



### Short Communication

## Water Quality Monitoring of Groundwater Resources around Sugar Factory, Near East-West Champaran Border, Bihar, India

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### Abstract

Ground water is an essential and vital component of our life. It is used for drinking, irrigation and industrial purposes etc. but due to fast urbanization and industrialization, ground water resources are under stress. The present investigation has been carried out to know the ground water quality around sugar factory of East and West Champaran Bihar. The parameters monitors was within the permissible limits prescribed by WHO, USPHS and BIS.

**Key words:** Ground water, vital, East and West Champaran.

### Introduction

Water quality is of vital concern for mankind as it is directly related with human welfare. Groundwater is water that is found underground in the cracks and spaces in soil, sand and rock and its supplies are replenished, or recharged, by rain and snow melt. In some areas of the world, people face serious water shortages because groundwater is used faster than it is naturally replenished. In other areas groundwater is polluted by human activities.

Groundwater is used for drinking water by more than 50 percent of the world's population, including almost everyone who lives in rural areas. The largest use for groundwater is to irrigate crops. Hence, quality of ground water is very important. Generally it is polluted by anthropogenic sources (i.e. domestic waste, garbage, fertilizers and industrial waste) and acid rain. So it is necessary to monitor regularly to minimize the pollution.

The present investigation reveals the quality of ground water around sugar factory near Sagauli (E.Champaran) and Majhulia (W.Champaran). The location selected for investigation is due to the people residing around were totally depends upon Bore wells.

### Material and Methods

Ground water sample were collected from four different spots (S1, S2, S3 and S4) of two places around sugar factory near East-West Champaran, Bihar, India. The sampling spots are about 1 to 1.5 km from sugar factory. All the monitoring work has been carried out during September-2011 to February-2012 in the laboratory. The parameters pH, EC, TDS, hardness, DO, COD, free NH<sub>3</sub>, iron and chloride etc. were monitored. All these parameters were monitored by using standard methods and instruments available in the laboratory.

### Results and Discussion

All the data obtained in the investigation is given in table-1 (Sagauli- S1 and S2) and table-2 (Majhulia- S3 and S4).

**pH:** It indicates the contamination and acidification of water. pH at spot S1 and S2 were vary from 7.1 to 7.9 and at spot S3 and S4 it was also 7.1 to 7.9 but the months were different.

**EC:** Conductivity gives an idea of the total solids content of water. Its value ranges from 635 to 772 ppm at spot S1 and S2 while at S3 and S4 it was 672 to 775 ppm.

**TDS:** Total dissolved solids (TDS) are the total amount of moving charged particles dissolved in a given volume of water. High TDS results in undesirable taste which is salty, bitter or metallic. High TDS indicates hard water. Its value varied from 310 to 395 at spot S1 and S2 while at spot S3 and S4 was 315 to 361.

**Hardness:** Hardness indicates the concentration of Ca and Mg ions. Its value ranges from 252 to 305 at spot S1 and S2 while at spot S3 and S4 it was from 277 to 331.

**DO:** It is the amount of oxygen dissolved or carried in the water. Its value observed from 4.3 to 5.6 at spot S1 and S2 while from 4.8 to 5.3 at spot S3 and S4. Its value more than 6 indicates the water quality is good.

**COD:** It indicates the amount of organic pollutants in water. Its value was found that more than tolerance limits i.e. from 35 to 60 ppm at spot S1 and S2 while at spot S3 and S4 was from 36 to 62 ppm.

**Free NH<sub>3</sub>:** Its value was found less than 1 ppm at all spots. At spot S1 and S2 it was from 0.04 to 0.35 ppm while from 0.09 to 0.27 ppm at spot S3 and S4.

**Chloride:** Its concentration above normal values indicates pollution. At all spots its value was under permissible limit prescribed by WHO. Value observed at spot S1 and S2 was from 109 to 245 ppm while at spot S3 and S4 from 115 to 247 ppm.

**Iron:** Its value was also found less than 1 ppm at all spots. At spot S1 and S2 it was from 0.02 to 0.9 ppm while from 0.3 to 0.9 ppm at spot S3 and S4.

### Conclusion

All the parameters monitored was within the permissible limits except COD which was slightly higher than normal value prescribed by WHO, USPHS and BIS. The data obtained in this investigation was surprisingly not much polluted, even though the monitoring spots are within the 1km to 1.5km radius from the sugar factory. So the ground water of monitoring spot can be used for domestic and irrigation purposes.

### References

1. Ranjan Rakesh, Analysis of Abiotic Parameters of river Sikrahana, near Motihari, Bihar, India, *Asian J. Exp. Chem.*, **6(2)**, 93-95 (2011)
2. Vaishnav M.M. and Dewangan S., Assessment of water quality status in Reference to statistical parameters in different Aquifers of Balco Industrial Area, Korba, C.G. India, *Res. J.Chem.Sci.*, **1(9)**, 67-72 (2011)
3. Iwuoha G.N. and Osuji L.C., Changes in surface water physic-chemical parameters following the dredging of Otamiri of Nigeria, *Res. J.Chem.Sci.*, **2(3)**, 7-11 (2012)
4. Matini L., Tathy C. and Moutou J.M., Seasonal groundwater quality variation in Brazzaville, Congo, *Res. J.Chem.Sci.*, **2(1)**, 7-14 (2012)
5. Deshpande S.M. and Aher K.R., Evaluation of ground water quality and its suitability for drinking and agriculture use in parts of Vaijapur, District Aurangabad, MS, India, *Res. J.Chem.Sci.*, **2(1)**, 25-31 (2012)
6. Malik G.M., Joshi M.P., Zadaiya S.K. and Raval., Study on physico-chemical characterization of some lotic system of south Gujarat,India, *Res. J.Chem.Sci.*, **2(1)**, 83-85 (2012)
7. Sinha Madhu Rani et al, Physico chemical examination and quality assessment of ground water (Hand-Pump) around Patna main town, Bihar state, India, *J.Chem.Pharm. Res.*, **3(3)**,701-705 (2011)
8. Pandey Sandeep and Tiwari Sweta, Physico-chemical analysis of ground water of selected area of Ghazipur city-Acase study, *Nature and Science*, **7(1)**, 17-20 (2009)
9. Jinwal A. and Dixit A., Pre and post monsoon variation in physic-chemical characteristics in ground water quality in Bhopal, India, *Asian J. Exp.Sci.*, **22(3)**, 311-316 (2008)
10. Parikh Ankita N. and Mankodi P.C., Limnology of Sama Pond, Vadodara city, Gujrat, *Res. J. Recent Sci.*, **1(1)**, 16-21 (2012)
11. Patil Shila G., Chonde Sonal G., Jadhav Aasawari S. and Raut Prakash D., Impact of physic-chemical charecteristics of Shivaji University lake on phytoplankton communities, Kolhapur, India, *Res.J.Recent Sci.*, **1(1)**, 56-60 (2012)

Table-1  
Sagauli Spot (S1 and S2) Sep-2011 to Feb-2012

Months → Parameters↓		Sep	Oct	Nov	Dec	Jan	Feb
PH	S1	7.6	7.9	7.1	7.5	7.1	7.4
	S2	7.3	7.8	7.2	7.1	7.3	7.7
EC	S1	758	742	695	687	660	642
	S2	772	696	705	675	635	640
TDS	S1	315	323	395	310	345	357
	S2	362	351	380	333	325	345
Hardness	S1	295	301	287	276	262	261
	S2	305	300	297	260	252	262
DO	S1	5.2	4.9	5.3	4.9	5.3	5.1
	S2	5.6	4.3	5.1	4.7	4.9	5.0
COD	S1	35	52	60	55	63	71
	S2	42	40	45	60	47	58
Free NH <sub>3</sub>	S1	0.17	0.19	0.22	0.35	0.04	0.11
	S2	0.12	0.11	0.18	0.27	0.09	0.15
Iron	S1	0.5	0.5	0.9	0.4	0.3	0.6
	S2	0.6	0.8	0.7	0.3	0.5	0.2
Chloride	S1	235	231	245	125	117	109
	S2	240	205	195	137	125	111

Note: All data expressed in ppm except EC which is expressed in mm/cm

**Table-2**  
**Majhulia Spot (S3 and S4) Sep-2011 to Feb-2012**

Months → Parameters↓		Sep	Oct	Nov	Dec	Jan	Feb
<b>PH</b>	<b>S1</b>	7.8	7.5	7.3	7.5	7.2	7.6
	<b>S2</b>	7.4	7.7	7.4	7.9	7.1	7.3
<b>EC</b>	<b>S1</b>	772	761	720	695	702	680
	<b>S2</b>	775	730	745	710	695	672
<b>TDS</b>	<b>S1</b>	345	352	340	325	318	321
	<b>S2</b>	375	345	361	331	315	329
<b>Hardness</b>	<b>S1</b>	302	300	295	275	300	325
	<b>S2</b>	310	297	277	298	315	331
<b>DO</b>	<b>S1</b>	4.9	5.3	5.0	4.8	4.9	5.1
	<b>S2</b>	4.7	4.9	5.2	5.1	4.8	4.8
<b>COD</b>	<b>S1</b>	42	48	39	55	62	58
	<b>S2</b>	39	51	36	42	49	52
<b>Free NH<sub>3</sub></b>	<b>S1</b>	0.21	0.27	0.19	0.23	0.07	0.09
	<b>S2</b>	0.19	0.20	0.17	0.15	0.09	0.10
<b>Iron</b>	<b>S1</b>	0.7	0.7	0.9	0.3	0.5	0.6
	<b>S2</b>	0.8	0.5	0.7	0.5	0.4	0.7
<b>Chloride</b>	<b>S1</b>	247	232	227	205	124	115
	<b>S2</b>	236	207	178	198	126	121

Note: All data expressed in ppm except EC which is expressed in mm/cm