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# Physico - Chemical Analysis of Ground Water at Mahoba city (U.P.) India

Rani Sonkar
*Department of Zoology, Vipin Bihari P.G. College, Jhansi*

***Abstract: The availability and potability of drinking water is a great stress to entire world drinking water is the Basic need for the human life. It is important to all living being, analysis of physical chemical factors viz colors', odour, taste, turbidity, PH, total hardness, total alkalinity, total dissolved solids, dissolved oxygen. Cl, fluoride, SO4, ground water (tube well water) were determined in summer season 2015. Sample taken from six stations in the entire city the safely of drinking water is important for the health. The result shows that the ground water from some sampling stations is with in permissible limit according to WHO and ISI standards.***
***Key words- isi, who, Drinking water, potability***

## I. INTRODUCTION

Ground water is about 20% of the world resource of fresh water and widely used by industry, irrigation and domestic purpose. Only about 1% of all of fresh water available from river, pond and lakes. Ground water is also polluted by domestic waste, industrial waste, fertilizer and ultimate and most suitable fresh water resource for human consumption in both urban as well as rural areas. The important of ground water for existence of human society can not be overemphasized. There are several states in India where more than 90% populations are dependent on ground water for drinking and other purpose. Safe drinking water is important as a health and development issue a national, regional and local level. In Some regions it has been shown the investments in water supply and sanitation can yield a net economic benefit since the reduction in adverse health effects and health cure cost out with the costs of under taking the interventions. The contaminated drinking water is hazardous for human being. It may be fatal also. The untreated water cause defects nervous system, organ damage, reproduction effects and cancer like fatal diseases. According to the control pollution board (2000) 90% of the water supplied in Indian towns and cities are polluted out of which only 1.6 gets treated. In Uttar Pradesh the total area is approximately 165 million hectare but lentic water is approximately 0.162% in rural ponds 0.133% in lakes and reservoirs contain 1.50% but the Bundelkhand region is facing great crises of drinking water and with contamination.

In spite of it the drinking water quality assessment has not yet been done in Chitrakoot Dham Division, in the region especially the district Mahoba is facing great shortage of drinking water. It is not located on the river bank so drinking water for the city is supplied by the pond Madan Sagar, some tube well. Mahoba city is located in between latitude 25 degree 15' N to 25 Degree 18'N and longitude 49 degree 50'E to 79 degree 54'E at average altitude of 207 Mahoba mean sea level. It is situated in the rocky vindhya range of Bundelkhand which faces acute scarcity of drinking water in summer. The drinking water supply in Mahoba city is pond Madan Sagar and tube wells ground water supply. The water supply pipeline scheme of Mahoba City was executed during to year 1959-60 and commissioned in the year 1963 the water in supply system is treated with chlorine and also filtered as per the water work norms. Besides shortage of water in this area Drinking water is also contaminated which causes various water born disease viz-Diarrhea, Cholera, Typhoid, Hepatitis, Colic dysentery etc. As no Physico-chemical factor to assess the drinking water quality and proper measures are to be adopted for the suitable quality of water in distribution system, so this important work was carried out scientifically to find out the pollution problems along with the suggestion for proper management on the drinking water. In the present study at Mahoba City (U.P.).

Table 1. Description of water sampling sites

| Sample No | Location | Source |
|---|---|---|
| $S_1$ | Charkhari Baipass | Ground Water |
| $S_2$ | Bhatipura | Ground Water |
| $S_3$ | Subhash Nagar | Ground Water |
| $S_4$ | Ramleela Maidan | Ground Water |
| $S_5$ | Bajaria | Ground Water |
| $S_6$ | Navnirmit Charkhari | Ground Water |


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Table-2. Physico-chemical parameters Summer Season-2015

| Sample No | Taste | Odour | Colour | Turbidity (NTU) | PH | TDS (mg/l) | T.H. (mg/l) | T.A. (mg/l) | Cl(mg/l) | D.O(mg/l) | FL(mg/l) | $SO_4$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $S_1$ | Satisfactory | Odour-less | Colour-less | 1.9 | 7.9 | 786 | 512 | 306 | 106 | 6.5 | 0.6 | 32.17 |
| $S_2$ | Satisfactory | Odour-less | Slightly yellowish | 1.6 | 7.4 | 850 | 635 | 345 | 128 | 6.8 | 0.8 | 27.16 |
| $S_3$ | Satisfactory | Odour-less | Colour-less | 1.5 | 8.3 | 676 | 304 | 130 | 75 | 606 | 0.7 | 24.26 |
| $S_4$ | Slightly Brackish | Odour-less | Slightly yellowish | 2.4 | 8.7 | 910 | 612 | 408 | 142 | 5.9 | 0.9 | 29.38 |
| $S_5$ | Satisfactory | Odour-less | Colour-less | 2.0 | 8.0 | 630 | 311 | 198 | 90 | 6.5 | 0.3 | 23.00 |
| $S_6$ | satisfactory | Odour-less | Colour-less | 2.1 | 7.5 | 615 | 275 | 210 | 105 | 6.1 | 0.5 | 22.00 |

## II. MATERIAL AND METHODS

Total six water samples were collected in summer season 2015, from different stations (Charkhari baipass, Bhatipura, Subhash Nagar, Ram leela Maidan, Bajaria, Navnirmit Charkhari Baipass) in Mahoba city (Table-1) all the samples were collected in sterilized bottles D.O. bottles and were stored at $4^0$ C till further investigation, samples were collected from the sites in between 9.30- 11.00 am, Physico chemical analysis of water samples were carried out using standard methods APHA (Trivedy and Goel 1980). Physico–chemical factors colour, Turbidity Taste, odour, PH, total hardness, Total dissolved solids, chloride and D.O. Fluoride, and total alkalinity were analyzed as per the methods given in APHA (2005).



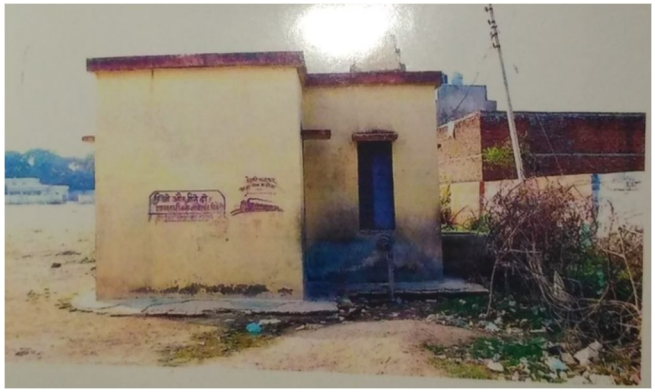
$S_1$- Charkhari Baipass



$S_2$- Bhatipura



$S_3$- Subhash Nagar

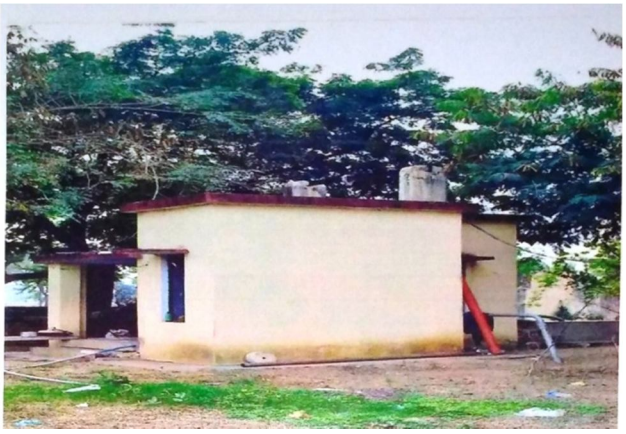


S4- Ramleela Maidan



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$S_5$ –Bajariya



$S_6$ –Navnirmit Charkhari Baipass

## III. RESULT AND DISCUSSION

The Examined Physico-chemical factors showed considerable Variations in different samples.

*A. Taste*

It was found satisfactory in the tube well A.C.E.F. $S_1$, $S_2$, $S_3$, $S_5$, $S_6$ in summer reason, brackish in taste was found in stations. The cause of it is that discharge collect which thought percolation change the said taste.

*B. Odour*

Odourless water was found in all station in summer reason. The cause is the leaching organic materials and chemical near water resources. The odors in water are rejection able for drinking whereas odourless water is potable.

*C. Colour*

Drinking water should ideally have no visible colour. The colour of ground water was found colour less in $S_1$, $S_3$, $S_5$, $S_6$ in summer seasons whereas slightly yellowish colour was in $S_2$, $S_4$ stations during both the due to soil strata nature.

*D. Turbidity*

The turbidity in water reduces transparency due to the presence of particular matter viz clay and silt. The turbidity caused by silt on mud beyond a limit is harmful. In the present study turbidity was observed 1.5 NTU to 2.4 NTU. PH- The effect of PH on the chemical and biological nature of water makes for determinations is very important. It is defined as log ($H^+$) and measured as intensity of acidity or alkalinity on a scale ranging from 0.14 the free H+ are more it is expressed acidic i.e. (PH > P) while more $OH^+$ ions is expressed as alkaline (i.e. PH < 7) PH value of ground water ranged from 7.0 to 8.7. The acidic medium of water in quite harmful whereas alkaline is medium above 7 to 9.5 is suitable for fish and fish culture and other biota.

*E. Total hardness*

This is caused by the presence of multivalent metallic cat ions and mainly due to $Ca^+$ and mg++ ions. Hardness is reported in terms of ca, mg carbonates. It is an important Parameter in decreasing the toxic effect during the present study it was found to be in the range of 476 to 550.

600 mg/l to total hardness has been prescribed limit for drinking water by limit for drinking water by IC MR 1975, BIS 1992, WHO 1984 has recommended 500 mg/l of total hardness as maximum permissible limit for drinking water.

*F. T.d.s*

Total dissolved solids depends on waste water In natural water dissolved solids are composed of organic and inorganic components as carbonates bicarbonates phosphates ca, mg etc. BIS has prescribed limit 500 mg/l for dissolved solids in potable water. The T.D.S of all the samples stations were range of 6.77 to 916 mg/l.



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*G. Chloride*

Chloride is one of the most constant components of water high chloride content has deleterious effect on metallic pipes chloride was found to be in range of 126 to180 mg/l BIS has set desirable limit of chloride to be 250 mg/l for drinking water.

*H. D.O*

Dissolved oxygen (D.O) range from 6.5 to 8.9 mg/l. D.O. is very important factor in drinking water for consumption well as for aquatic biota.

*I. Fluoride*

It is high concentration causes dental fluorosis and lower concentration (<08 mg/l) causes dental carries, sources of fluoride are found in coke, glass and ceramic, electronic, pesticide and fertilizer, fluoride of all the samples were in range 0.01 to 1.2 mg/l

*J. $SO_4$*

The main sources of sulphate are rocks, domestic, sewage and detergents its increased value also depends upon more percolation of water during rains. Sulfate occur naturally in numerous minerals and are used commercially principally in the chemical industries Mahoba City in the range of sulphate 25.06 to 29.10 mg/l. No health based guideline is proposed for sulphate BIS has set the limit of sulphate in drinking water to be 200 mg/l. whereas its permissible limit is 400 mg/l the absence of any other alterative source.

*K. T.A*

The alkalinity in the water is generally imported by the salt of carbonates, Bicarbonates, phosphate nitrate, silicates etc together with hydroxyl ions in free states. High alkalinity rich water can cause. It varied from 226.28 to 304.75 mg/l

## IV. CONCLUSION

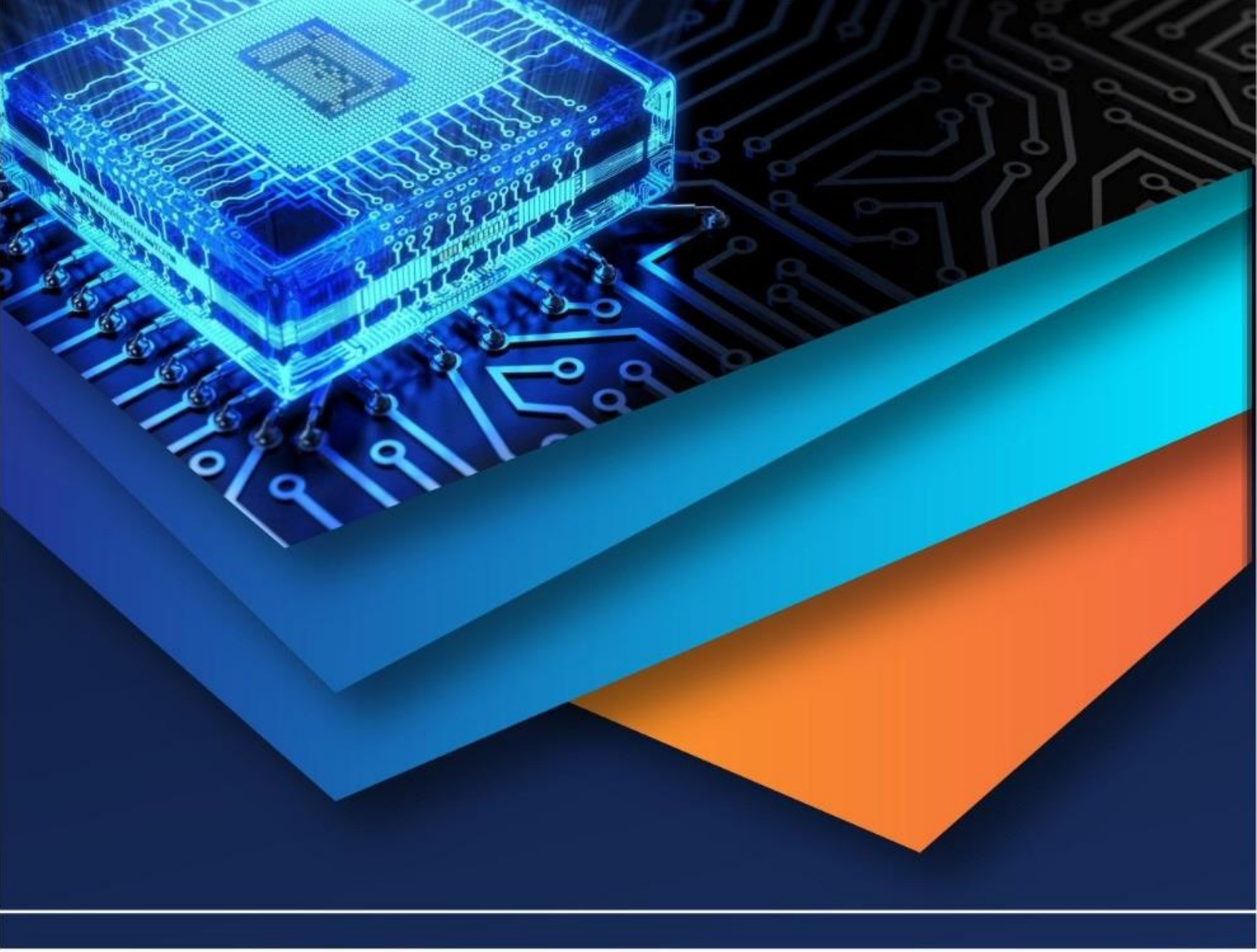
The physico chemical factors studies are within the permissible limit as per WHO and BIS. Norms for drinking purposes in the studies period. The finding of the present study is also recommended ground water is suitable for irrigation and domestic use. Some tube wells in study are unfit for drinking as well other domestic purpose.

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