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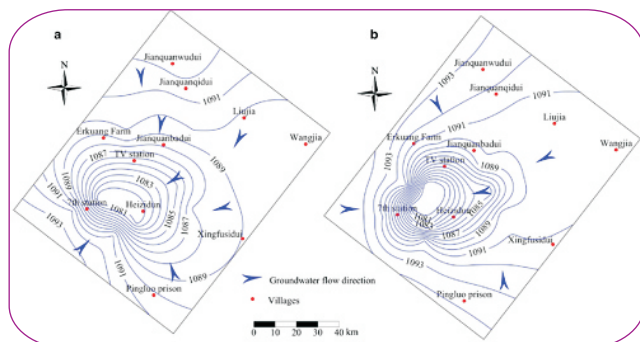
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HYDROCHEMICAL CHARACTERIZATION AND QUALITY ASSESSMENT OF JAGABUDI RIVER FROM KHED TAHSIL, RATNAGIRI

¹Srikant Kekane , ²Sachin Sagar and

³Dr. R. P. Chavan

^{1,2}Department of Chemistry I. C. S. College, Khed (Maharashtra) India.

³Department of Chemistry Dnyanasadhana college, Thane west (Maharashtra) India.

ABSTRACT :

Waterborne pathogenic organisms include bacteria, protozoa, and viruses. A number of researchers have explored, water pollution is most serious and widespread problem across the globe. The work presented here is one of the first investigations to focus on water pollution of the Jagabudi river, Khed Tahsil, India. The quality of river water was assessed by comparing with existing standards for fundamental parameters. Water pollution was estimated using nine parameters. The quality of water was up to standards, results showed that the water quality was not much affected by surrounding activity. It is concluded that WQI can be utilized as a tool in comparing the water quality of targeted locations.

KEYWORDS : Hydrochemical parameters, River water, Biological Oxygen Demand, Chemical Oxygen Demand.

1. INTRODUCTION

The Jagabudi is a river of great importance emerging from the Vashishti river towards the town of Khedi in Ratnagiri district, Maharashtra, India. The river starts from Bahirawali and ends at Khedi near Khedi. The river joins the Vashishti river at Bahirawali. From all nearby villages and cities, waste is dumped into the river. Different anthropogenic activities are taking place on this river, which are responsible for causing pollution in the water of the Jagabudi river.

Waterborne diseases have led to more than two million deaths and four billion cases of diarrhea annually. Infectious diarrhea is responsible for the greatest burden of this morbidity and mortality, and children less than five years of age are the most severely affected populations.

The development of economic and social sustenance centrally depends on water. Therefore, protecting quality water is the greatest challenge in the current century.

The increase in urbanization, industrialization, and agricultural activities causes danger of contamination of soil and water. Therefore, the detection of water standards becomes essential for planning and water management. The declining water quality affects man, animals, and plant life to a great extent. In India, due to increasing urbanization and industrialization, the problem of water pollution is considered to be an alarming situation, and about 70% of rivers in India are polluted. In the last few decades, there has been an impact on the water quality of Indian rivers.

2. STUDY AREA AND LOCATION OF SAMPLING POINTS:

The present study was carried out in the year 2014-2015 at Kudoshi, Sukiwali, Veral, Bharana Naka, Mahad Naka, Khedi, Khari, Nandgaon, Nilik, and Shirishi village located on the bank of the Jagabudi river.

3. MATERIALS AND METHODS

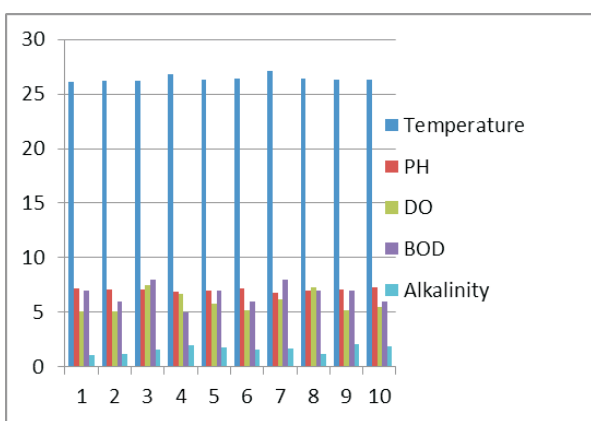
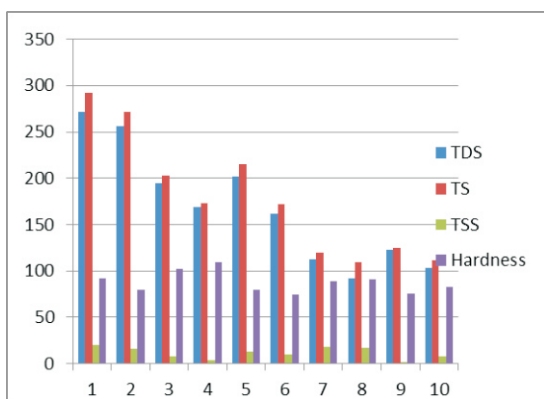
Hydro-chemical parameters of the water were estimated based on standard methods (A.P.H.A. 1998), R.K. Trivedy, and P.K. Goel, 1986. Parameters like Temperature, pH, TDS, TS, TSS, DO,

BOD, Alkalinity, Hardness was determined. Samples each of two liters in acid washed five liter plastic containers were collected between 8 A.M. to 10 A.M. from sampling site in the first week of every month from January –December 2014. The water samples taken from a depth of 5-10 cm below the surface of water. And samples were brought to the laboratory in ice boxes for the analysis of various physico-chemical parameters.

4.RESULTS & DISCUSSION:

The annual average value of parameter of water sample analysis from selected sites is shown in the table below.

Sampling stations →	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Parameter ↓										
Temperature	26.1	26.2	26.2	26.8	26.3	26.4	27.1	26.4	26.3	26.3
PH	7.2	7.1	7.1	6.9	7.0	7.2	6.8	7.0	7.1	7.3
TDS	272	256	195	169	202	162	112	92	123	103
TS	292	272	203	173	215	172	120	109	125	111
TSS	20	16	8	4	13	10	18	17	02	8
DO	5.12	5.10	7.51	6.72	5.74	5.16	6.18	7.33	5.23	5.45
BOD	7	6	8	5	7	6	8	7	7	6
Alkalinity	1.09	1.23	1.59	2.02	1.75	1.62	1.69	1.19	2.11	1.91
Hardness	92	80	102	109	80	74	89	91	75	83



TEMPERATURE

The average temperature of river water was within the range of 26.10C to 27.10C. The measurement of temperature is important because it shows quick effect on all the process occurs in water . The temperatures range observed in the present study is optimum .More or less similar results were found to shivayogimath et.al (2012)

pH

The concentration of hydrogen ion in water is measured by pH. Acceptable limit of pH is in between 6.5 to 8.5. The water , having pH below 7 is called acidic water, which may cause the corrosion of metals . In the current analysis, the concentration of hydrogen ion (pH) ranges between 6.8 to 7.3 and all the studied samples

shows the values within acceptable limit 6.5 to 8.5 according to WHO. The water from selected station is not harmful. These values are close to those reported by Ayoade et.al.(2006) in two lakes of Nigeria and fluctuation in pH was reported by Rim-Rukesh et.al.(2006).

TOTAL DISSOLVED SOLIDS (TDS)

TDS plays pivotal role in ensuring quality of water . The high value of TDS may limit the use of water in day to day life. The acceptable range of TDS is 500 mg/L. The study shows that the range of TDS in stipulated area is 92 to 272 shown in Table . The highest value was observed at S4 and this might be due to more anthropogenic activities taking place at this location .Amanial Haile Reda reported similar observation of drinking water in Arbaminch town(2016).

TOTAL SUSPENDED SOLIDS (TSS) AND TOTAL SOLIDS (TS)

TSS value shows the low amount of contaminants , as the values ranged from 2 mg/L to 20 mg/L. The permissible limits of WHO (3 0mg/L). Similarly the TS values of water samples were ranging from 292 to 109 mg/L and all these measured values were also within the WHO guideline value which is 500 mg/L. The results of both TSS and TS showed that river water is consumable for animals can be used for irrigation purpose. Similar observations were found to Amanial Heile Reda (2016), studied drinking water quality of Arbaminch town.

DISSOLVED OXYGEN

The DO value of water body gives information for physical and biological processes taking place in water. The low value of the DO may cause death of fish present in water and other organisms. From the analysis data it can be said that no selected site is having DO level below 5mg/L.The value of DO ranges from 5.mg/L to 7.51 mg/L.Increased level of DO was reported by Ayoade et.al (2006), and Vyas et.al. (2006) in studying various Lakes. Shukla et.al.(1992) studied water of Ganga river Gazipur.

BIOCHEMICAL OXYGEN DEMAND (BOD)

The BOD is the amount of oxygen utilized by microorganisms in stabilizing the organic matter , the range of BOD noted at sampling site is in the range of 5mg/L to 8mg/L. The standard value of WHO is 6mg/L . Similarly the high amount of BOD was reported by Vyas et.al.(2006)

ALKALINITY :

Alkalinity of the water is its capacity to neutralize a strong acid and it is characterized by the presence of hydroxyl ions capable of combining with hydrogen ions.Alkalinity of neutral water is due to free hydroxyl ions present in it.The acceptable limit of alkalinity is 200 mg/L. In the current study alkalinity were determined and the results showed that the alkalinity of the water samples ranged from 1.09 to 2.11 mg/L. In the present study; the values are found to be within the permissible limit of Indian standard, which was also reported as same by Shivayogimath at.al. (2012) from the river ghataprabha.

HARDNESS:

This is a property of water ,which prevents the lather formation with soap and increases the boiling point of water . The cations of calcium and magnesium are responsible for the hardness of water .The range of hardness of selected location was found to be from 74mg/L to 109mg/L which are in the range of acceptable limits of WHO standard. Almost similar kind of results was obtained by Vyas et.al. (2006) in the upper lake, but Mishra et.al (2008) reported a significant increase of total hardness in aquaculture pond in Orissa.

5. CONCLUSIONS

The Jagabudi river water quality is found to be the better .The activities of the people on the river show variations in parameter at the different locations.It is fact that the water borne diseases may be due to the disposal of sewage, domestic waste and drainage systems.It is essential to educate and arrange the programme

for people on disposal and treatment of waste so as to maintain the water quality of existing water resources for future generations.

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