



## Computing of Physico-Chemical Characteristics of Drinking Water Sources in Summer at Unchahar, Raebarely (UP)

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### Abstract

Unchahar is a subdivision of Raebarely District (situated Prayagraj and Lucknow Road 120 km from Prayagraj and well Known due to National Thermal Power Corporation ,NTPC) . There is no proper sewer system in the town and effluents in summer are allowed to flow over the roads and streets, as the result endangering the ground water quality of potable water .To determine the extent of ground water pollution assessment of physico-chemical characteristics of drinking water sources was done during summer.Eight sites Were named as Site-I- Vakdamihra , Site-II- Chote Purva, Site-III- Madarl Ganj, Site-IV- Kathual , Site-V- Chawan Ka Purwa, Site-VI- Narwapar , Site-VII- Hasanganj & Site-VIII- Vipraha chosen for the aim .The level of those parameters and contents were evaluated ;exceeded all the eight sites comparing with desirable limits as prescribed by WHO and results were lowest at Site-7- Hasanganj and highest at Site-1- Viparamihara.

**Keywords:**Computing,BOD,COD,TKN etc.

### Introduction:

The term pollution derived from the latin word pollure and means to soil or to defile .The term pollution, contamination,nuisance and degradation often are used simultaneously to describe faulty conditions of surface waters .Pollution have defined as an unavoidable change in Physico-chemical and biological characteristic of our air .

Pollution of water is responsible for a very large number of mortalities and incapacitations in the world . Polluted state of water resources has led to a steady decline in fisheries and has also affected the irrigation land. Water no longer remains a free good. Availability of clean water is going to become the greatest `constraint for the development of tomorrow . Man has tried to cope with this scenario and has rapidly advanced its efforts to counteract this malady .

In past few decades natural and polluted waters have been studied in detail all over the world and considerable data is now available on most kind of pollutants and their effect on ecosystem as well as on organisms . Sources of pollution can be divided into two groups natural and cultural .The sources can be further classified as either point or non point .Point sources enter the pollution transport routes at discrete unidentifiable locations and usually can be measured directly or otherwise quantified and their impact can be evaluated directly .Pollution from non point sources can be related to weathering of

minerals ,erosion of virgin lands and forests including residues of natural vegetarian or artificial or semi artificial sources .The last can be directly related to human activity such as fertilizer applications or use of agricultural chemicals for controlling weeds or insect erosion of soil materials from agricultural farming areas and animal feed lots, construction sites etc Ground water is usually traced back to four main origins. Industrial domestic agricultural ,environmental pollution ,each family is being divided up into continuous and accidental types.



Unchahar Subdivision

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## Experimental and Discussion in the month of April:

In this month temperature was found maximum 28.20 °C at site-IV(Kathuar) and minimum 25.00 °C at site-VII(Viparamihara). It is very important to know that temperature is an important factor to influence the biological reaction in water.

It ranged between 7.75-9.89It was found maximum at site-I (Vipramihara) and minimum at site-VII (Hasanganj).Hand pumps are installed by the side of gutters where animal and vegetable waste is scattered all along the sides of these gutters. Peels of vegetable, fruits and morsels of edibles make the soil alkaline resulting increase the measured pH value and due to NTPC too.

In this month Conductivity ranged between 660.00-675.00 us/cm. Lowest value was recorded at site-VII –Hasanganj and highest at site-I-Vipramihra. Virtually DS are in high concentration at site-VII (Hasanganj). At the eight sites it followed the order site -I>site-V>site-III >site-VIII>site-VI>site-II>site-VII.

Turbidity varied from 9.0-21.0 NTU .Highest value of turbidity was recorded atsite- I (Vipramihara) and lowest at site-VII – Hasanganj.It followed the order site -I>site-V>site-III >site-VIII>site-VI>site-II>site-VII.. Turbidity was under the permissible limit for drinking water at the sites I,II,III , IV&VII. Calcium content at the eIght sites followed the order site -I>site-V>site-III >site-VIII>site-VI>site-II>site-VII.It fluctuated between 94.78-109.8mg/lt. Highest value was recorded at site- I (Vipramihara ) and lowest at site- VII (Hasanganj). It was under the permissible limit for drinking water (205mg/lt, ISI, 1991 but exceeded the desirable limit (82.00 mg/lt, ISI, 1991) at all the eight sites.

It ranged between 67.40-68.40 mg/lt. Highest value was recorded at site- I (Vipramihara) and lowest at site-VII (Hasanganj). It was above the permissible limit for drinking water (30 mg/lt, ISI,1991) at all the eight sites . The concentration of total solids ranged between 678.00-720.00 mg/lt.The highest value was recorded at site-I (Patel Nagar) and lowest at site-VII (Vipramihara). At the eight sites it followed the order site I>site-VI>site-V>site-II>site-VIII>site-III>site-IV>site-VII.Total solids contents were above the desirable limit 500 mg/lt at all eight sites. Actually in many parts of the world ; water with dissolved solids concentration ranging from 2000-4000 mg/lt is also used and no psychological effects were reported . Suspended solids varied from 22-26mg/lt. Highest value was recorded at site-I(Vipramihara) and lowest at site- VII(HasanGanj). It followed the order site-I >site-VI>site-V>site-VIII>site-III>site-IV>site-II>site-VII. Settleable solids varied from 8.48-12.98 mg/lt. Highest value was recorded at site-I (Patel Nagar) and lowest at site-VII (Mahaveer Nagar). It followed the order site-I>site-III>site-IV>site-VI>site-V>site-VIII>site-II>site-VII.



The chloride content followed the order site-I>site-VI>site-III>site-V>site-II>site-IV>site-VIII>site-VII. It shows the degree of pollution of animal origin. In this month it varied from 355-369 mg/lit. The lowest value was recorded at site-VII (Vipramihara) and highest at site-I (Hasanganj). At all sites chloride content surpassed the limit for drinking water (250mg/lit, ISI, 1991) but was found under the permissible limit for drinking water (1000mg/lit, ISI, 1991).

A scientist Stiever(1967) has reported that the sulphate reduces to H<sub>2</sub>S very quickly under high organic pollution and depleted oxygen conditions. It followed the order site-I>site-VI>site-III>site-V>site-IV>site-VIII>site-II>site-VII. In this month sulphate content ranged between 167.00-182.00 mg/lit. Highest value was recorded at site - I(Viparmihrah) and lowest at site-VII(Hasanganj ).

Carbonate at the eight sites followed the order site-I>site-III>site-VI>site-V> site-II>site-IV>site-VIII>site-VII. It varied from 7.40-9.50 mg/lit. Highest value was recorded at site-I (Vipramihara) and lowest at site-VII (Hasanganj).

Bicarbonate followed the ordersite-I>site-III>site-VI>site-V>site-II>site-IV>site-VIII>site-VII. It varied from 576-620mg/lit. Highest value was recorded at site-I(Vipramihara) and lowest at site-VII (Hasanganj).

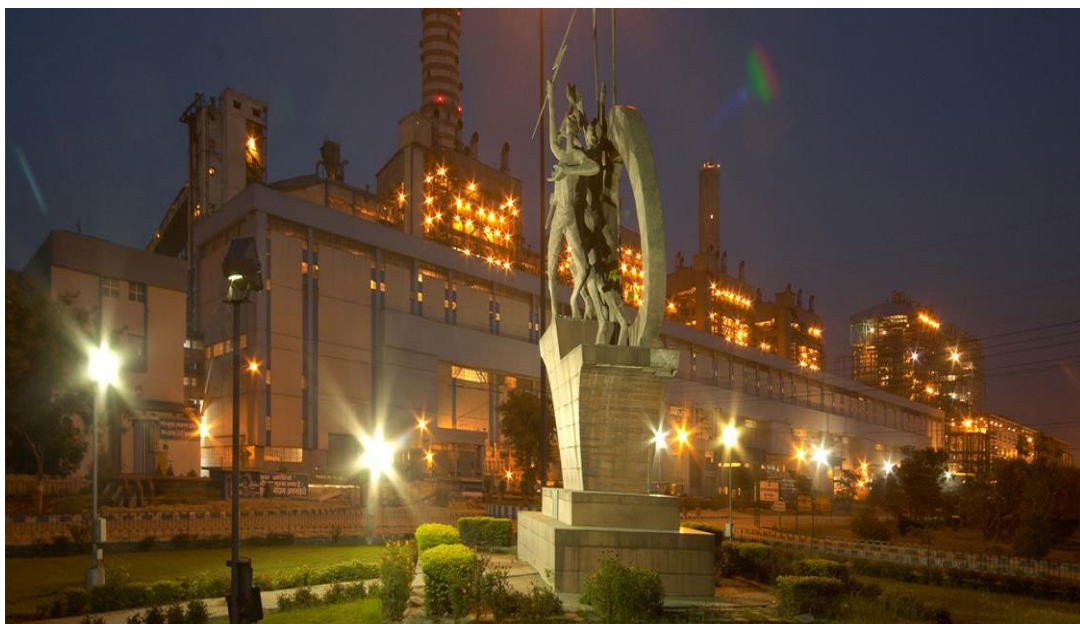
Free CO<sub>2</sub> followed the order site-I>site-III>site-VI>site-V>site-II>site-IV>site-VIII>site-VII. It ranged between 13.59-17.78 mg/lit. Highest value was recorded at site-I (Vipramihara ) and lowest at site-VII (Hasanganj). Water at all sites is corrosive in nature as CO<sub>2</sub> always exceeds the limit (6mg/lit, Kudesia, 1991). The high CO<sub>2</sub> level here is an indication of pollutants in water and not much harmful for aquatic life. The higher value of free CO<sub>2</sub> might be due to increased rate of decomposition of organic matter by microbes in bottom resulting in the fast production of free Carbon di oxide.

In this month Nitrate ranged between 16.80-18.80 mg/lit. It followed the ordersite-I>site-III>site-VI>site-V>site-II>site-IV>site-VIII>site-VII. Highest value was recorded at site-I (Vipramihara) and lowest at site-VII(Hasanganj). Site-I,Patel Nagar is situated near the open ground which is suitable for agriculture. Its highest value at aforesaid site was due to the influx of nitrogenous fertilizers through agricultural lands.

Nitrite ranged between 1.90-5.82 mg/lit. It followed the order site-I>site-III>site-VI>site-V>site-II>site-IV>site-VIII>site-VII. At the site I, II& VII nitrite content was found under the provisional guidelines for drinking water 3mg/lit.

Sodium controls the acidic basic equilibrium. It followed the order site-I>site-II>site-VI>site-V>site-III>site-IV>site-VIII>site-VII. Highest value was recorded at site-I(Vipramihara) and lowest at site-VII (Hasanganj). No permissible limit has been prescribed of sodium for drinking water.

It ranged between 12.80-13.75 mg/l. The order followed by all eight site was site-I>site-III>site-VI>site-V>site-II>site-IV>site-VIII>site-VII. Highest value was recorded at site-I(Vipramihara) and lowest at site-



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VII(Hasanganj). Dissolved Oxygen followed the order site-I>site-III>site-VI>site-V>site-II>site-IV>site-VIII>site-VII. It varied from 6.70-8.90 mg/l. Highest value was recorded at site-I (Vipramihara) and lowest at site-VII(Hasanganj). DO at the sites II and VII was found below the minimum desirable limit 6 mg/l for drinking water

BOD in this month ranged between 10.89-11.90 mg/l. Highest value was recorded at site-I (Vipramihara) and lowest at site-VII(Hasanganj). It followed the order site-I>site-III>site-VI>site-V>site-II>site-IV>site-VIII>site-VII . BOD at all sites exceeded the maximum permissible limit of 2mg/l for drinking water. Chemical oxygen demand in this month followed the order site-I>site-III>site-VI>site-V>site-II>site-IV>site-VIII>site-VII . In this month It ranged between 73.68-90.25mg/l. Highest value was recorded at site- I (Vipramihara) and lowest at site- VII (Hasanganj). Total Kjeldal Nitrogen followed the order site-I>site-III>site-VI>site-V>site-II>site-IV>site-VIII>site-VII . It varied from 13.77-21.44 mg/l. Highest value was recorded at site-I (Vipramihara) and lowest at site-VII(Hasanganj). It is lowest at site-VII because it is least dirty and maintaining some hygiene and sanitation conditions are good. Similarly various parameters and contents were determined and discussed in the month of June also.



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## Conclusion-

Hasanganj (site- VII) is found with desirable limit of various Physico-Chemical parameters and contents of water. Worst affected is Vipramihara (site-I) due to the bad community habits, rivulets and gutters delivering fifthly and boggy water, the said site is thickly inhabited by people of lower middle class; who have installed hand pumps in their houses for meeting their needs of drinkable water and water for cleaning purposes

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