# Quality of drinking water in relation to human health in Dabra municipal areas (Gwalior, M.P.)

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## ABSTRACT

Water is a primary need of human being and animals. Now days underground water has become the main source of drinking water supply in almost all villages and town and in number of cities.18 ground water samples collected from Dabra municipal areas were analysed for 10 parameters such as pH ,Total alkalinity, Total hardness,$Mg^{2+}$,$Ca^{2+}$,$Na^+$, $K^+$ $Cl^-$, E.C.,T.D.S . In the present investigation Sodium chloride,E.C..,and T.D.S. are very high concentration in Dabra Muncipal areas. Most of them peoples suffering from various diseases such as mainly digestive problems.

**Key words:** pH, Total alkality, Total hardness, $Mg^{2+}$, $Ca^{2+}$, $Na^+$, $K^+$ $Cl^-$, E.C., T.D.S.

## INTRODUCTION

Water is an important ecological factor in the life of organism. It is found in three principal forms atmospheric moisture, precipitation and soil water, of which precipitation is the the chief source. Atmospheric moisture is present as invisible vapour, Known as the humidity and also as visible vapour known as fog or cloud. Precipitation is actually the chief source of soil moisture. Soil moisture is the chief sources of water for plants .Water relation of plants bring about in them many physiological responses by affecting seed germination, water uptake, transpiration, translocation and some biochemical process.

Freshwater habitats occupy a relatively small portion of earth's surface as compared to marine and terrestrial habitats. But freshwater habitats are of much importance to mankind such habitats are of two general types lentic and lotic in most developing countries as ours, most of the underground sources of drinking water, especially in outskirts of larger cities and villages are polluted.

Ground water seepage pits, refuse dumps, septic tanks barnyard manures, transport accidents and different pollutants. Important sources of ground water pollution are sewage and other waste otherwise. Raw sewage is dumped in shallow seakpits .This gives birth to cholera, hepatitis, dysentery etc. The present study deals with the investigation of ground water quality of sample collected from different areas of Dabra Municipal areas (Gwalior, M.P.)

## MATERIAL AND METHODS

The samples were collected during the month December 2006. Samples for analysis were collected in sterilized bottles (plastic with acid washed). pH -systronic pH meter Type 361 Total Alkality of the ground water samples were determined by titrating With N/50 $H_2SO_4$ using phenolphthalein and methyl orange as an indicator. The total hardness of the water samples were determined by complexometric titration with EDTA using eriochrome black-T as an indicator. Calcium-EDTA titrimetric, Magnesium-Calculation from total

hardness and calcium method Chloride-Argentometric titration, Sodium and potassium - flame photometer (128) technique.

### RESULTS AND DISCUSSION

The pH of the water body indicates the degree of deterioration of water quality[1]. The desirable pH range necessary for drinking water is from 7.0 to 8.5. The pH value of water sample in the study area ranged from 7.6 to 8.8. This shows that the pH of water sample was observed to be slightly alkaline. The desirable limit for total alkalinity is 200mg/L. The value of ground water samples were varied from 156 mg/L to 570 mg/L The desirable limit for Total hardness in drinking water according to I.S.I. and ICMR is 300mg/L. Its values in Ground-water samples varied from 195 mg/L to 555 mg/L. The drinking water

**Table - 1:**

| S.No. | Location | pH | T.A. | T.H. | $Mg^{++}$ | $Ca^{++}$ | $Na^+$ | $K^+$ | $Cl^-$ | E.C. | T.D.S. |
|-------|----------|-----|------|------|------|------|-------|-------|---------|------|--------|
| 1 | $A_1$(H) | 7.7 | 365 | 375 | 60.8 | 50 | 162.5 | 2.3 | 241.4 | 1456 | 914 |
| 2 | $A_2$(H) | 8.3 | 465 | 390 | 57.1 | 62 | 263.8 | 3.1 | 340.8 | 1926 | 1233 |
| 3 | $A_3$(H) | 8.8 | 570 | 510 | 25.5 | 162 | 523.2 | 3.5 | 741.9 | 3294 | 2108 |
| 4 | $A_4$(H) | 8.3 | 445 | 360 | 46.2 | 68 | 274.8 | 2.5 | 347.9 | 1914 | 1225 |
| 5 | $A_5$(H) | 8.1 | 380 | 390 | 41.3 | 88 | 314.6 | 4.4 | 472.1 | 2147 | 1347 |
| 6 | $A_6$(H) | 7.9 | 270 | 195 | 12.1 | 38 | 435.9 | 1.9 | 624.8 | 2363 | 1512 |
| 7 | $A_7$(H) | 7.9 | 370 | 400 | 49.8 | 78 | 724.1 | 4.8 | 1111.1 | 3948 | 2526 |
| 8 | $A_8$(H) | 7.6 | 195 | 200 | 23.1 | 42 | 268.5 | 3.7 | 397.6 | 1565 | 1001 |
| 9 | $A_9$(H) | 8.1 | 310 | 260 | 36.4 | 44 | 195.4 | 3.0 | 252.05 | 1370 | 877 |
| 10 | $A_{10}$(H) | 8.3 | 465 | 330 | 52.2 | 46 | 399.4 | 2.9 | 504.1 | 2396 | 1533 |
| 11 | $A_{11}$(H) | 8.1 | 335 | 340 | 47.4 | 58 | 210.7 | 3.5 | 294.65 | 1596 | 1021. |
| 12 | $A_{12}$(H) | 8.2 | 445 | 400 | 44.9 | 86 | 466.8 | 3.0 | 667.4 | 2820 | 1805 |
| 13 | $A_{13}$(H) | 8.6 | 510 | 370 | 51.0 | 64 | 528.5 | 3.3 | 695.8 | 3037 | 1943 |
| 14 | $A_{14}$(H) | 7.9 | 260 | 280 | 36.4 | 52 | 319.0 | 3.8 | 489.9 | 1974 | 1246 |
| 15 | $A_{15}$(H) | 8.2 | 435 | 420 | 48.6 | 88 | 455.1 | 4.2 | 670.95 | 2818 | 1803. |
| 16 | $A_{16}$(H) | 8.9 | 555 | 545 | 60.8 | 118 | 440.7 | 3.8 | 659.94 | 3006 | 1924 |
| 17 | $A_{17}$(H) | 8.7 | 550 | 540 | 81.4 | 82 | 441.83 | 3.6 | 663.85 | 3001 | 1921 |
| 18 | $A_{18}$(H) | 8.0 | 355 | 210 | 12.1 | 64 | 301.4 | 126.4 | 461.50 | 2054 | 1314 |

T.A. = total alkalinity,
T.H. = total hardness,
H=Hand pump
$A_1$ = Shubhashganj,
$A_2$=Krishanpura,
$A_3$=Usha colony
$A_4$=Dabra bus stand,
$A_5$=Kamleshawer colony,
$A_6$=Pichore tiraha,
$A_7$=Railway station,
$A_8$=Chinor road,

$A_9$= Sugar mil,
$A_{10}$=Shivcolony,
$A_{11}$=Jawahar colony,
$A_{12}$=Shickchak colony,
$A_{13}$=Bujurg road,
$A_{14}$=Thakur baba road,
$A_{15}$=Sarafa bazar,
$A_{16}$=Gaumatipura,
$A_{17}$=Ramgarh,
$A_{18}$=Bhimnagar

containing high magnesium contents may be cathartic and diuretic [2,3]. Magnesium values varied between 12.1 mg/L to 81.1 mg/L. WHO permissible limit of calcium in the ground water is 100 ppm[3]. In the present investigation calcium content ranged from 37 mg/L to 165 mg/L. Ground water pollution by sodium salt is an unavoidable phenomenon caused form the return flow of irrigation and disposal of industrial and urban wastes. In large concentration it may affect a person with cardiac diffencies[3] [6,8]. Sodium values in groundwater samples varied from 163.15mg/L to 720.31mg/L. Potassium is an essential nutrient for plants Potassium values in ground water samples varied from 2.0 mg/L to126.4 mg/L Water containing 250mg chloride per liter may have a detectable salty taste. The minimum chloride ( 241.4)content was observed at $A_1$ and the maximum values(1111.1 ) was obtained at $A_7$. The chloride is troublesome in irrigation water and harmful for aquatic life. Total dissolved solids are an important parameter for drinking water and water to use for other purposes. The permissible limit of TDS suitable[3,7,8,] for drinking is 500 mg/L (W.H.O.) TDS concentration more than 1500 mg/L may causes gastrointestinal irritation.The total dissolved solids values of water sample in the study area ranged from 876 mg/L to 2525 mg/L. In the present investigation Sodium chloride, E.C., and T.D.S. are very high concentration in Dabra Muncipal areas. Most of them peoples suffering from various diseases such as mainly digestive problems. Dabra municipal areas ground water are not suitable for drinking purpose.

All the value are expressed in mg/L except pH, electrical conductivity Electrical conductivity is expressed in micromhos/cm at $25^0$C

## CONCLUSION

In the present investigation Sodium chloride, E.C. and T.D.S. are very high concentration in Dabra Municipal area, Most of the people suffering from various diseases, mainly digestive problems. Dabra municipal area ground water are not suitable for drinking purposes.

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