Short Communication

Physico-Chemical Analysis of Kharun River Water in Raipur, CG, India

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Abstract

It has been observed that the Kharun River got polluted from many more sources which has been found nearby river, so river water got polluted in terms of BOD, chemical oxygen demand (COD), pH value, Alkalinity, toxic metals, DO etc. We have taken the water sample during three different season like Summer season (W1), Winter season (W2), Rainy season (W3) and we found that the river water cannot be used for other purposes like drinking etc. So it has been suggested to implant the sewage treatment plant (STP) nearby Kharun River so that we can maintain the water quality of river. Dinking the polluted water of river creates negative impact on health cause jaundice, typhoid. SO it is very necessary to keep River water clean. After the determination of water it was found that the total hardness of the water has been more affected. Similarly calcium ion and value of pH also found varied from their standard values. So it can be say the water of the Kharun river cannot be used without any treatment process.

Keywords: APHA, industrial waste, domestic waste, toxic metal, sewage, WHO, NIS, STP.

Introduction

River water quality in the world has experienced since recent years deterioration because of uncontrolled both domestic and industrial wastes. Many studies have also been reported on the study of different effects of industrial and urban wastes on the evolution of surface water quality and the pollution of inland aquatic ecosystems. Due to industrial effluent and domestic wastes surface water bodies' quality degraded drastically[1].

As many effluents into the river water creates equilibrium with the environmental got disturbed which result into polluted rivers[2]. Physical, chemical and biological activities results into quality characteristics of aquatic environments.

Kharun river is affected by pollution due to the growing population of the coastal centers, the continuous development of industry and agriculture.

Indeed, liquid domestic and industrial waste sources generated by the cities are dumped throw nallah into the river from a precarious and without any prior treatment[3]. Moreover, there are mining waste, laundry waste and metal residues which can be a major source of contamination of the aquatic ecosystem of the river[3].

The specific objectives are to determine the physic-chemical properties (pH, BOD, COD, TDS, EC etc)[4].

It has been observed that many nallah opens into the river that content sewage generated by the people who lived nearby areas.

The water of the nallah contains toxic and heavy metals which can be caused very serious disease to the human beings.

Materials and methods

Area of study: *Kharun river* originates from Petechua in the southeast of the district and after flowing joins the Sheonath river near Somnath in the north[5].

Kharun river flows from the south-east direction of the district Durg. The river flows around 75km north side near Simga[5]. Latitude and Longitude of the river is 21.2397, 81.5628.

Table-1: Parameters and Method.

Parameters	Method
pH	pH metry
EC (µS/cm)	Conductometry
TDS (mg/L)	Filtration Method
COD (mg/L)	Hanna Analyzer
BOD (mg/L)	
DO (mg/L)	
Total Hardness(mg/L)	EDTA titration
Calcium ions (mg/L)	EDTA titration
Alkalinity (mg/L)	Titration Method

Methods: For the sampling of water we have taken Pre cleaned glass jar, cleaned by non-ionic detergents and then rinsed in tap water[6]. Just after the collection of samples, analysis was done by the below following methods and parameters[7].

In three different seasons sample are collected: i. April 2019 – W1, ii. August 2019 – W2, iii. November 2019 – W3.

Water treatment process: As we study the river water contain many contaminants salinity Algae, organic, substances, TSS (Total Suspended Solids) etc. which are harmful for human health or others. So it is necessary to remove contaminants from the river water.

The following treatment can be done to remove impurities from river water. i. Grit Remover- Sand or grit particles can be separated by this process from the water. ii. We can use some organic substances to remove chemical disinfection by the oxidation process. iii. Chemical precipitation is the method by which we can reduce hardness of water. iv. Turbidity reduced by the dissolved air flotation / UF filtration membrane. v. Salinity also can be reduced by osmosis (reverse osmosis process).

Results and discussion

The standard quality of water as per WHO is given in the below table.

After the determination the pH value of the sample in all the seasons are varied between 7.8– 8.3 although as WHO guideline the value of pH should be in between 7.0 to 8.5

The value of TDS were also found more varied from the standard value given by WHO which is 1000mg/L while as per our finding the range varies from 110mg/L to 162mg/L

Calcium ion found higher from the its set rage. As per WHO, 1984 the value of Calcium ion should be 75mg/L.

Magnesium ion and Alkalinity were found within the range.

Conclusion

The conclusion is river water quality is not good. For any other purpose like drinking etc.

TDS value, calcium ion, Hardness, pH value of the samples were found varied from the given standard value by WHO[8].

People consuming water of Kharun River directly without any treatment and it causes very harm to human being. So it is proposed to implant STP near by the River of Kharun, Raipur.

Table-2: Water Quality Parameters and there WHO Standards.

Parameters	Method	WHO Standard	Samples of Kharun River Water		
			W1	W2	W3
pH	pH metery	7.0-8.0	7.8	8.3	8
EC (µS/cm)	Conductometry	1400	196	200	198
TDS (mg/L)	Filtration Method	1000	110	156	162
COD(mg/L)	Hanna Analyzer	---	12	88	43
BOD(mg/L)		---	9.3	43.3	28.3
DO(mg/L)		---	8.1	1.7	6.9
Total Hardness(mg/L)	EDTA titration	100	182	185	184
Calcium ions (mg/L)	EDTA titration	75	126	127	126
Alkalinity (mg/L)	Titration Method	120	163	164	162

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