# Studying of physico chemical analysis of drinking water in Mushalpur sub division of Baksa District of Assam.

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**Abstract :**

The present study deals with the physico chemical analysis of drinking water quality in Mushalpur sub division of Baksa district, Assam. The physico chemical parameters such as PH, temperatures, TDS, Fe, $Cl^-$, $NO_3^-$, $F^-$, $SO_4^{2-}$ & Pb were collected from 7 sampling station. The parameter were analysed by standard and appropriate method. Each parameter were compared with the standard desirable limits of parameter in drinking water as recommended by WHO. Permited values were found to be executed for iron and sulphate.

**Index Terms :** Ground Water, Iron, Sulphate, Mushalpur sub division.

1. **Introduction :** The Baksa district is located between $26^0$25' north latitude and $26^0$48' north latitude and between $90^0$55' and $91^0$46' east longitude. The study area is mainly northern region of Mushalpur sub division surrounded by foot hills of Himalaya. It has a humid meso-thermal climate. Seasonal variations of rainfall are observed in the district. In every area of the district, the humidity is high and never drops below 75%. Water is mainly polluted due to anthropogenic activities and human activities in domestic life. Fertilizers and pesticides, processing waste and animal waste etc are constantly added to water. The socio- economic condition of people in this area are not well. The people chiefly use ground water for drinking purpose. Both tube well and ring well are used by the people. The seven important places were selected for study namely, Subankhata, Nikashi, Hastinapur, Nayabasti, Dihira, Moithabari and Uttarkuchi . There was no major industry in the study area.

2. **Review of related work :**

Deka, P.K., and Sarma, C. (2006) have studied the physico and chemical parameters of some groundwater sources in the Bajali area, Barpeta district. They found that the pH of water samples is alkaline in most cases. The mean value was 8.2, which prescribes the desirable limits of the pH range of drinking water by WHO (1984). The mean value of arsenic in groundwater in the Bajali area is 0.02 ppm, within the prescribed desirable limits by the WHO. Deka, D.K., and Talukdar, S. Dept. of Env. Science, Gauhati University (2008) studied drinking water quality characteristics in and around Nalbari town, Assam. They analyzed 10 water samples from different locations and showed the different parameter results as follows: pH is higher in the monsoon season than in the winter season. The iron content of water samples ranges from 0.33 mg/L to 1.18 mg/L in winter and 0.23 mg/L to 0.98 mg/L in monsoon season. Fluoride ranges are 1.31 mg/L to 2.4 mg/L in the winter period and 1.01 mg/L to 2.2 mg/L in the monsoon season.

3. **Materials & Methods :**

The water samples were collected in pre cleaned polythene container of five liter capacity. The container in all cases were filled with air or to prevent agitation during transport. Water samples were collected from tube wells and ring wells. The water samples of Subankhata, Uttarkuchi and Moithabari were tube wells. The rest of the water samples were collected from ring wells. The parameters namely temperature, PH and TDS were determined immediately after collection of samples. The chemical parameters were analysed in the laboratory by standard and appropriate methods.

Table : 1 (Showing physico-chemical Parameters analysed during winter session in 2014)

| Sl. No. | Sampling Site | Source | Temperature t°C | PH | TDS | Fe Mg/l | $F^-$ Mg/l | $Cl^-$ Mg/l | $NO_3^-$ Mg/l | $SO_4^{2-}$ Mg/l | Pb Mg/l |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Subankhata | Deep Tube Well | 19 | 6.5 | 213.4 | 1.30 | 0.40 | 1.2 | 1.5 | 180 | .004 |
| 2 | Nikashi | Ring Well | 20 | 6.6 | 147 | .32 | .03 | 09 | 1.1 | 336 | .012 |
| 3 | Hastinapur | Ring Well | 20 | 6.8 | 143.25 | .36 | .01 | 06 | 1.4 | 334 | .021 |
| 4 | Dihira | Ring Well | 18.5 | 6.8 | 151.3 | .31 | .02 | 05 | 1.3 | 325 | .020 |
| 5 | Nayabasti | Ring Well | 19 | 6.7 | 187 | .24 | .034 | 04 | 1.6 | 214 | NIL |
| 6 | Uttarkuchi | Tube Well | 20 | 6.9 | 132.4 | .26 | .05 | 02 | 1.2 | 156 | NIL |
| 7 | Moithabari | Tube Well | 20 | 6.8 | 156.3 | .25 | .03 | 1.1 | 1.1 | 186 | NIL |

Table : 2 (Showing physico-chemical Parameters analysed during the Post Monsoon session in 2014)

| Sl. No. | Sampling Site | Source | Temperature t°C | PH | TDS | Fe Mg/l | $F^-$ Mg/l | $Cl^-$ Mg/l | $NO_3^-$ Mg/l | $SO_4^{2-}$ Mg/l | Pb Mg/l |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Subankhata | Deep Tube Well | 29 | 6.4 | 238 | 1.37 | .45 | 1.7 | 1.93 | 197 | .005 |
| 2 | Nikashi | Ring Well | 30.6 | 6.5 | 156.8 | .36 | .30 | 10.4 | 1.74 | 344 | .016 |
| 3 | Hastinapur | Ring Well | 30 | 6.5 | 158.3 | .39 | .02 | 10.9 | 1.7 | 342 | .0216 |
| 4 | Dihira | Ring Well | 30.5 | 6.6 | 156.2 | .32 | .04 | 9.56 | 1.69 | 349 | .018 |
| 5 | Nayabasti | Ring Well | 30 | 6.7 | 165.4 | .28 | .025 | 06 | 1.58 | 331 | Nil |
| 6 | Uttarkuchi | Tube Well | 30.5 | 6.8 | 135 | .24 | .012 | 04 | 1.54 | 184 | Nil |
| 7 | Moithabari | Tube Well | 31 | 6.8 | 154 | .26 | .024 | 8.4 | 1.34 | 183 | Nil |

Result and Discussions :

1. Temperature : The temperature lies between $18.5^0$ C -$31^0$Cduring the two session of the water samples.
2. PH : The PH values varies widely but were mostly within acceptable range. The PH values lies between 6.4 – 6.9 during two season of the water samples.
3. TDS : The value of TDS of the water samples lies between 132.40 mg/l – 238 mg/l during the two season of the water samples. The values of TDS of water samples were below prescribed limits given by WHO.
4. Fluoride : The range of $F^-$ concentration of water samples lies between .01 mg/l to 0.45 mg/l . The fluoride concentration is below the permissible limits set by the WHO for all the water samples.
5. Iron : The iron concentration of most of the water samples exceeded WHO guidelines of drinking water. The values of iron concentration lies between 0.21mg/l to 1.37 mg/l during two season. The sample of Subankhata recorded 1.37 mg/l of iron (especially high concentration) amongst the water samples.
6. Sulphate : The sulphate concentration of water samples is in the range of 156 mg/l to 349 mg/l during the two season. Most of the water samples exceeds the highest desirable limits of 200 mg/l sulphate recommended by ICMR (205)
7. Chloride : The $Cl^-$ concentration of the water samples lies between 1.1 mg/l to 10.9 mg/l during two season. The values do not exceed the WHO guidelines value of 250 mg/l.
8. Nitrate : The nitrate concentration of water sample lies between 1.1 mg/l to 1.93 mg/l during two season. The values are within the prescribed limits of WHO.
9. Lead : The lead concentration of seven water samples lies between Nil to .0216 mg/l during two season. The lead concentration of water samples were within acceptable limits prescribed by WHO.

**Conclusion :** From the present study, it can be concluded that the area is mainly Iron and Sulphate Prone Zone. The concentration of both Iron and Sulphate in the study area as high as the desirable limits prescribed by the WHO.

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