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A Study on the Pollution Level of Water of Chambal River in Kota Rajasthan

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ABSTRACT

River water is a very important source for house hold purposes and irrigation. In the present study physicochemical parameters of chambal river water of Kota Rajasthan India have been studied. Total eleven parameters, viz. pH, Turbidity, TDS, Total alkalinity, chloride, fluoride, nitrate, phosphate, sulphate, calcium and magnesium were studied. Results of the study reveals that except fluoride and phosphate all parameters were found under the permissible limit as given by Indian standard specification for drinking water (IS 10500). Thus it has been recommend that this water can be used for irrigation but for household purposes proper purification is necessary

INTRODUCTION

Water is necessary for industry, agriculture and human existence [1]. Water is one of the most important of all natural resources known on earth. It is important to all living organisms, most ecological systems, human health, food production agriculture and economic development etc.. Thus safety of water is most important for all of us. The quality of water is affected by various contaminants which included physico-chemical and microbiological moieties. Such contaminants causes serious health problems [2]. Due to pollution quality of the drinking water becomes poor and unhealthy. The poor quality of water causes many diseases in the humans and also effect the productivity of crops so that quality of the water must be tested regularly. Pollution of river is a global problem [5]. In India it is reported that about 70% of the available water is polluted. The chief source of pollution is identified as sewage constituting 84 to 92 percent of the waste water. Industrial waste water comprised 8 to 16 percent [4,6]. The disposal of waste leads to contamination of river and lakes chronically affecting the flora and fauna. The domestic sewage discharged from a population of about 2 millions gives rise to numerous water-borne diseases like typhoid, cholera, dysentery, poliomyelitis and cysticercosis, thereby affecting the human health and deterioration of the water quality [7,8]. Studies related to water pollution of rivers like Godavari, Krishna, Tungbhdra, Cauvery, Jhelum, Kosi, Alaknanda, Betwa, Ganga and Yamuna etc. have been carried out by various workers [9]. However little has been done with the river Chambal. Currently this river is facing tremendous pressure due to encroachments, discharge of untreated

domestic and industrial waste, dumping of solid waste and illegal diversion of water. We therefore proposed to study pollution level of chambal river of Kota Rajasthan by various physicochemical parameters and their comparison with the Indian standard IS 10500

STUDY AREA

The present study focuses on the Chambal river that flows through heart of the Kota City, one of the prominent industrial and educational town of Rajasthan state in India. The district Kota lies between 24° 25' and 25° 51' North latitudes and 75° 31' and 77°26' East longitudes with total area of 5767.97 Sq Kms. "Kota City" is located at extreme South of it at 25° 11' North latitude and 75° 51' East longitude occupying total area of 238.59 Sq Kms with average height 253.30 meters from sea level. The following locations of Kota city have been selected for the pollution study of chambal river. The samples were collected from these locations following the standard procedure and analysed according to the APHA and standard methods.

1. Sample site - I Kota Garh Palace
- 2 Sample site - II Under Chambal Bridge Nyapura
3. Sample site - V Adharshila
4. Sample site - VII Gawadi

EXPERIMENTAL

Sampling :

All chemicals used were of AR grade purity. Water samples were collected for the present investigation from four different experimental sites, i.e. Kota Garh Palace, Under Chambal Bridge, Purani puliya Nyapura, Adharshila and Gawadi within Kota city in the Month of November. The Samples were collected in screw capped polyethylene bottle from the Chambal river. Sample bottles were thoroughly rinsed with distilled water and then rinsed with river water before collecting samples. Caps of bottles were closed tightly after filling up of can to avoid changes in physico-chemical characteristics.

Analysis of water samples:

All chemicals used were of AR grade purity .Total 11 parameters namely pH, Turbidity, TDS, total alkalinity, chloride, fluoride, nitrate, phosphate, sulphate, calcium and manganessium were determined according to the procedure prescribed by APHA. All the analysis were done at Go green mechanism P.V.T. LTD an ISO 9001 certified laboratory Ahemdabad India.

Table : Physicochemical parameters of Chambal river in Kota Rajasthan

S. No.	Parameters	Site - I	Site -II	Site - III	Site - IV
1.	pH	6.91	6.81	6.99	6.85
2.	Turbidity	5.74	2.92	4.24	5.82
3.	TDS	268	306	226	392
4	Total alkalinity	120	134	112	132
5	Chloride	75	54	95	52
6	Fluoride	0.01	0.39	0.078	0.37

7	Nitrate	6.45	11.23	6.98	9.88
8	Phosphate	0.17	0.04	0.21	0.21
9	Sulphate	11.56	15.32	11.99	15.78
10	Calcium	32	38.2	30.4	32.8
12	Magnesium	10.6	14.4	13	16.3

* All units are in mg/l except turbidity which is in NTU

** Sampling site I = Adhar Shila II = Purani Puliya Nyapura III = Ghar palace ke piche IV = Gawadi

RESULTS AND DISCUSSION

Results of the present investigation are given in the above table. As per the above results water quality of chambal river in the study area are discussed below along with the comparison of Indian standard specification for drinking water IS 10500. pH value of a solution is a measure of their acidity or alkalinity. The permissible limit of pH values for drinking water is specified as 6.5 to 8.5 as per IS 10500. The pH values of chambal water samples from all four sample sites I to IV were found between 6.81 to 6.99. This is under permissible limit. Turbidity of site I to IV were found to be 2.92 to 5.82 which is under acceptable limit 10 NTU as per the IS 10500. TDS (Total dissolve solids) in the present case were found in the range of 226 to 392 mg/l which shows good quality of water as per IS 10500. Total alkalinity were found to be 112 to 134 mg/l which is under permissible value 200 mg/l. In the present study chloride and fluoride concentration were found to be between 52 to 95 mg/l and 0.01 to 0.39 mg/l respectively. Chloride concentrations are acceptable as per Indian standard IS 10500. However as per IS 10500 concentrations of fluoride is below 0.6 mg/l thus water is rejected for drinking purpose. Low concentration of nitrate i.e. 6.45 mg/l to 11.23 mg/l were found in the sites I to IV this is acceptable because as per IS 10500 upper limit of Nitrate is 45 mg/l. Concentration of phosphate were found to be 0.04 to 0.21 mg/l. There is no IS 10500 standard permissible limit for phosphate for drinking water, while WHO (1993) has fixed it to be 0.1 mg/l. Thus only in one sample site (site - II) phosphate concentration was found under WHO limit, i.e. 0.04 mg/l. The Concentration of sulphate were found to be 11.56 to 15.78 this is acceptable under IS 10500 limits. Concentrations of magnesium and calcium were found to be 30.4 to 38.2 mg/l and 10.6 to 16.3 respectively mg/l. As per IS 10500 maximum acceptable limit of magnesium is 100 mg/l and that of calcium is 200 mg/l. Thus both metals are found within acceptable limit. Thus chambal water of sample site - II, i.e. purani puliya nyapura Kota Rajasthan can be used for drinking after proper purification.

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