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Assessment Of Geographical And Physicochemical Properties Of Kewai River-Madhya Pradesh

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Abstract: ***Due to immense pressure on water resources by population explosion integrated by pollution factor there is an exigency of pure water source for human utilization. Comforting the same facts, few water resources are left in the ever receding pocket of consumable water resources. This study reflects one of the few water resources, naming Kewai River a tributary of Son River in Madhya Pradesh, India. Kewai River stretches out to 60 Km from Kelhari District to Bachha Village where is merges to Son River. During the study water samples were collected from four locations. River water tested upon parameters- Temperature, pH, total dissolved solids, alkalinity, odor, chloride content, hardness, and compared with BIS (Bureau of Indian standards) permissible limits, speculation done in November 2016 within temperature gamut of 23°C to 29°C.***

Keywords: Kewai river, Physicochemical property, BIS.

I. INTRODUCTION

Water and water resource plays an important part in development of any society and country. The civilization tends to settle in proximity of water sources. It is noticeable that less than 3% of Earth's water is fresh water of which Over 68 percent of the fresh water on Earth is found in icecaps and glaciers, and just over 30% is found in ground water. Only about 0.3% of our fresh water is found in the surface water of lakes, rivers, and swamps. [National Geographic analysis] Freshwater withdrawals have tripled over the last 50 years. Demand for freshwater is increasing by 64 billion cubic meters a year. Over 1 billion people lacks the supply of fresh water [1]. So there is an immense need of pure natural water to be used by humans. The analysis of water can be done by examination and determination of its physicochemical properties. Physicochemical properties refer here to health of water by looking at its chemical and physical properties. Physicochemical property reveals about the health and condition of water by characterizing it into consumable or non-consumable water. The physicochemical analysis test procedures were strictly referred to APHA [2] and reference to BIS [3] and WHO standards. This research paper deals with Kewai river, an isolated river situated in Madhya Pradesh, India, a tributary to river Son, followed by speculation of physicochemical property in reference to BIS (Bureau of Indian standards).

II. STUDY AREA

Kewai River: River is a tributary of Son river, Kewai originates [Latitude 23.395214 Longitude 82.078574] from Bairagi Pahad near Kelhari Tehsil in Madhya Pradesh, India. It flows in Shahdol District and Anuppur District and then later merge into Son River [Latitude 23.082080 Longitude 81.902039] [4]. Kewai River is about 60 km long and flows North to South in direction. Depth of river most of places in under 1 meter, with variation seen as 4 meter in Rokra, 5 meter in Sitamadi and Darsagar [5]. Mapping is done with the help of Google Maps 2016. Investigation of this paper is done on 4 locations over length of Kewai river, marked as point 1-4

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on map, as shown in figure 1. River is isolated by city population and only surrounded by villages. The origin is from hills that runs in Madhya Pradesh, is the key factor that causes many water bodies to have isolation from city and industrial pollution. There is a noticeable number of cremation and ritual offering grounds in proximity to Kewai river and observably no factories or companies. Locations near site 4 hosts the periodic grazing of herds of animals. Observable amount of algal growth is seen in increasing fashion, site 1 being no algal growth to site 4 having observable amount of algal growth

Figure 1: Geographic map of Kewai river showing 1,2,3&4 as sampling sites

Site number	Place	Location [Latitude, Longitude]
1	Majhauli	23.68749,82.05556
2	Mauhari	23.25700,82.04449
3	Bhalumara	23.14125,81.972780
4	Cholna	23.085673,81.91072

Table 1: Site details

III. MATERIAL AND METHOD

The water samples were collected from 4 sites: Majhauli, Mauhari, Bhalumara and Cholna [Table 1]. Dated: 12th Nov 2016. Time chosen for sample selection [*i.e.* Months after monsoon] in such a way that the level of water in river is sufficient for speculation of physicochemical property. Water samples were collected in triplicates and stored in PET(plastic) containers furthers preserved in icebox. The recommended precautions were taken as prescribed by APHA standards. [2] Samples were taken at early noon and pH, TDS, Temperature of sample, ambient temperature, odor and color of samples were estimated on the spot by pH meter having ± 0.1 sensitivity, TDS meter having ± 0.1 sensitivity. For the analysis of chloride content, hardness, and alkalinity, samples were incubated in icebox and taken to the laboratory for the speculation. For the tests, standard protocols were followed [4].

IV. RESULT AND DISCUSSION

The investigated water of Kewai river reveals the physicochemical properties of water which is tabulated in the table. It shows the pH of water which varied from 7.1-7.6 pH. i.e. 7.1, 7.3, 7.5, 7.6 for site 1, site 2, site 3 and site 4 respectively. TDS (total dissolved solids) varied: 27 ppm -75 ppm. i.e. 27 ppm, 60 ppm, 72 ppm, 75 ppm for site1, site 2, site 3 and site 4 respectively. For determination of odour and clarity of water organoleptic test is performed, buy 3 individuals, for odor: all samples were odorless including all sites. For the clarity of water secchi disk was incompatible due to less depth of Kewai river, and organoleptic measure was done and determined clear. The indication of pH, TDS and clarity of water lies under permissible limit [Table 2]. Prediction can be made on such

Site	*Odour*	*pH*	TDS (ppm)	Alkalinity (mg/L)	Hardness (mg/L)	Chloride content (mg/L)
Site 01	No	7.1	27	16	20	21
Site 02	No	7.3	60	24	25	21
Site 03	No	7.5	72	32	30	21
Site 04	No	7.6	75	32	30	21
Pattern	Constant	Increasing	Increasing	Increasing	Increasing	Constant

Table 2: Tabular representation of Physicochemical properties of Kewai river

S no	Characteristics	Requirements (Acceptable limits)	Permissible Limit in the Absence of Alternate Source	Kewai River
01	Odour	Agreeable	Agreeable	Acceptable
02	pH value	6.5-8.5	No relaxation	7.1-7.6
03	Total dissolved Solids, mg/L, Max	500	2000	25-75 ppm (TDS meter converted unit)
04	Chloride (as CL), mg/L, Max	250	1000	21 mg/L
05	Alkalinity, mg/L, Max	200	600	16-32 mg/L
06	Total Hardness (as $CaCO_3$), mg/L, Max	300	600	20-30 mg/L

Table 3: Tabular representation of Kewai river water properties with reference to BIS standards of drinking water

results that water is consumable; this is possibly due to the ambience of river. Further speculations revealed that the chloride content (Argentometric method) i.e. 21mg/L remained constant throughout the length of the river (at all sites). Constant value of chloride ions shows that there is theoretically no active source of watershed discharge into river, such as water softening discharge or any industrial effluent which is the prime cause of high and variable Cl^- ions in water bodies. [6] Alkalinity varied 16 mg/L-32 mg/L (as $CaCo_3$ equivalent) i.e. 16 mg/L, 24 mg/L, 32 mg/L and 32 mg/L for site 1, site 2, site 3 and site 4 respectively. Whereas hardness varied 20 mg/L-30 mg/L (as $CaCo_3$ equivalent). i.e. 20 mg/L, 25 mg/L, 30 mg/L and 30 mg/L for site 1, site 2, site 3 and site 4 respectively. It is noticeable that there is pattern in

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physicochemical properties of sites [Table 02] mostly in increasing order from site 1-4, however it is seen that there is sudden change in values between site 2 and 3 which is probable indication of populated area or busy shore with human activities like cremation, washing station and herd grazing, which is noted. Although there is almost no change of values between site 3 and 4, which is evidence of partial isolation of river due to terrain. Speculations made on Kewai river water fell strictly in constraints of BIS (Bureau of Indian standards), projecting that water is safe for drinking purpose (under tested parameters), although the availability of such pure water is scarce due to overpopulation effects, possible explanation of purity of Kewai river water would be the isolation of Kewai river from city (populated area), absence of industry or its effluent and also its origin and run along mountains.

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