached from pipe work, tanks and purification media [9]. A water purification system can also be a source of impurities and so must be designed not only to remove contaminants from the feed water, but also to prevent additional recontamination from the system itself.

In case of inorganic impurities, when water percolates through soil of the earth, there is every possibility of organic salts to get dissolved causing hardness of water. The bicarbonates of calcium and magnesium give rise to a temporary hardness, while the sulfates and chlorides cause permanent hardness [10].

## III. EXPERIMENTAL

The water samples were collected in the year 2017. The samples were of grab or catch samples and collected in sterilized bottles using the standard procedure in accordance with the standard method of American Public Health Association (1995) [1]. Spectrophotometer Digital Systronic Range 340 to 960 μ/m was used for analysis and chemicals used were of analytical grade

Sr.No	Parameter of water analysis	Methods
1	pH	Potentiometric
2.	DO	Azide modification
3.	BOD	Azide modification
4.	COD	Dichromate reflux
5.	Chloride	Gravimetric
6.	Sulphate	Spectrophotometric
7.	Calcium	Titrimetric
8.	Magnesium	Titrimetric
9.	Hardness	Titrimetric

IV. OBSERVATION TABLE

Sr.No.	Parameters	Sampling Station I Winter Season (December 2016)	Sampling Station II Winter Season (February 2017)	Sampling Station III Summer Season (April 2017)
1	pH	6.81	6.9	7.3
2	DO	5.4	4.8	4.9
3	BOD	6.3	7.2	7.1
4	COD	63	81	87
5	T.D.S.	378	389	421
6	Calcium	69	92	104
7	Magnesium	81	76	87
8	Hardness	337	463	486
9	Chloride	129	136	149
10	Sulphates	31	28	39

V. RESULTS AND DISCUSSION

River water samples were collected from Krishna river, in the month of December 2016, February 2017 and April 2017 at three sampling stations. pH of the river water is observed in the range from 6.8 to 7.3 which shows slight alkalinity in the summer season. Dissolved oxygen is found in the range of 4.8 to 5.4 for the given sampling stations. Dissolved oxygen is important for living organism to maintain their biological processes [11-13]. In corrosion also it is important factor. The higher concentrations of DO in winter were probably due to the fact hot conditions during winter are more favorable for higher photosynthesis [14]. Good water should have the solubility of Oxygen. 7.6 and 7.0 mg/L at 30°C and 35°C respectively [16]. Dissolved Oxygen in water is necessary for aerobic biological activities. In the absence of sufficient amount of dissolved oxygen in water, the anaerobic degradation of the pollutants makes the water foul smelling. BOD is a measure of the amount of oxygen required for the Biological Oxidation of the organic matter under aerobic conditions at 20 °C and for a period of 5 Days. Basically BOD is directly related to the extent of pollution of waste water, sewage and industrial effluents. Here observed values are in the range of 6.3 to 7.2 mg/l. COD is a measure of any kind of oxidisable impurities present in the sewage. COD is a measure of both the biologically oxidisable and biologically inert organic matter present in the sewage sample [17]. Here observed values are between 63 to 87 mg/l. The chloride and sulphate of this river water were not high. The amounts of chloride found in the sample did not exceed the maximum permissible limit i.e. 500 mg/L for drinking water prescribed by WHO [15]. The presence of sulphate has less effect on the taste of water compared to the presence of chloride. The desirable limit of sulphate in drinking water prescribed by ICMR is 200-400 mg/L. For the remaining parameters like calcium magnesium and hardness, the observed values are within the limit of WHO.

VI. CONCLUSION

By studying the physico-chemical parameters of Krishna river in the year December 2016 to April 2017, It is concluded that the river water is suitable for domestic and irrigation purposes through all the seasons. Some of the parameters are showing the higher values beyond the permissible limit at some sampling stations. But it is not a permanent trend. It may be due to agricultural run-off and daily activities by the residents

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