



Short Communication

Comparative Physico-Chemical Analysis of River Water and underground Water in Winter Season of Rewa City, MP, India

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Available online at: www.isca.in, www.isca.me

Received 5th February 2014, revised 15th March 2014, accepted 22nd March 2014

Abstract

In this paper we are analyzed to seasonal variation and comparative physico-chemical study of river water and underground water of Rewa city (M.P.), INDIA in winter season. A most of samples are within prescribed limits as suggested by World Health Organization and Indian Standard Institute for drinking purpose. Seasonal variation in physical and chemical parameters like colour, odour, taste, pH, Total dissolved solids, Total hardness, calcium (Ca^{2+}), magnesium (Mg^{2+}), Sulphate (SO_4^{2-}), carbonate (CO_3^{2-}), bicarbonate (HCO_3^-), Total alkalinity etc. We are studied for a period of year 2013 in winter season. Some data were found in some limits.

Keywords: Physico-chemical study, water hardness, seasonal, variation.

Introduction

Present paper reports results of the study of seasonal variation and comparative physico-chemical analysis of river water and underground water in winter season for colour, odour, taste, pH, Total dissolved solids, Total hardness, Ca^{2+} , Mg^{2+} , SO_4^{2-} , CO_3^{2-} , HCO_3^- , Total alkalinity etc. Were analyzed for a period of 2013 in winter season and river water sample are indicated by sample "A" and underground water sample are indicated by sample "B"¹⁻².

Material and Methods

The water sample were collected during the winter season of 2013 of river water and underground water from Rewa, city. Material requirement for sampling and analysis of water of Itinerary for the trip, sample transport arrangement, location map, sampling site location map, icebox, weighted bottle sampler, bottles, sample containers, special sample containers, glassware, thermometer, tissue papers, other field measurement are sample identification forms, Labels for sampling containers, field note bottle, markers, soap, towel etc. All analysis were carried out as per APHA and BIS desirable limit for drinking water. Some material and methods are depicted as follows like colour, odour and taste in water is determined by physically, pH Value in water is determined by pH meter, total dissolved solids in water is determined by TDS measurement apparatus, total Hardness in water is determined by EDTA complexometric titration using EDTA solution, buffer solution, EBT indicator, distilled water and titration apparatus, calcium in water is determined by EDTA titrimetric method using NaOH, ammonium purpurate, standard EDTA solution, standard

calcium solution, magnesium in water is determined by calculation from total hardness and calcium by EDTA method, sulphate in water is determined by Nephelometry method using Nephelometric turbidity meter with sample cells, magnetic stirrer, timer within dicator of second, carbonate, bicarbonate, total alkalinity in water is determined by titration method using HCl solution methyl orange, phenolphthalein as a indicator etc¹⁻².

Results and Discussion

Table 1 shows values of river water and underground water pH ranges 8.1, 7.6, value of TDS (mg/L) 143, 106, colour of water colourless, odour of water odourless, taste of water unpleasent, total hardness (mg/L) of water 76, 170, total alkalinity (ppm) 124, 180, value of Ca^{2+} (mg/L) 25.6, 60, value of Mg^{2+} (mg/L) 2.9, 12, value of SO_4^{2-} (mg/L) 22, 14, value of CO_3^{2-} (ppm) 1.2, 2.0 value of HCO_3^- (ppm) 122, 125 etc.

Conclusion

The result of seasonal variation and physico-chemical study of river water and underground water sample indicate overall alkaline nature. The river water and underground water pH between desirable limit can affect the mucous membrane. sample have Total dissolved solid less than 1000 mg/l, hence suitable for drinking and samples have normal carbonate (CO_3^{2-}), normal sulphate (SO_4^{2-}) and moderate to hard, very hard and hard in nature. The comparison of analyzed data with WHO, ISI and BIS desirable limit for drinking water indicate that all water are more or less suitable for drinking¹⁻².

Table-1

Showing variable average value of all parameters of sample A and B

Parameters	Sample-A	Sample-B
Colour	Colourless	Colourless
Odour	odourless	Odourless
Taste	unpleasant	Unpleasant
pH	8.1	7.6
TDS (mg/l)	143	106
Total hardness (mg/l)	76	170
Ca ²⁺ (mg/l)	25.6	60
Mg ²⁺ (mg/l)	2.9	12
So ₄ ²⁻ (mg/l)	22	14
Co ₃ ²⁻ (ppm)	1.2	2.0
HCO ₃ ⁻ (ppm)	122	125
Total alkalinity (ppm)	124	180

Table-2

Water Quality parameters and drinking water Standards

Parameters	Drinking Water WHO (1984) and ISI (1991)	
	Desirable	Maximum
pH value	6.5to8.5	Nor elaxation
Dissolved Solids mg/l	500	2000
Colour Hazen units	5	25
Odour	Unobjectionable	-
Taste	Agreeable	-
Total hardness (asCaCO ₃) mg/l	300	600
Alkalinity mg/l	200	600
Calcium mg/l	75	200
Manganese mg/l	0.1	0.3
Sulphate mg/l	200	400

Table-3

Water Quality parameters and drinking water Standards

Parameters	BIS Desirable limit for drinking water
pH	6.5-8.5
TDS (mg/l)	500
Total hardness(mg/l)	300
Total alkalinity(mg/l)	200
Ca ²⁺ (mg/l)	75
Mg ²⁺ (mg/l)	100
So ₄ ²⁻ (mg/l)	200
Co ₃ ²⁻ (mg/l)	-
HCO ₃ ⁻ (mg/l)	250

References

1. Manoj Kumar Solanki, O.P. Gupta and Shukdeo Prasad Ahirwar, Study of Yearly Variation and Physico-Chemical study of River Water, Underground Water and Surface Water of Rewa City, MP, India, *Int. Res. J. Environment Sci*, 2(9), 1-4 (2013)
2. Manoj Kumar Solanki and O.P. Gupta, Physico-chemical and comparative analysis of river water, underground water and surface water of Rewa city MP, India, *Poll Res.*, 32(2) 235-237 (2013)
3. Das N.C., Physico-Chemical Characteristics of Selected Ground Water Samples of Ballarpur City of Chandrapur District, Maharashtra, India, *Int. Res. J. Environment Sci.*, 2(11), 96-100 (2013)
4. Amutha and Prakash, A Study on Fluoride in Drinking Water of Government Kallar Higher Secondary Schools in Madurai, Tamil Nadu, India during Pre-monsoon and Post-monsoon seasons of years 2010 to 2012, *Int. Res. J. Environment Sci.*, 2(12), 29-34 (2013)

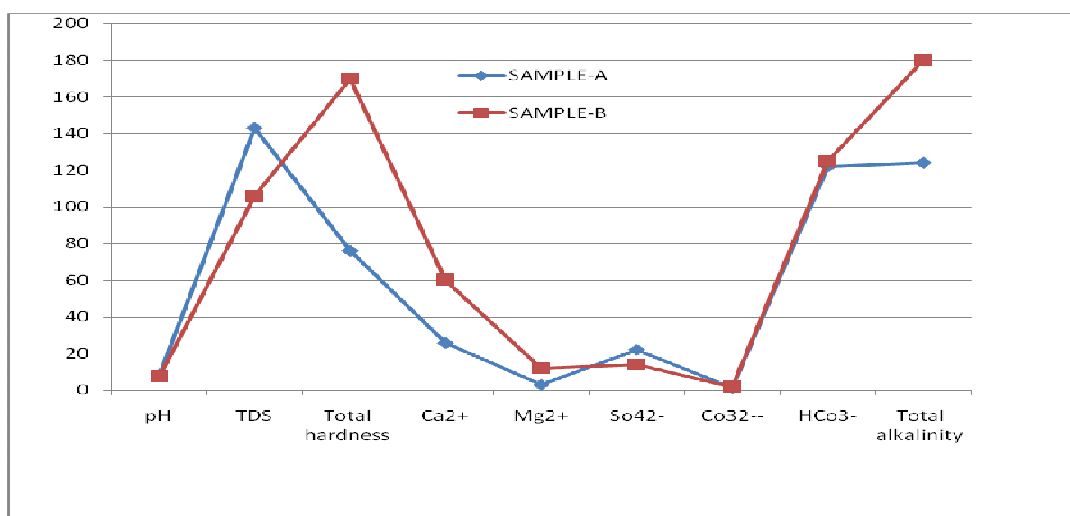


Figure-1
 Average value of all parameters of sample "A" and sample "B"

5. Verma Apoorv and Pandey Govind, A Study of Groundwater Quality in Urban and Peri-urban Areas of Gorakhpur City in India, *Int. Res. J. Environment Sci.*, **3(1)**, 6-8 (2014)
6. Mikia M., Mady-Goma Dirat I., Tsoumou A., Mabanza J., Vouidibio J. and Diatewa M., Preliminary Data on the Ichtyofaun of Djiri River (Affluent of right bank of Congo River), *Int. Res. J. Environment Sci.*, **2(10)**, 1-6 (2013)
7. Yadav Janeshwar, Pathak R.K., Rathour Jaypal and Yadav Ankit, Physico-Chemical Analysis of Water and Locked Soil of Sadli Reservoir, Region Kasrawad, District Khargone M.P. INDIA, *International Research Journal of Environment Sciences*, **2(4)**, 26-29 (2013)
8. Chaurasia Sadhana and Karan Raj, Water Quality and Pollution load of River Mandakini at Chitrakoot, India, *International Research Journal of Environment Sciences*, **2(6)**, 13-19 (2013)
9. Dubey Savita, Analysis of Physico-Chemical Parameters of Kshipra river Water at Ujjain, *International Research Journal of Environment Sciences*, **2(7)**, 1-4 (2013)
10. Smitha Ajay D. and Shivashankar P., Physico Chemical Analysis of the Freshwater at River Kapila, Nanjangudu Industrial Area, Mysore, India, *International Research Journal of Environment Sciences*, **2(8)**, 59-65 (2013)
11. Kumar Naresh, Singh Ankusha and Sharma Priya, To study the Physico-Chemical properties and Bacteriological examination of Hot Spring water from Vashisht region in Distt. Kullu of HP, India, *International Research Journal of Environment Sciences*, **2(8)**, 28-31 (2013)
12. Neelesh Shrivastava, Mishra D.D., Mishra P.K. and Avinash Bajpai, A study on the sewage disposal into the Machna river in Betul City, Madhya Pradesh, India, *Advances in Applied Science Research*, **3(5)**, 25 73-2577 (2012)
13. Agarwal A. and Saxena M., Assessment to pollution by physic, chemical water, *Advanced applied science research*, **2(2)**, 185-189 (2011)
14. Garizi A.Z., Sheikm V. and Sadoddin A., Assessment to seasonal variations of chemical characteristics in surface water using multi variate statistical methods, *Int. Jr. Environ. Sci. Tech*, **8(3)**, 581-592 (2011)
15. W.H.O. Guidelines for drinking water quality, Vol. 1, Recommendations WHO, Geneva (1984)
16. Hemant Pathak and S.N. Limaye, Study of Seasonal Variation in Groundwater Quality of Sagar City (India) by Principal Component Analysis, *E-Journal of Chemistry*, **8** (2011)