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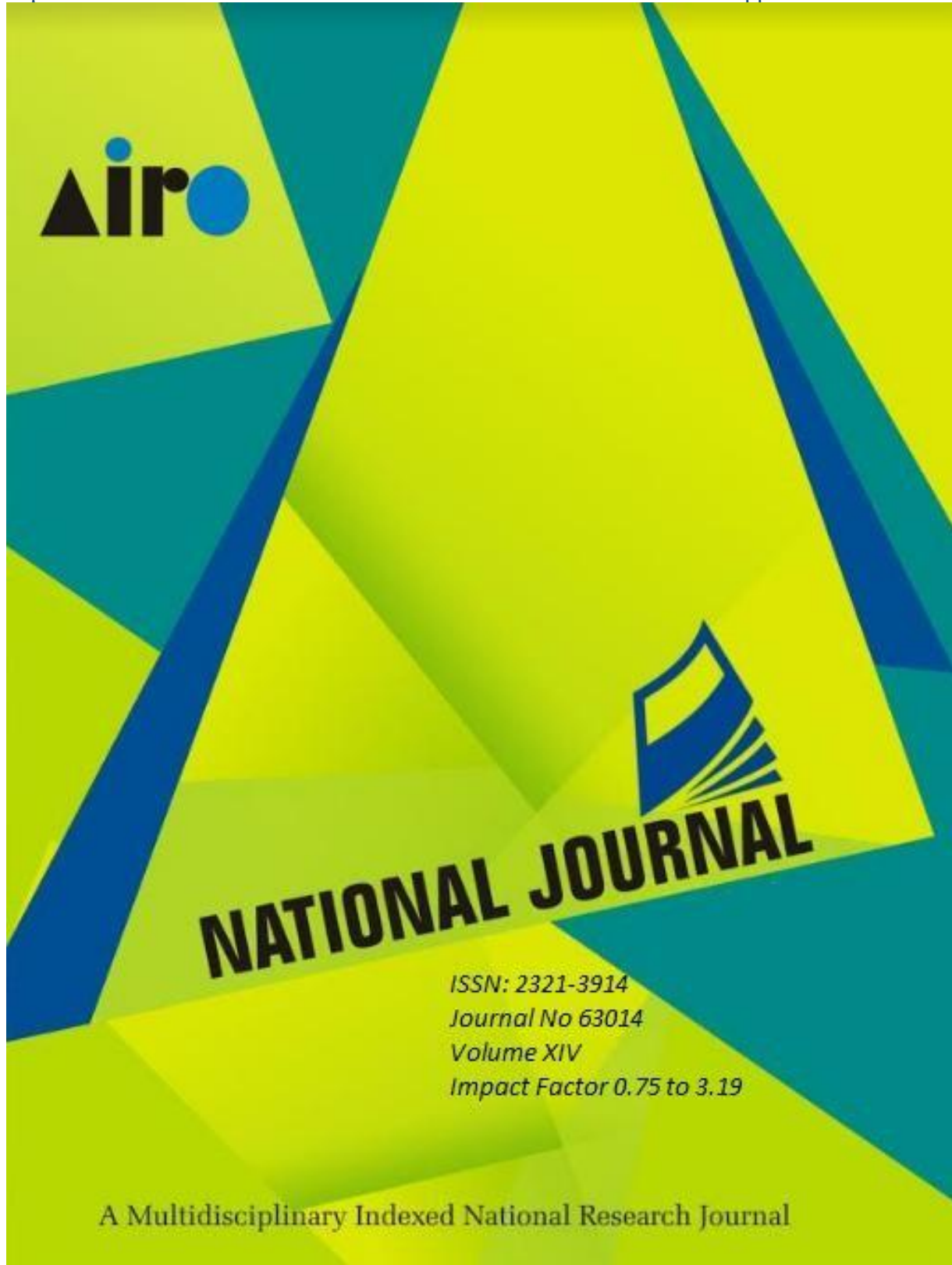
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GROUND WATER QUALITY OF NORTH AREA OF JAIPUR CITY AND ITS AGGLOMERATES

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ABSTRACT

Groundwater an important source of water supply and relatively low susceptible to pollution as compared with surface water. Polluted water produces adverse effects to human health as well as on environment. The present paper discusses the scenario of ground water quality in north area of Jaipur and its agglomerates. 25% sample in pre monsoon and 37% sample in post monsoon lies between desirable limit in respect to TDS, 81% the sample showed TH in safe limit, 44% sample in pre monsoon and 50% sample in post monsoon were observed in permissible limit. Nitrate ion concentration in drinking water create several problems like cyanosis, tumor goiter, oral cancer, cancer of colon, rectum or other gastrointestinal cancer, lymphoma and dyspnea and cardio-vascular system effected with high nitrate. The value of fluoride in 13% sample in pre monsoon and .06% sample in post monsoon showed in desirable permissible limit. WQI result showed that water quality in north area of Jaipur and its agglomerates in pre monsoon is slightly good but in post monsoon improvement in water quality required.

KEYWORDS: *Nitrate, Drinking Water, Potential risk to health, water quality index, total hardness*

INTRODUCTION

Water plays a decisive and crucial role in growth and location of settlements. Water maintains an ecological balance in the relationship between living things and environment in which they live. the

demands for water has been rising in the urban centre not only due to the accelerated growth in population but also due to growth in the economic activities and social needs. Physiographically the city area is characterized by wide variety of features

like sandy –plains, hills and intermountain-valleys, pediments etc. already there are acute shortages of ground waters in many areas of Jaipur. Careless pollution and contamination of the groundwater has greatly impaired the quality of available water.

Material and methods – Ground Water Samples of North East area in Pre and Post Monsoon were collected and analysed as per standard methods. The water samples were collected from various borewell and hand pump in polythene bottle from the study area. The samples were analysed for TDS by evaporation method, TH by

complex metric titration and Chloride are determined by titration with standard silver nitrate solution using potassium chromate as indicator (argentometric titration method) and Fluoride and nitrate by U.V Visible spectrophotometer method. Sixteen pointed locations are used. Drinking water tube well which are closer to public area are given priority for sampling, because such as directly related to human.

Result and Discussion– The water quality data i.e. Minimum, Maximum, Mean for Pre and Post Monsoon have been given in Table 4.1

TABLE 4.1: Analysis of Pre Monsoon North area of Jaipur and its Agglomerates

Water quality parameter	Pre monsoon			Post monsoon		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Cl	44.33	1359.21	243.34	21.98	1331	228.67
TH	36	1049.3	390.39	180	940	422.44
NO ₃	9.9	202	73.45	9.9	209.16	90.94
F	0.23	1.71	1.02	.28	2.5	1.06
TDS	349	4348	1206.62	411	4670	1313.12

Total Dissolve Solids (TDS)

High value of TDS indicate either contamination or presence of excessive mineral matters. Observed values of TDS in this area varied from 349 mg/L to 4348

mg/L in Pre Monsoon and 411 mg/L to 4670 mg/L in Post Monsoon. In North area of Jaipur about 75 % samples in Pre and 63% in Post Monsoon shows very high value of TDS than permissible limits described by BIS. The average values in

Pre Monsoon and Post Monsoon were 1206.62 mg/L and 1313.12 mg/L. V.K.I area in pre monsoon and Harmada in post monsoon exhibits low value of TDS. Lalawas shows highest value of total dissolved solids in pre and post monsoons .only 25 % water samples in Pre Monsoon

and 37% water samples in Post Monsoon are accepted for drinking purpose in North Area of Jaipur. High value of total dissolved solids in Post Monsoon indicates poor quality of water predicted to more seepage and movement of ground water in this area .

TABLE 4.2 : Analysis of Total Dissolved Solids in drinking water (by panels of tastes)in North area of Jaipur and its Agglomerates

S.no	Total Dissolved Solids in water (mg/L)	Acceptability for drinking purpose	TDS in North Area in Pre Monsoon (%)	TDS in North Area in Post Monsoon(%)
	300-600	Good	25%	38%
	600-900	Fair	32%	.06%
	900-1200	Poor	19%	25%
	≤1200	Unacceptable	25%	31%

Total Hardness

Total hardness is due to carbonate ,sulphate ,bicarbonate , nitrate of calcium and magnesium Total hardness varied between 36mg/L to 1049.3 mg /L in Pre Monsoon and 180 to 940 mg/L in Post Monsoon of North Area of Jaipur. 19% in both Monsoon sample water were found to exceed the permissible limit . The average value of total hardness in Pre Monsoon is 390.39g /L and in Post Monsoon is 422.44mg /L. panchyawala has a minimum value of total hardness in pre monsoons and V.K.I area in post monsoon . Jaisinghpura has maximum value of total hardness in

both monsoon. High value of total hardness leads to heart diseases and kidney stone problem 81 as human health problems.

Chloride

Greater amounts of chloride arise from the natural occurrence in geological strata concerned and entry of sewage effluents and wastes. Chloride concentration of water samples are varied from 44.33 to 1359.21 mg/L in Pre Monsoon and in range of 21.98 to 1331.33 mg/L in Post Monsoon with average value of 243.34 mg/L and 228.67 mg/L. V.K.I Area shows minimum

and lalawas has maximum value of chloride in both Monsoon

Nitrate

The concentration of nitrate in the study area varying from 9.9 to 202.20 mg/L in Pre Monsoon and 9.9 to 209.16 mg/L in Post Monsoon. The average value of nitrate in Pre Monsoon and Post Monsoon are 73.45 mg/L and 90.94 mg/L. It is observed that nearly 44% of groundwater samples from the study area in Pre Monsoon and 50 % of groundwater samples in Post Monsoon within the permissible limit. High value of nitrate is due to heavy use of nitrogenous fertilizers,

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cattle waste dumping, pit latrines, waste water disposal value in both monsoons but Jaisinghpura Khor in pre monsoon and Amer in post monsoon have maximum value of nitrate

The concentration of fluoride in the study area varies from 0.23to 1.71 mg/L in Pre Monsoon and 0.28 to 2.50 mg/L in Post Monsoon. All sample in study area have below the permissible limit prescribed by IS Standard 21 except in Lalawas and jaisingh pura .The average value of fluoride in Pre Monsoon are 1.024 mg/L and 1.06 mg/L in Post Monsoon. There are slightly changes in the value of fluoride in Post Monsoon.

TABLE 4.3 Calculated WQI values for North area in Pre Monsoon of Jaipur and its Agglomerates

Parameter	C _i (Observed value)	S _i (Standard value)	Q _i (Quality Rating)	W (weight)	W _i (Relative Weight)	S _I (Sub Index)
TDS	1206.62	500	.136	3	241.32	32.81
Cl	243.34	250	.1818	4	97.35	17.69
F	1.024	1.5	.227	5	68.26	15.49
NO ₃	73.45	45	.227	5	63.22	14.35
TH	390.39	300	.227	5	30.13	6.83
					OVERALL WQI	87.17

TABLE 4.4: Calculated WQI values for North area in Pre Monsoon of Jaipur and its Agglomerates

Parameter	C _i (Observed value)	S _i (Standard value)	Q _i (Quality Rating)	W (weight)	W _i (Relative Weight)	SI (Sub Index)
TDS	1313.12	500	.136	3	262.62	35.71
Cl	228.67	250	.1818	4	91.46	16.62
F	1.06	1.5	.227	5	70.6	16.02
NO ₃	90.94	45	.227	5	202.08	45.87
TH	422.44	300	.227	5	140.81	31.96
					OVERALL WQI	146.18

Conclusion- this ground water pollution results indicate improper disposal of waste water- both domestic as well as industrial. Organized community life requires twin services of water supply and sewage disposal. In these areas all the parameter like TDS, TH, NO₃, are high in both monsoons due to various anthropogenic activities and geochemical processes prevailing in the region.

Amer, Jaisinghpura, Saipura, Lalawas, Galta, Brahmपुरi, Railway Station have high value of total dissolved solids in both monsoons. Most of samples shows high value of total hardness in post monsoon due to addition of calcium and magnesium salt in water. In North Area 19% sample in

Pre Monsoon and Post Monsoon show high value of chloride while in other areas all the sample show below value than prescribed limit 57% in pre and post monsoon shows high value of Nitrate. In this study Amer, jaisingpura, lalawas, galta, shastri nagar, jhotwara, railway station shows high concentration of nitrate which is above permissible limit. High value of nitrate in this area indicate the recharge and solution of fertilizer, contamination from animal or human waste.

In north area of Jaipur and its Agglomerates almost all water samples show lower value of fluoride than permissible limit in both monsoons. In

North areas WQI value show poor water quality in post monsoon. High value of WQI in postmonsoon indicate increment of all parameter..

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