

# PHYSICO-CHEMICAL STATUS OF VARIOUS BORE WELL WATER FROM AKHADA BALAPUR DISTRICT HINGOLI MAHARASHRTA - INDIA

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**Abstract :** In the present investigation the work is carried out to study Physico-Chemical Status of Various Bore Well Water from Akhada Balapur Hingoli District Maharashtra – India. Physico-Chemical parameters were studied and analyzed in the month of October 2019. To assess the quality of ground water, the parameters were compared with standard desirable limits of that parameter in drinking water. The various parameters like pH, O<sub>2</sub>, CO<sub>2</sub>, Chlorides, TDS etc.

**Key words:-** Physico- chemical, Bore well, pH, O<sub>2</sub>, CO<sub>2</sub>, Chlorides etc.

## I. INTRODUCTION

The word “Marathwada” has been used since the time of the Nizam. Hingoli district lies to the west of the Vidarbha and east of Khandesh region of Maharashtra. Marathwada is frequently affected by drought condition. There are seven districts in the Marathwada region. Hingoli district is situated at the northern part of Marathwada in Maharashtra. Borders of Hingoli are surrounded by Akola and Yeotmal in northern side, Parbhani in western side and Nanded at South-Eastern side. The district came into existence by division of Parbhani district on 1<sup>st</sup> May, 1999. In Akhada Balapur Bore well water is the source of drinking water for human and cattle. Water is the fundamental need for living things on earth which is the nature’s free gift and available in abundant. The water is the basic need for the existence of all life. The Greek philosopher Pinder said that “Water is the best of all things”. Water is the essential requirement of all life. (Bhawankar A. S. et al, 2011) which man has exploited more than any other resources for the sustenance of life. It is essential for life, health, sanitation as well as for manufacturing of essential commodities. The health problems are more because of poor quality of water. It is estimated that approximately 38 million Indians are affected by waterborne diseases yearly. Nearly 1.5 million children are estimated to die because of diarrhea alone 73 million working days are lost due to waterborne diseases each year. The resulting economic loss is estimated around \$600 million each year. The problems of chemical contamination is also more in India with 195813 habitations in the country are affected by poor water quality. The water contamination for health is due to fluoride, arsenic. Iron is also creating a major problem with many habitations showing excess iron in the water samples.

## II. MATERIAL AND METHODS

In the present study, the six sampling stations were selected, the six sampling stations were selected from Akhada Balapur region. The good quality polythene bottles were selected for the collection of water samples during the month of October 2019. During the collection of water samples no any preservatives were added. Only rinsed bottles directly used to prevent any type of contaminations.

**Table 1: Shows the :- Physico- chemical parameters of bore well water**

Samples cite	TDS (mg/lit)	E.C. $\mu\sigma$	CO <sub>2</sub> (mg/lit)	DO (mg/lit)	pH	Chlorides (mg/lit)
S1	0.7	1.741	12.44	2.38	6.98	54
S2	0.7	1.942	12.41	2.48	7.81	192
S3	1.4	1.742	11.21	1.71	7.86	42
S4	0.6	1.877	11.13	4.21	7.20	142
S5	0.8	1.649	10.1	1.74	7.80	99
S6	0.6	1.740	10.2	4.19	6.95	53

The representative ground water samples were collected from Dutt Nagar(S1), Devi Galli(S2), Madhav Nagar(S3), Sai Nagar(S4), Jetvan Nagar(S5) and Hanuman Nagar(S6). These stations are analysed for different physico-chemical parameters by using standard methods APHA (1998), Trivedi and Golel (1981), IAAB(1998).

## III. RESULT AND DISCUSSION

**Total Dissolved Solids (TDS) :-** The high content of total dissolved solids increases the density of water, influences osmotic regulation of water for drinking, irrigational and industrial purposes. Total dissolved solids in the six sampling stations ranges from 0.6 mg to 1.4 mg. The TDS value is low in Sai Nagar (S4) water samples and highest in Madhav Nagar (S3) water (Delphine Rose et al 2005).

**Electrical Conductivity (EC) :-** Electrical conductivity ranges from 1.740  $\mu\sigma$  to 1.942  $\mu\sigma$ . The electrical conductivity is less in three bore wells i.e. Dutt Nagar (S1), Madhav Nagar (S3), Jetvan Nagar (S5) and Hanuman Nagar (S6) and high in Devi Galli (S2), Sai Nagar (S4) water samples. (Pondhe, et al. 2008)

**Free Carbon Dioxide (CO<sub>2</sub>) :-** Carbon dioxide in water is mainly due to diffusion of air from inflow ground water. Surface water normally contains less than 10 mg free carbon dioxide per liter while some ground water may easily exceeds that conc. APHA (1998) in this investigation CO<sub>2</sub> varies from 10.1 to 12.44 mg/lit (Karadkhele S. V. et. al.2008)

**Dissolved Oxygen (DO):-** Concentration of dissolved oxygen in water is important factor, it indicates ability to support to the life of living things. In the present study the DO level fluctuated between 1.71 mg/lit to 4.21 mg/lit. The sample S3 and S5 are minimum and sample S4 and sample S6 was maximum dissolved oxygen ( Madhuri Pejaver and Minakshi Gurav 2003).

**pH:-** It is very important ecological factor and which provides information in many type of geochemical equilibrium or solubility calculations. Measurement of hydrogen ion concentrations which is represented as pH . pH is nothing but hydrogen ion concentration or hydrogen ion activity. In this investigation the pH value ranged between 6.95 to 7.86. Minimum pH value in sample 6. The pH values shows slightly alkaline trend. The pH values observed meets the quality of water required for drinking purposes. (Ingole et. al., 2009)

**Chloride:-** Chlorides in all natural waters in widely varying concentrations. The chloride content normally increases as the mineral content increases. Upland and mountain supplies usually are quite low chlorides, whereas river and ground water usually have considerable amount. The presence of chlorides in natural water can be attributed to dissolution of salt deposits, discharges of effluents from chemical industries, oil well operations, sewage discharges, and irrigation drainage. Each of these sources may result in local contamination of both surface water and ground water.

Potable water may contain small amount of chlorides without any harmful effects .Concentration of chloride ions in excess of 250mg/lit as sodium chloride imparts a salty taste to water. But when potassium or magnesium are associated with chlorides considered to be an indicator of pollution due to organic wastes of animal origin. High chloride content streams a deleterious effect to metallic pipes and structures as well as on agricultural plants. Magnesium chloride causes corrosion in boilers. It is the important factor to detect the contamination of water by waste water .The permissible limit of chloride in drinking water is 250mg/lit. Chloride in the form of Cl<sup>-</sup> ion is one of the major inorganic anions in water. In potable water, the salty taste produced by chloride concentration is variable and dependent on the chemical composition of water. In this investigation chloride ranges between 54mg/lit to 192 mg/lit. Minimum chloride was traced in sample 1 and maximum in sample 2 (Jeyaseeli et. al. 2007).

#### IV. CONCLUSION

The analysis of ground water quality parameters of groundwater from 6 different sites at Akhada Balapur in Hingoli District , Maharashtra shows that the pH, dissolved solids , chlorides, oxygen , carbon dioxide are well in permissible limits during the study period of month October 2019.

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