



## ASSESSMENT OF GROUND WATER QUALITY OF PATNA, BIHAR

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Assessment of Physico- chemical characteristics of ground water of Patna has been carried out during the year 2010-2011. Patna is the capital of Bihar. Patna which is the cultural, administrative and educational head quarter of Bihar. It is situated on the bank of river Ganga even though most of the people fulfil their need of water from ground water. The physico- chemical characteristics such as Temperature, Conductivity, Total dissolved solids, Turbidity, pH, Dissolved Oxygen, B.O.D. Chlorides were studied. The values of Conductivity, Total dissolved solids and chlorides were below the permissible limits.

**KEY WORDS:** Ground Water, Patna . Physico- chemical characteristics.

**INTRODUCTION**

Ground water is a most precious natural resources for several vital function such as for public industrial and agriculture were supply. It is the surface water that seeps into the ground. The water seeps down through the fine gaps between the sand particles displacing the air until it find its level . The ground water acts as a reservoir by virtue of large pores spaces in earth materials. It is stored in karstic fissured an porous aquifers. It provides drinking water to most a third of the population and irrigates the Crop land.

Due to the increased demand of water the ground water is excessively exploited. The ground water is used for domestic, industrial and agricultural purposes, which add contaminants to the ground water reservoirs. Now a days, the increasing effects of pollution on and exploitation of ground water have become a serious threat. Therefore it is essential to study the quality of groundwater . Many workers such as Dhembare and Pandhe(1998), Kataria(2000), Adak and Purohit(2001), Kumari Sunita & Jha (2008) have been carried exhaustive study on ground water quality.

The present investigation was undertaken to study the Physico-Chemical Characteristics of ground water from Patna town during the year 2010-2011. Patna is the capital of Bihar. It is situated on the bank of Ganga river, even though most of the people fulfill their need of water from groundwater. The characteristics such as Temperature, Total Dissolved Solids, Conductivity, Turbidity, pH, Dissolved Oxygen, B.O.D. and Chlorides were studied.

**MATERIAL AND METHODS**

For the purpose of study of ground water quality the samples were collected during October 2010 –September 2011. from five sampling stations namely: 1. Kankarbagh near P.C.College colony 2. Rajendra Nagar near Railway

station 3. Chitkohra Bazar 4. Dherachak Anisabad near Hajari Roy 5. Hanuman nagar near Budha Dental college. The samples were collected in thoroughly cleaned polythene bottles ensuring proper preservation as per the Standard Methods (APHA 1998). Various physico-chemical & biological parameters were analysed according to the laboratory standards methods (APHA 1998.)

**RESULTS & DISCUSSION**

The variation in physico-chemical characteristics of ground water are given in the table no-1. Water temperature is the most important factor of water which affects the chemical and biological reactions in water.

The **Temperature** was found to be in the range between 24.8 to 28.6 C. The lowest temperature was observed at site II Rajendra nagar near Railway station and highest temperature was recorded at site V Hanuman nagar near Budha Dental college.

WHO (1998) and ISI (1991) permissible limit for **pH** is 6.5 to 8.5. The value of pH ranged from 7.16 to 8.25. The pH value were within the drinking water standards. It shows slightly alkaline trend. Simillar results were observed by Dhembare et al (2002). The maximum pH value may be due to the buffering capacity of water and geology of catchment area ( Rashid 1982 ).

**Dissolved Oxygen** is an index of physical and biological processes going on in water. The dissolved oxygen was ranged from 3.08 to 4.28 mg/l. The lowest value was observed at site V Hanuman nagar near Budha Dental college and highest value was recorded at site II Rajendra nagar near Railway station .

According to WHO (1998) the standard **BOD** value for drinking water is 5 mg/l. The minimum value were recorded at site I Kankarbagh near P.C. college and maximum at site IV Dherachak Anisabad near Hajari Roy.

**Physico- Chemical Characteristics of Ground Water at five different sites**

Parameter	Site -I	Site -II	Site- III	Site-IV	Site- V	Average
Temperature	25.4 <sup>0</sup> c	24.8 <sup>0</sup> c	25.9 <sup>0</sup> c	26.8 <sup>0</sup> c	28.6 <sup>0</sup> c	26.3 <sup>0</sup> c
pH	8.25	7.82	7.53	7.16	7.34	7.62
DO	3.80	4.28	3.86	3.40	3.08	3.68
BOD	1.40	2.50	2.80	3.02	2.92	2.53
Chloride	57.36	60.20	92.75	117.55	138.28	93.22
TDS	373	350	316	290	264	318.60
Turbidity	11	14	09	26	34	18.80
Electrical Conductivity	472	676	798	987	1132	813.00

All values in mg/l except pH, Turbidity.

The **Chloride** concentration at five site ranged from 57.36 to 138.28 mg/l. Chloride are important in detecting the contamination of ground water by waste water. Schenider (1970) stated that chlorides may be present in ground water due to discharge of industrial effluents. The value 250mg/l is the permissible limit of drinking water standard as prescribed by WHO (1998) . The excessive chloride gives the water an objectionable salty taste and gives laxative effect to human body.

**Total Dissolved Solids** (TDS) ranged from 264 to 373 mg/l. The standard acceptable limit of TDS is 500 mg/l. Thus at all the sites were below the permissible limit. Mariappan etal (2000) found the TDS value higher than that of permissible limit for drinking. TDS and Conductivity are positively correlated with each other.

The drinking water standard for **Turbidity** is less than 5 NTU as prescribed by WHO (1998). The Turbidity value was ranged from 9 to 34. These values were for above the drinking water standards. Ramaswamy and Sridharan (1998) observed that the turbidity is 3 to 28 times higher than the drinking water permissible limit prescribed by WHO (1998).

**Electrical Conductivity** value ranged from 472 to 1132 m hos/cm. indicating low mineralization in the region. The permissible limit of electrical conductivity as per BIS is 1000 m hos/cm. The conductivity values were below the permissible limit as per WHO (1998)

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