

Potability of well water of Khagaria

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Abstract: Water samples of open well of Khagaria town have been collected and analyzed for different water pollution parameters like pH, dissolved oxygen, turbidity, electrical conductivity, total hardness (TH), total dissolved solid (TDS), biochemical oxygen demand (BOD), sulphate, phosphate and nitrite. The result has been compared from the standard limit described by WHO and ISI. On the basis of result it has been concluded that almost all the open well sources are seriously polluted.

(Keywords : D.O., B.O.D., TH and T.D.S.)

Introduction

The global lack of abundance of useable water has become an issue that presents a dangerous problem of our future. Ironically only a small portion of our planet water is actually useable. In our country the ground water aquifers are being pumped at a rate than can it naturally be recharged which makes water availability dwindling in many town of our country⁽¹⁻⁵⁾. Anthropogenic activities lead to serious problem to water bodies. The urban areas, domestic effluents, discharged into the nearby surface area of open wells causes extreme pollution in water and create health problem^(6, 7). Potability of well water has been studied by several researchers at many places and reported that the quality of water is based on their physico-chemical parameters⁽⁸⁻¹⁰⁾. Some recent research papers on pollution of drinking water are concentrated on microbiological quality of drinking water^{11, 12}.

To prevent the contamination of useable water it is quite necessary to perusal

study the pollution load of ground water making water pollution as a global issue. In this direction a step has been taken to study the water pollution of Khagaria town which is a district head quarter of Khagaria. Though the area is water abundant zone as it is surrounded by river from three sites but there is serious problem. Long back in 1993, B. N. Pandey⁽¹³⁾ has presued the study of water pollution of the river Kosi at Purnia. Since then the entire area has been untouched so far as the study of water pollution is concerned. This fact inspired and promoted us to perusal research on the open well water pollution of Khagaria town.

Study Area

Khagaria is a district town of Purnia division in north Bihar the district town is situated on the bank of a perennial river Budhi Gandak. In the east site of the town there is another perennial river i.e. Kosi river at about 15 Km distance while in the north there is Kamla Blanan river. The open wells which are the main source of drinking water in several wards of the town have been taken as source of water for the present population studies.

Experimental

Matreial and Methods

Well water sample were collected from houses in the different wards of the Khagaria town during November 2015 to January 2016. The pH of water samples was determined by pH meter at the time of the sampling. All the samples were brought to the lab where they were analyzed for the various pollution parameters like electrical conductivity, total

TABLE – 1
Experimental results of well water samples of Khagaria town

Sample & Sampling Spots	pH	EC ₂ μmho/cm	TH (PPM)	TDS (PPM)	Turbidity (NTU)	DO PPM	BO D PPM	Sulphate PPM	Phosphate PPM	Nitrate PPM
WW ₁ (Ward ₁₁)	7.8	0.18	254	254	1.5	7.5	3.0	14.5	1.15	0.01
WW ₂ (Ward ₁₁)	7.8	0.15	260	260	1.4	7.5	2.9	14.5	1.10	0.01
WW ₃ (Ward ₁₂)	7.8	0.14	245	248	1.5	7.0	3.0	15.3	1.16	0.03
WW ₄ (Ward ₁₂)	7.7	0.16	257	257	2.1	7.04	3.0	14.6	0.75	0.2
WW ₅ (Ward ₁₇)	7.9	0.18	256	256	1.8	8.0	2.7	14.8	0.90	0.01
WW ₆ (Ward ₁₇)	7.1	0.09	256	256	1.5	7.3	2.8	20.0	1.12	0.02
WW ₇ (Ward ₁₈)	7.4	0.16	270	270	2.0	7.4	3.0	20.0	0.25	0.01
WW ₈ (Ward ₁₈)	8.1	1.20	259	259	2.2	7.9	3.5	20.0	0.85	0.02
WW ₉ (Ward ₁₉)	8.1	1.13	248	248	0.8	7.9	3.9	20.13	0.85	0.02
WW ₁₀ (Ward ₁₉)	8.1	1.20	239	239	2.5	7.09	3.0	25.0	0.76	0.09
WW ₁₁ (Ward ₂₀)	7.8	1.20	220	220	2.1	6.9	2.5	25.9	0.89	0.08
WW ₁₂ (Ward ₂₀)	7.9	1.20	268	268	1.8	7.8	2.7	20.6	1.70	0.06
WW ₁₃ (Ward ₂₀)	7.9	2.1	257	257	1.9	7.7	2.9	21.8	1.32	0.04
WW ₁₄ (Ward ₂₁)	8.1	0.19	240	240	1.3	6.68	3.4	21.7	1.11	0.02
WW ₁₅ (Ward ₂₂)	8.2	0.19	258	258	2.6	6.68	3.9	21.9	0.9	0.01
WW ₁₆ (Ward ₂₃)	8.2	0.2	247	247	2.8	7.4	3.7	21.4	0.6	0.03
WW ₁₇ (Ward ₂₃)	8.2	0.5	248	248	2.5	7.9	3.4	21.5	0.8	0.03
WW ₁₈ (Ward ₂₄)	7.9	0.08	248	248	2.1	7.0	3.09	21.5	0.74	0.03
WW ₁₉ (Ward ₂₄)	7.8	0.09	256	256	1.7	7.09	2.4	15.5	0.26	0.02
WW ₂₀ (Ward ₂₆)	7.6	0.06	258	258	1.8	7.3	3.4	20.4	0.85	0.02
WW ₂₁ (Ward ₂₆)	8.4	0.07	259	259	1.9	7.8	3.8	15.8	1.13	0.01
WW ₂₂ (Ward ₂₆)	7.8	0.08	257	257	1.9	7.8	3.8	20.9	1.23	0.01
WW ₂₃ (Ward ₂₆)	7.7	0.19	264	246	2.1	7.9	3.7	30.0	0.29	0.03
WW ₂₄ (Ward ₂₆)	7.8	0.18	268	268	2.1	7.8	3.9	28.9	0.30	0.02

hardness, total dissolved solid, turbidity, dissolved oxygen, nitrate, sulphate phosphate and biochemical oxygen demand. All the pollution parameters were determined to using standard methods from APHA¹⁴.

Results and Discussion

All together 24 wells covering the different wards along M. G. Road of the town have been selected for water collection. The experimental results have been displayed in table – 1. The pH of all the well water samples lies in between 7.1 to 8.4 according to the ISI limit and who recommendation the standard pH of drinking water is required to be in the range of 7.0 to 8.5, so all the well water samples have pH in the permissible limit. The prescribed limit for total hardness of drinking water is 300 mg (ppm) while in the present study well water

samples of 11 wards of Khagaria block record total hardness 171 to 249 ppm, its shows that total hardness of well water samples of Khagaria town are well within the prescribed limit and are extremely soft water samples records D.O. values around 7 mg/L (ppm) which is fairly good for drinking purposes. The turbidity, electrical conductivity and TDS values for all the 24 samples are within the permissible limit⁽¹⁵⁻¹⁸⁾. The sulphate, phosphate and nitrate for all the well water sample are also well below the standard values¹⁹⁻²⁰.

Conclusion

On the basis of the analytical findings it may be concluded that the water of the various wells is still under controlled pollution and their water is not objectionable for human consumption and other domestic purposes.

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