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STUDY OF KUNDALIKA RIVER WATER POLLUTION, SOURCES AND EFFECT ON HUMAN HEALTH IN ROHA TALUKA, DIST.RAIGAD, MAHARASHTRA, INDIA

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ABSTRACT

Pollution of rivers in India is continuously affecting many areas and affecting the human and environment. Due to changes in the quality standards of river water, the quality of river water is changing and now it is no longer potable. Pollution of river water is affecting the ecosystem of the river. People are facing health related problems due to the consumption of contaminated water from the river. Four water samples of Kundalika river were collected from Kolad bridge side, Killa village side , Roha bridge side, Dhatav nala side. These water samples were collected during the month of May-June 2022 from each site and analysed for its physic-chemical parameters with respect to its water pollution, sources and effect on human health. The overall parameters observed in the study area showed that the water of Kundlika River is suitable for irrigation and domestic use only and not for drinking purpose. River pollution is a growing problem in Roha region today, so the factors which polluting the river need to be controlled. Therefore,itis important to protect river waterby frequent monitoring and inspections of water quality to reduce human activities in this region.

Keywords : River water Pollution, sources, impact, Kundalika River.

INTRODUCTION

Industrial effluents of different origins containing toxic metals, pesticides, etc and anthropogenic sources create water pollution problems through discharges into river water. The utility of river water for various purposes is governed by physico-chemical and biological quality of the water. Water has become an essential commodity for the development of industrials and agriculture. Water is absolutely essential not only for survival of human beings, but also for animals, plants and all other living things (Razoetal.,2004). Water is also crucial for the quality of life. The increased application of commercial fertilizer and widespread use of variety of a new pesticide, insecticides, herbicides and weed killers in agricultural practices are resulting in a host of new pollution problems from land drainage. This type of agricultural pollution has severe impact on water Pollution, as most of pollutants are resistant to natural degradation. Irrigated agriculture is dependent on adequate water supply of usable quality. Rivers serve as the primary supply of drinking water in both urban and rural areas, and they play a vital role in public health and environmental standards (F.Falah et al, 2017).

Water in a river is often gathered from rainfall, surface runoff, and the discharge of stored water in natural reservoirs such as a glacier. Rivers, in addition to be in a rich source of fish, also indirectly benefit agriculture by providing water for irrigation (A.Kumar & A.Dua,

2009). Due to rapid increase in human population and industrialization, as well as waste water disposal, water quality has deteriorated in recent years(Y Teng et al, 2011). Thus, continuous intake of contaminated drinking water is the reasons behind various stomach related disorders and other diseases. To evaluate the quality of river water for the purpose of irrigation, health, domestic and fisheries, we need to identify the physiochemical characteristics that are important for respective field, and their acceptable levels of concentrations.

MATERIAL AND METHODS

Study of area:- Four water samples of Kundalika river were collected from Kolad bridge side , Killa village side , Roha bridge side, and Dhatav nala side. These water samples were collected during the month of May-June 2022 from each site. Some physical and chemical parameters of Kundalika river water were analysed using standard methods (Bandela et al, 2005,Trivedi & Goel, 1986, APHA, 1992).

RESULTS: Table No.1 A. Physical Parameters:-

Sr. No.	Parameters	KRW1	KRW2	KRW3	KRW4
1	Colour	Colourless	Colourless	Colourless	Light Greenish
2	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
3	Temp	27^0C	26^0C	29^0C	30^0C
4	PH	7.1	7.8	7.2	7.3
5	Conductivity (us/cm)	290	290	260	292
6	Turbidity (NTU)	0.8	0.8	0.04	0.05

Table No.2 B. Chemical Parameters:-

SR.NO.	PARAMETERS	KRW1	KRW2	KRW3	KRW4
1	Total Hardness (ppm)	145	162	180	190
2	Calcium Hardness (ppm)	84	86	85	92
3	Phosphates	0.05	0.07	0.06	0.08
4	Chlorides (mg/lit.)	28	28	26	32
5	TSS (mg/lit.)	4	4	6	8
6	TDS (mg/lit.)	185	190	182	192
7	Iron	0.04	0.09	0.06	0.08
8	Silica	29.1	30.6	32.1	32.2

(KRW1- Kundalika River water sample at Kolad KRW2- Kundalika River water sample at Killa KRW3- Kundalika River water sample at Roha Bridge KRW4- Kundalika River water sample at Dhatav Nalla)

DISCUSSION:

A.Physical Parameters

1.Colour:- Not really even pure water is not colourless, but has a slight blue tint to it. In the natural world you often see water that is definitely not clear. Sediment and organics colour

natural water shades of brown or green. In the present investigation the colour of all water samples is colourless except the sample KRW4.

2.Odour:-Pure water is odourless. But, our drinking water sometimes has the smell due to chlorine and other disinfectants. So, it does. Also, some impure water having certain impurities or biological waste makes it have odour (unpleasant one). In the present investigation the all the samples are odourless.

3.Temp:- Ground-water temperatures generally are controlled by the burial depth of the aquifer. The average temperature of water samples of the study area were in the range of 26^0C to 30^0C. Temperature in this study was found within permissible limit of WHO (30^0C).

4. pH:-pH is an important parameters in evaluating the acid- base balance of water. It is also the indicator of acidic or alkaline condition of water status. WHO has recommended maximum permissible limit of pH from 6.5 to 8.5. In the current investigation pH ranges from 7.1(KRW1) to 7.8 (KRW2) which are in the range of WHO standards. Basically, the PH is determined by the amount of dissolved carbon dioxide (CO_2), which forms carbonic acid in water.

5.Electrical Conductivity (EC):- The current investigation indicated that EC values were ranged in between 260 µS/cm (KR3) to 292 µS/cm (KR4). These results clearly indicate that water in the study area was considerably ionized and has the lower level of ionic concentration activity due to small dissolve solids for all samples. According to WHO standard, EC value should not exceeded 400 us/cm.

6. Turbidity:-The turbidity of water depends on the quantity of solid matter present in the suspended state. It is a measure of light emitting properties of water and the test is used to indicate the quality of waste discharge with respect to colloidal matter.

In the present study, the turbidity for well water sample was ranged from 0.04 (KRW3) to 0.8 (KW1and KR2). Whereas as per the standards, the permissible limit is 1-5 NTU. It indicates that water from all the sample is under the limits.

B.Chemical Parameters

1.Total Hardness:-

In the present study, the total hardness of the water sample was ranged from 145 (KR1) to 190 (KRW4), which is below the permissible limit i.e. 200-600 mg/lit as per the ISI and WHO standards. It is a measure of capacity to precipitate soap. It is the sum of the polyvalent cations present in water. 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 (Abdlhossein, 2008).

2.Calcium Hardness:-

Calcium hardness is a measure of the amount of calcium ions present in the water. A description of water as “hard” means that it has a high mineral content. In the present study, the Calcium Hardness of the water sample was ranged from 84 (KRW1) to 92 (KRW4).

Whereas the permissible limit is 100-300 mg/lit as per ISI and WHO Standards. It clearly shows that the calcium hardness of all the samples falls within the standard range.

3.Phosphates:- Total phosphorus concentrations are more stable, and are thus a more reliable index of the phosphorus status of effluents and natural waters. The amount of Phosphate found in the present study was ranges from 0.05(KRW1) to 0.07 (KRW2 and KRW4) which is mostly within the permissible limits prescribed by World Health Organization (1999) i.e., 1 mg/l

4.Chlorides:- According to WHO standards, concentration of chloride should not exceed 250 mg/l (Chinamalli & Vijaykumar, 2023). In the present study, the chloride of the water sample was ranged from 26 (KRW3) to 32 (KRW4). Whereas the permissible limit is 250 mg/lit as per BIS and WHO Standards, which indicates that all the samples having the level of chloride is within the permissible limit.

5.Total Suspended Solids:- High levels of suspended solids in drinking water or wastewater can have an impact on both the environment and human health i.e. Gastrointestinal problems. TSS can reduce the natural dissolved oxygen content of water and increase water temperature, so making it impossible for small fish to survive.In the present study, the TSS of the water sample were ranged from 4 (KRW1and KRW2) to 8 (KRW4). Whereas the permissible limit is 5 to 10 mg/lit as per ISI and WHO standards, so TSS level for three samples is found within the permissible limit.

6.Total Dissolved Solids:- The water with high TDS value indicates that water is highly mineralized. High value of TDS in ground water generally not harmful to human beings, but high concentration of these may affect persons who are suffering from kidney and heart diseases. In the present study, the TDS of the water sample were ranged from 182 (KRW3) to 192 (KRW1). Whereas the permissible limit is 300-500 mg/lit as per ISI and WHO Standards. At the sample site KRW1it is having slight higher TDS level may be due to human activities in the bank of river.

7. Iron:- Iron is one of the earth's most plentiful resources, making up at least five percent of the earth's crust. When iron is present in our water, it is usually found at concentrations less than 10 milligrams per liter (mg/l) or parts per million (ppm); however, levels high enough to cause problems are often found (Chinamalli & Vijaykumar, 2023).

In the present study, the iron for the water sample was ranged from 0.04 (KRW1) to 0.09 (KRW1). Whereas the permissible limit is 0.3 mg/lit as per ISI and WHO Standards.

8.Silica:- All natural water supplies contain some dissolved "silica" and most will also contain suspended or colloidal silica. In solution it can exist as silicic acid or silicate ion, depending upon the pH value. The silica content in natural waters is commonly in the 5 to 25 mg/L range, although concentrations over 100mg/L occur in some areas.

In the present study, the silica for the water sample was ranged from 29.1(KRW1) to 32.2 (KRW4). Whereas the permissible limit is 5 to 25 mg/lit as per ISI and WHO Standards. So it clearly indicates that water from these sample sites is not safe for drinking purpose.

CONCLUSION

1. The overall parameters observed in the study area showed that the water of Kundlika river is suitable for irrigation and domestic use only and not for drinking purpose.

2.The silica for the water sample was ranged from 29.1(KRW1) to 32.2 (KRW4). Whereas the permissible limit is 5 to 25 mg/lit as per ISI and WHO Standards. So it clearly indicates that water from these sample sites is not safe for drinking purpose.

3.Marine life is affected by water pollution which increases day by day, disrupting the ecosystem of the river.

4. Not only aquatic life but also people are affected as people end up drinking that polluted water, using it for daily chores, and making themselves vulnerable to various diseases, for example, water-borne diseases such as typhus, jaundice, cholera, etc.

5. River pollution is a growing problem in Roha region today, so the factors which polluting the river need to be controlled. Industrial water needs to be reused after proper treatment.

6.The government should make proper efforts to make the river water clean, and the government and the NGOs together should tell the importance of the river to the people.

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