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Assesmentof Water quality of Ram Ganga River in Moradabad District, Uttar Pradesh, India

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Abstract

Pollution of river water is one of the areas of major concern to environmentalists. Rapid industrialization, urbanization andmodern agriculture activities have direct impact on water resources. These factors effects thewater resources quantitatively and qualitatively. The study area selected were the Ram gnaga riverof Moradabad district, Uttar Pradesh, India. The river water is an important source ofpotable water supply for the city as well as adjoined areas of the district for all purposes.The physico-chemical parameters like pH, turbidity, total hardness, alkalinity, BOD, COD, content in water of Ram gangariver werestudied to ascertain the drinking and domestic as well as irrigation water supply in Moradabad district. In the present study water quality of River is taken into account and river water isfound to be severely polluted with reference to these analyzed parameters.

1. Introduction

Water is the most precious resources on earth without which there would be no life on earth. Pollution is a serious problem as 73% of India's surface water resources and as growing number of its ground water reserves have been contaminated by biological, organic and inorganic pollutants. In south Asian countries such as Nepal, India and Pakistan, pollution of rivers is more severe and critical near urban areas due to huge amounts of pollution load discharged by urban activities. Water of river Hindon was found to be more polluted than river Narmada [1-4]. The pollution of Pamba River is due to Sabrimala pilgrimage, free flow of sewage, domestic waste and fecal matter into the river [5]. The main cause of water pollution is human activities. Humans produce bodily wastes that enter the river and polluted water [6]. Industries discharge variety of pollutants in the waste water including heavy metals, organic toxins, oil nutrients and solids. Many of the substances are toxic or even carcinogenic. Pathogens can obviously produce water born diseases in either human or animal hosts. These wastes also increase the concentration of suspended solids (turbidity), bacteria and virus groeth leading to potential health impacts. Increase in nutrient load may lead to eutophication; organic wastes increases the oxygen demand in water leading to oxygen reduction in water with potentially severe impacts on whole ecosystems [6]. The river Ram ganga is spread across Moradabad district.

2. Materials and Methods

Water Sampling: - A total of 45 water samples were collected from 15 locations which are situated in Ram gang river basin and from each location three water samples were taken for study toanalyse the water quality. The samples are collected in clean polyethylene bottles and prior to collection, the samples are rinsed throughly with sample water [7- 8]. The water samples are taken through pumping so the samples will be a representative and order to avoid only contamination from the surface of river basin [9].

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3. Methodology

The following methods are adopted to evaluate water quality parameter of Ram ganga River.

- The pH of the samples was determined by using digital pH meter [10].
- Turbidity was determined by Naphelo-turbidity meter [11].
- Total hardness was determined tetrimetrically using EDTA method [12].
- Total alkalinity was determined by tetrimetrically method.
- BOD was determined as per standard method.
- COD was determined by potassium dichromate open reflex method [13]

4. Result and Discussion

pH: - The maximum value of pH of the water samples was recorded as 8.4 at station 3 and minimum value of pH was recorded as 7.1 at station 5. In general pH was within the limits of standard value. For drinking water, a pH range of 6.0-8.5 is recommended [14].

Turbidity: - The present study shows the turbidity in the range of 5.4 -25.9 NTU. World Health Organization prescribed the highest desirable limit 5.0 NTU and maximum permissible limit25.0 NTU. In few stations the value of turbidity present is higher than permissible limits.

Total Alkalinity: - The alkalinity of water is its capacity to neutralize acids. The maximum alkalinity was recorded as 515 ppm at station 6 and minimum value is recorded as 152 at station10. BIS has set a desirable level of alkalinity in drinking water to be 200 ppm where as its value has been prescribed to be 600 ppm in the absence of alternative source. So in maximum stations value of total alkalinity present in water is higher.

Total hardness: - In the present study water samples of different locations was observed in the range of 180-290

ppm. The hardness of water is not a pollution parameter but indicates water quality.

BOD: - Biochemical oxygen demand is usually defined as the amount of oxygen required by bacteria in stabilizing the decomposable organic matter. BOD gives an idea about the extent of pollution. In present study water samples, sampling stations BOD was found in the range of12-50.6 ppm, it indicates that the pollution affects the water quality.

COD: - The chemical oxygen demand is a measure of oxygen equivalent to the requirement of oxidizing organic matter contents by a strong chemical agent. The COD test is helpful in indicating toxic conditions and the presence of biologically resistant organic substances. The maximum COD value was recorded 190 ppm at station 8 and the minimum values was recorded as 70 ppm at station 2. The high value of COD due to high level of pollutants present in water sample. Table-1 summarizes the result of various parameters at different stations.

Table: 1: Parameter Studied in Ram Ganga River at Different Stations

Parameters	Station at Ram ganga River Basin														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
pH	7.2	7.3	8.4	8.1	7.1	7.5	7.5	7.2	7.9	7.2	7.3	7.5	7.4	7.5	7.2
Turbidity (NTU)	6.5	6.8	5.4	20	18.8	21.2	25	5.3	18	17	25.9	25.6	25.7	25.3	21
Total Alkalinity (ppm)	400	412	201	200	365	515	250	241	298	152	512	450	350	360	412
Total Hardness (ppm)	198	201	190	204	180	280	222	230	189	250	231	290	212	214	214
BOD (ppm)	15	45	12	36	33	35	50.6	45	42	47	26	29	35	49	26
COD(ppm)	90	70	78	79	85	94	144	190	145	124	79	85	99	102	212

5. Conclusion

The above analysis clearly indicates that almost all the parameters are not within the range of standard valuesprescribed by various agencies. The water of Ram ganga River is highly contaminated at all the stationsduring the course of study and it was found unfit for consumption, domestic and irrigation purposes. Government agencies should take some serious steps to improve the quality of Ram ganga River.

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