

Physioco-Chemical Status of Kundalika River at Roha Taluka Dist. Raigad Maharashtra



Environment

KEYWORDS : Water quality , Physicochemical parameters, Roha region, DO meter

V. R. Jadhavar	Department of Chemistry, K.E.S. Anandibai Pradhan Science College, Nagothane, Dist. Raigad. 402106.
I. B. Ghorade	Department of Environmental Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
R.G. Machale	Dept. of Chemistry K.S.K. Arts, Commerce & Science College, Beed.
S. S Patil	Department of Environmental Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

ABSTRACT

Pollution of water bodies is one of the areas of major concern to environmentalists. Water quality is an index of health and well being of a society. Industrialization, urbanization and modern agriculture practices have direct impact on the water resources. These factors influence the water resources quantitatively and qualitatively. The present study has been carried out at Kundalika River in industrial area of Roha-Taluka dist -Raigad [M.S.]. This area is spread around 6-10km throughout. The physico-chemical parameters like Temperature, pH, Conductivity, Turbidity, Total Dissolved Solid, Total Hardness and Dissolved Oxygen were studied to ascertain the drinking water quality

INTRODUCTION

Raigad is one of the important industrially developed district in Maharashtra. It lies at the bank of Arabian Sea. The geographical position of it is 17°51' north to 19°80' south latitude and 72°51' east to 73°40' west longitude. The total length of south-north is 150km and east-west width is 48km. The total geographical area of Raigad district is 6750km². Hilly area is one of the important salient features of Raigad district. In this district there are 14 talukas. This investigation was carried out at Kundalika River, Taluka -Roha Dist. Raigad. Hydrosphere is one of the most important segment of the environment. Hydrosphere includes all types of water i.e. surface water, groundwater, oceans, rivers, lakes etc. Water is essential to all kinds of life. Water anyone turns on the faucet, water is expected to flow from it night or day, summer or winter, whether one fills a glass to drink or attempts to water the lawn. It is supposed to be clean, odor free & safe for human consumption. Water is truly an amazing substance and yet it is so mundane that we seldom are really aware of its presence, it has vital role in life processes, and the importance of its characteristics. The very presence of water on earth is unique phenomenon and it appears to be a rare substance in our overall planetary system. It is water vapor that potentiates life on earth the earth and its atmosphere are composed of wide variety of natural solids and gaseous substances but there are very few natural liquids such as water.

Our life span is longer today than ever before, and we are becoming aware that our entire environment particularly our food and water systems should be scrutinized. Perhaps certain substances should be added and others removed from the little over a quart of water needed by every person each day. Water is a chemical compound and to make decision about the water, a person should know enough about basic chemistry to understand water's unique behavior.

MATERIAL AND METHODS

The present study has been carried out at Kundalika River in industrial area of Roha-Taluka dist -Raigad [M.S.]. This area is spread around 6km throughout. This area consist of the some main and important industries like Sudarshan Industries Ltd. ,FDC Ltd., Pepsi Industry Ltd., Vidhi Dystuff Ltd., etc. In the study area of Nagothane industrial area six sampling sites were selected i.e. Named as KR1, KR2, KR3 KR4 , KR5 ,KR6.(K-Kundalika River, W= Water) .These sampling points are selected on the basis of location of industry, location of common effluent treatment plant (CETP), the course nallah , the discharge of sewage etc. Parameter such as pH, temperature ,DO and TDS were analyzed on the site itself. The samples were brought to the laboratory for analysis. All efforts were made to follow the standard

methods for collection, preservation and analysis of samples (APHA, AWWA-1998, De. A.K. 1998, NEERI.1981, Trivedy & Goel 1986).

RESULT AND DISCUSION

The variations in analysed physical and chemical characteristics are tabulated in table number 1 & 2.

Table No.1:-Seasonal variations in Physicochemical Parameters of the water at different stations along the bank of Kundalika River from Maharashtra (2010-2011).

Sample No.	Temperature oc			pH			Conductivity (µ mho/cm)			Turbidity in NTU		
	S	M	W	S	M	W	S	M	W	S	M	W
KR1	26.8	26.1	25.4	7.5	7.1	7.4	380	230	310	12	25	11
KR2	26.9	26.2	25.3	7.3	7.1	7.4	385	229	314	12	27	09
KR3	26.7	26.0	25.6	7.2	7.3	7.5	389	234	317	14	26	13
KR4	26.8	26.3	25.2	7.2	7.2	7.6	391	236	322	17	27	14
KR5	27.0	26.2	25.3	7.3	7.2	7.3	388	239	326	16	28	12
KR6	27.3	26.3	25.1	7.4	7.3	7.4	381	234	329	15	29	13

Table No.2:-Seasonal variations in Physicochemical Parameters of the water at different stations along the bank of Kundalika River from Maharashtra (2010-2011).

Sample No.	Total dissolved solids mg/l			Total Alkalinity in mg/lit			Total Hardness mg/lit			DO mg/lit		
	S	M	W	S	M	W	S	M	W	S	M	W
KR1	342	298	310	101	85	76	52	45.5	45	4.6	5.1	5.3
KR2	349	291	314	102	81	74	54.5	46.7	46	4.7	5.7	5.7
KR3	348	302	312	107	86	77	56	48.9	46.7	4.5	5.6	5.9
KR4	351	306	317	105	87	78	54	46.7	47.1	4.8	5.4	6.1
KR5	353	309	319	109	90	76	57	49.8	47.1	4.8	5.3	6.3
KR6	357	301	316	106	92	76	57.6	51.0	48.8	5.2	5.5	6.3

Temperature-

In the present investigation the range of temperature of water during summer was found to be in between 26.7 °c (KR3) to 27.3 °c (KR6), in monsoon 26.0 °c (KR3) to 26.3 °c (KR4 & KR6) and in winter 25.1 °c (KR6) to 25.6 °c (KR6). At higher temperature solubility of oxygen and other gases decreases and water becomes tasteless while metabolic activity of organism increases. Tamlurkar et. al. [2006] recorded maximum temperature of water at Nanded in Maharashtra. Temperature had an appreciable effect on dissolved oxygen and biochemical oxygen demand and the aquatic organism in water [Kathuri and et. al. 2005].

pH- pH is the measurement of free acidity or alkalinity of water solution, hence it is an important factor for water analysis. In

the present investigation the range of pH of water during summer was found to be in between 7.2 (KR3 & KR4) to 7.5 (KR1), in monsoon 7.1 (KR1&KR2) to 7.3 (KR3 & KR6) and in winter 7.3 (KR5) to 7.6 (KR4). The maximum pH values were recorded in summer months and minimum in winter season and slight increased in monsoon months. The changes in pH together with conductivity of water body indicate the presence of certain pollutants. [Pawar et. al. 2006].

Conductivity-It is ranged from during summer was found to be in between 380 (KR1) to 391 (KR4), in monsoon 230 (KR1) to 239 (KR5) and in winter 310 (KR1) to 329 (KR6). It is showing large measure of soluble ions which is confirmed by the presence of other metals and chlorides as well as other parameters. However the average conductivity is low.

Turbidity- In the present investigation the range of turbidity was in between 12 (KR1& KR2) to 17 (KR4) in summer, in monsoon 25 (KR1) to 29 (KR6) and in winter 9 (KR2) to 14 (KR4) NTU units. Lowest values were in winter months and highest in monsoon months. Higher turbidity affects the life indirectly by cutting the light to be utilized by the phytoplankton growth.

TDS- Total dissolved solids were recorded in the range between 342 (KR1) to 357 (KR6) in summer, in monsoon 291 (KR2) to 309 (KR5) and in winter 310 (KR1) to 319 (KR5). The minimum values were recorded during monsoon and maximum in summer months. The TDS values were below the drinking water standards prescribed by WHO. Similar results were also observed by Dhembare and Pondhe [1997]. TDS conductivity and Turbidity are positively related with each other [Tamlurkar and Ambore 2006].

Total Alkalinity:- The alkalinity of natural water is due to the salts of carbonate, bicarbonates, silicates and phosphates along with hydroxyl ions, where as acidity of water means is quantitative capacity to react with strong base to a designed pH. Strong mineral acids, weak acids and hydrolyzing salts such as iron or aluminum sulphate may give acidity to water. In the present investigation the range of alkalinity was found to be varied between 101 (KR1) to 109 (KR5) in summer, in monsoon 81 (KR2)

to 92 (KR6) and in winter 74 (KR2) to 78 (KR4) mg/l. The pH water was found to have alkaline trend. This might be due to increase in carbonate alkalinity and cleaning activities. Agarkar and Bhosale [1991] observed bicarbonate alkalinity is mainly responsible for higher values.

Total Hardness- It is a measure of capacity to precipitate soap. It is the sum of the polyvalent cations present in water. It is varied in between 52 (KR1) to 57.6 (KR6) in summer, in monsoon 45.5 (KR1) to 51.0 (KR6) and in winter 45 (KR1) to 48.8 (KR6). The ions such as calcium and magnesium in combination with bicarbonates, carbonates, sulphide, sulphates and other anions make the water hard. Hard waters are believed to be more productive than soft waters. Hard waters may also create problems to human health causing gastritis [Abdhossein, 2008]. Hardness of water affects on health of human being.

Dissolved Oxygen- The concentration of DO regulates the distribution of flora and fauna. Seasonally the concentration of DO was more during monsoon and least during summer [Yogendra et.al. 2008]. DO play an important role in water quality determination. The introduction of oxygen demanding materials, either organic or inorganic, in to water causes depletion of the dissolved oxygen in the water. This poses a threat to fish and other higher forms of aquatic life if the concentration of oxygen falls below critical point [Ramana et.al. 2008]. There exists no better general indicator of water quality than DO. The DO levels recorded in the study area varied according to the rate of respiration and decomposition of the organic materials in the water [Bankar, et.al. 2005]. Thus, levels of DO in natural and wastewater are dependent on the physical, chemical and biological activities prevailing in the water body [Ravinder, et.al., 2005]. Dissolved oxygen is one of the most important constituent of water which affects physiological and biological process. In the present study, the DO for ground water was ranged from 4.5 (KR3) to 5.2 (KR6) in summer, in monsoon 5.1 (KR1) to 5.7 (KR2) and in winter 5.3 (KR1) to 6.3 (KR5 & KR6). Where as the permissible limit is 5 mg/l as per USPH Standards. Only 40% of water samples are below prescribed limit as per ISI standards. Similar trends were also observed at Pithampur area [Kothari, 2004].

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