

Potability Test Of Drinking Water As Used By The Inhabitants Of Selected Villages Of Block Poreyahat In Godda, Jharkhand

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ABSTRACT:-

(i) Background and objectives:- Through this research paper, it was tried to estimate the quality of drinking water, procured from the Tube wells, Wells (a deep hole in ground to obtain water) or small water bodies, as used by the inhabitant of fifteen selected villages of Block Poreyahat in District Godda, Jharkhand. The study was based on the analysis of the drinking water on the basis of five parameter i. e. pH, TDS, Hardness, Fluoride and Iron content in drinking water. The average count for the various parameters was near to the acceptable value except Iron concentration. In most of the areas under study, water was slightly acidic. After study it was found that condition of drinking water in these localities were not fully satisfactory

KEY WORDS-

Drinking water, Poreyahat, Godda, Total dissolved solids, Hardness, Fluoride, Iron and Drinking water parameters.

INTRODUCTION:-

Poraiyahat is the backward block in the District Godda. It is about 25 kilometer away from the district headquarter. It is encircled by Godda block towards north, Sunderpahari block towards east, Ramgarh and Saraiyahat blocks of district Dumka towards south and Bausi of Banka district towards west. Poreyahat Block of Godda district has a total population of 187,489 as per the Census 2011. Ground water is the important source of drinking water. In a large number of the area of the Poraiyahat drinking water was obtained from the hand pump. In some areas Government established water towers which in turn were loaded with the groundwater extracted through motor pump from the underground aquifer. The average monsoon rain fall in Poreyahat is about 700mm. Here red and yellow soil is found. Soils are generally strongly to moderate acidic in nature except for the low land valley soils.

MATERIALS & METHODS:-

Five parameters i.e pH, TDS, Hardness, Fluoride and Iron count were considered to evaluate the quality of drinking water of the villages under study.. The study areas included the selected 15 Villages of Block Poreyahat. Previous reporting of the acidic nature of the drinking water was the main consideration for the selecting of study areas. In these villages water requirement for drinking purpose was mostly fulfilled by untreated groundwater through hand pumps or well.

Water samples were collected with care using standard process. In this study, estimation protocol was primarily applied as per IS3025.

From each village under study three to five samples were collected from different places. On the basis of the test reports of these samples collected from each village, mean value was calculated for each parameter and for each village under study. The mean value of each parameter for each village is mentioned in Table - 1.

OBSERVATION & DISCUSSION:-

After study, it was observed that the Iron was present in high concentration in all water samples. Most people of these areas were noticed to suffering with diarrhea and other health problems due to the high concentration of the Iron in the drinking water.

The average values of the Iron concentration for the villages Bhaga, Dikwani padampur, Karudih, Phulwar, Surjadih, Barmasia Pandit tola, Barmasia Santhal tola, Chirudih, Khorisisa Upper tola, Dipna, Kherbari, Salgatand Santhal tola, Titya tand, Dadughutu Pharpur Buru tola and Dadughutu Manji tola are 4.09mg/l 2.55mg/l 5.33mg/l 1.98mg/l 41.51mg/l 2.55mg/l 5.03mg/l 18.33mg/l 5.38mg/l 9.1mg/l 10.76mg/l 7.09mg/l 4.11mg/l 4.73mg/l and 2.86mg/l respectively. The mean values of the pH of the drinking water for these villages under study were 6.88, 6.87, 6.43, 6.36, 6.05, 6.55, 6.45, 6.20, 6.23, 6.46, 6.58, 6.67, 6.64, 6.56 and 6.7 respectively. The mean values of Total dissolved solids for these villages under study were 512mg/l, 973.3mg/l, 425.8mg/l, 323mg/l, 181.2mg/l, 214.2mg/l, 245.9mg/l, 240.2mg/l, 354.2mg/l, 353.2mg/l, 765mg/l, 701.9mg/l, 444.5mg/l, 420.4mg/l and 461.7mg/l respectively. The mean values of Hardness for these villages under study were 290mg/l, 338mg/l, 244mg/l, 290mg/l, 124mg/l, 118mg/l, 150mg/l, 156mg/l, 142mg/l, 258mg/l, 344mg/l, 578mg/l, 288mg/l, 392mg/l and 450mg/l respectively. The mean values of Fluoride concentration for these villages under study were 1.47mg/l, 2.56mg/l, 1.19mg/l, 0.42mg/l, 1.5mg/l, 0.52mg/l, 0.15mg/l, 0.55mg/l, 0.43mg/l, 1.26mg/l, 2.95mg/l, 2.79mg/l, 1.65mg/l, 0.57mg/l and 0.09mg/l respectively.(Table - 1)

, The investigated villages were identified as ACIDIC WATER ZONE. This leads to the corrosion of the pipeline, water drainage pump and drinking water supply pump. Due to this peoples of these villages were suffering with belly acidity problem.

The average of the fluoride concentration of the water samples collected was above the desirable limit for the villages Bhaga, Dikwani padampur, Karudih, Surjadih, Dipna, Kherbari, Salgatand Santhal tola and Titya tand. In three villages Fluoride concentration was higher than permissible limit and leads to the toxic effects on the villagers. In these villages fluoride bearing minerals for example apatite, fluorite etc are found in the native rocks, Due to the weathering and trickling rain water effect these fluoride laden rocks release fluoride chemicals in ground water. Extensive use of phosphate fertilizers also contributed to the increased fluoride in irrigation lands,

Consumption of water with fluoride concentration above 1.5 mg/l is harmful. It leads to chronic dental fluorosis and Skeletal fluorosis.

In all the villages TDS was below the 2000mg/l (permissible limit) but in very few villages TDS content was below the desirable limit(500mg/l).

Total hardness is expressed in term of CaCO_3 and it is equal to the calcium and magnesium equivalent per liter. It can be classified as – Soft water when Hardness (mg/l) ranges from 0 to 60mg/l, Moderately hard water when Hardness(mg/l) ranges from 61mg/l to 120mg/l, Hard water when Hardness(mg/l) ranges from 121mg/l to 180mg/l and Very hard when hardness occurs beyond 180mg/l. The range of Hardness in the villages under study was from 118mg/l to 578mg/l. All the water samples were hard in nature except from Barmasia Pandit tola. No in any village soft water was found. But the Hardness of nearly all water samples were below permissible limit.

CONCLUSION & SUGGESTION:-

During the study period, it was observed that the quality of the drinking water was much poor in villages under study. Drinking water was found to be acidic in nature. Also high iron concentration was found. In some areas Fluoride was also found in high concentration. Therefore, it is suggested –

- I. Artificial groundwater recharge system should be implanted in these areas which help in the dilution of the fluoride and other toxic element of ground water.
- II. Water supply should be done through the overhead tank which should be fitted with water purifying and iron removing instrument.
- III. Due to the poor electric supply Solar powered water tower should be set up
- IV. Fluoride al plants should be installed.
- V. Activated Alumina containg bucket are recommended.
- VI. Neutralization of the acidic water with lime is recommended.
- VII. Awareness program about water pollution should be carried for the inhabitants of these villages.
- VIII. Lime Neutralization method should be used to cure the acidic problem of water
- IX. It is strongly suggested that Government should take responsibility to insure the supply of potable drinking water to the poor inhabitants of these villages under study

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REFERENCES:-

1. Department of Drinking Water and Sanitation - Jharkhand Gov
2. Sharma & Kaur, "Environmental Chemistry", 1996 Edition.
3. Mohan Rakesh 'Quality assessment of the water of two designated ponds of motihari town on the basis of chloride content' Research Expo Int. Rec. Jour. Mar 2014
4. Mohan Rakesh 'Study of the variations of the phosphate content in the water of the selected ponds of Motihari town' Global academic research journal, Mar 2014.
5. Sharma, Ghose, Bhaduri Ecology Environmental Pollution Food and Nutrition G. E. Pub. Patna.
6. Department of Drinking Water Supplies, Govt. of India.
7. APHA guidelines on Standard Methods for the Examination of Water and Wastewater
8. CMPDL, 1984: A report on hydrogeological investigations Rajmahal Project.
9. Manohar Sinha and Verma N.P. 1995: Quaternary Geological and Geomorphological mapping of Chandan – Badua sub basin in parts of Bhagalpur, Banka, Dumka and Godda District Bihar, GIS report.
10. Shekhar S. !992: Hydrogeology and Ground Water Resources of Godda District Bihar, CGWB report.

TABLE - 1
Mean (average) Value of the parameters of drinking water, as used by inhabitants of some selected Villages of Poreyahat, Godda, Jharkhand, Bihar

Parameters:-	pH	TDS (mg/l)	Hardness (mg/l)	Fluoride as P (mg/l)	Iron as Fe (mg/l)
Method reference:-	IS:3025(P-11)-1983 / 2002	IS:3025(P-16)-1984 / 2003	IS:3025(P-21)-2009	IS:3025(P-60)-2001 / 2008	IS:3025(P-53)-1964 / 2003
IS:10500(Desirable limit)	6.5-8.5	500	300	1.0	0.3
IS:10500Permissible limit	6.5-8.5	2000	600	1.5	1
Selected Villages					
01. Bhaga	6.88	512	290	1.47	4.09
02.Dikwani padampur	6.87	973.3	338	2.56	2.55
03. Karudih	6.43	425.8	244	1.19	5.33
04. Phulwar	6.36	323	290	0.42	1.98
05. Surjadih	6.05	181.2	124	1.5	41.51
06. Barmasia Pandit tola	6.55	214.2	118	0.52	2.55
07.Barmasia Santhal tola	6.45	245.9	150	0.15	5.03
08. Chirudih	6.20	240.2	156	0.55	18.33
09. Khorisisa Upper tola	6.23	354.2	142	0.43	5.38
10. Dipna	6.46	353.2	258	1.26	9.1
11. Kherbari	6.58	765	344	2.95	10.76
12.Salgatand Santhal tola	6.67	701.9	578	2.79	7.09
13. Titya tand	6.64	444.5	288	1.65	4.11
14.Dadughutu Pharpur Buru tola	6.56	420.4	392	0.57	4.73
15.Dadughutu Manji tola	6.7	461.7	450	0.09	2.86





