

## Study of Physico-chemical Parameters of Drinking Water of Nanded City and its Impact on the Human Health



### Chemical Science

**KEYWORDS:** physico -chemical parameter , drinking water, health impact

**Dr. Mahesh  
S . Bachewar**

Department of chemistry Shahir Annabhau Sathe College, Mukhed 431715  
MAHARASHTRA

### ABSTRACT

This study was conducted during 2015-2016 at pre and post monsoon seasons safe drinking water is the prime need of time most of people depends upon ground water sources that have problem of hardness, calcium nitrate, phosphate, fluoride, DO, BOD, COD and heavy metals copper and zinc and excess MPN count. The water samples has been analyzed and evaluated to suitable for human consumption and health impacts. The parameter are observed within the prescribed limits of 15:10500 while others are beyond the limits of WHO and ISI.

### 1. INTRODUCTION:-

Water is the most vital element among the natural resource and most essential commodity for all living organisms including human. Human needs it in the first place for his physiological existence. It is used many purposes example industrial water supply, irrigation, drinking propagation of fish and other aquatic system and generation of fish and hydropower. The environment economic growth and development are highly influenced by water its regional and seasonal availability and the quality of surface and groundwater. The quality of water is affected by human activities and declining due to the rise of urbanization, population growth, industrial production, climate change and other factor.

The consequences of urbanization, industrialization and excessive use of fertilizer lead to spoil ground water. Chemical are major source of water contamination that introduced during water movement through geological materials. During last decade this is observed that ground water get polluted drastically because of increased human activities. Consequently number of cases of water born diseases has been seen which a cause of health hazards. An understanding of water chemistry is the bases, of the knowledge of the multidimensional aspect of aquatic environmental chemistry which involves the source, composition and transportation of water. The quality of water is of vital concern for the mankind since it is directly linked with human welfare.

### 2. MATERIAL AND METHODS:-

Due to increasing trend of fast urbanization, industrialization there are fair chances of environmental and water pollution. Throughout the world interest in the quality of ground water which is degraded by human activities, over exploitation, over pumping and percolation of effluents, sewage. It becomes very important to assess the ground water quality of slum areas in the Nanded city. About 10 sampling station have been chosen for this present study area during 2015-2016 for this slum area of Nanded city of Maharashtra was prefer shown in table-1. We have applied some physico chemical parameter for analysis of drinking water qualities, Temperature, colour, pH, electrical conductivity {ec} total dissolved solids {TDS}, alkalinity, hardness, DO, BOD, COD, Nitrate, sulphate, phosphate,

fluoride, chloride and heavy metals copper zinc and most potable number{MPN} Temperature of each sample at R.T by thermometer in c, the pH by digital pH meter. Electrical conductivity measured by conductivity instrument in /cm. TDS known by disk filtration in mg/l. Titration method used for total alkalinity, total hardness and chloride by mohr's argentometric titration and  $K_2CrO_4$  as indicator. Do by Winkler's method. Nitrate, sulphate and phosphate measured by spectrophotometer BOD, COD fluoride was estimated with standard method as prescribed by Groltman {1978}, Trivedi and Geol {1986} and APHA {2005}.

### 3. SAMPLING STATION:-

The following 10 sampling station has been chosen for this present study area during 2015-2016.

- M.G.M institute of eng
- Gandhinagar
- Hingoli naka
- Maharana pratap chowk
- Government B.Ed college
- Dattanagar
- Mastanpura
- Maltekadi
- Tata showroom
- Guru govind sing airport



Fig .Maharashtra state location of NANDED

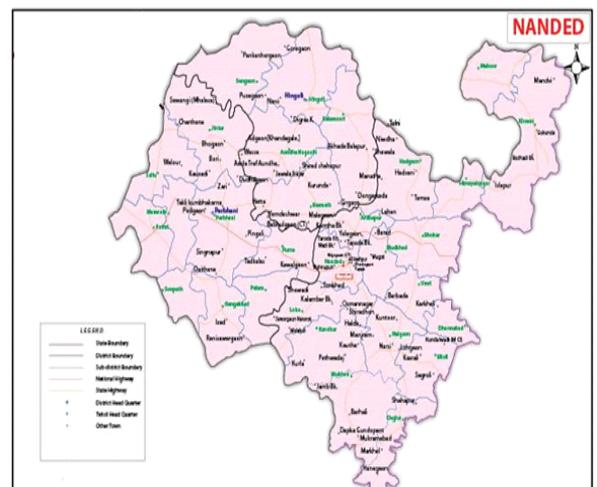


Fig. Nanded

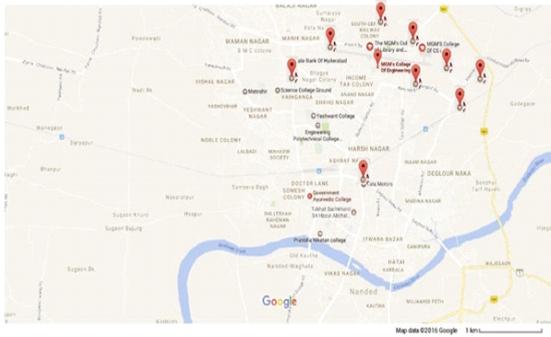


Fig. Sampling Location and map of Study area

Table -1 Analysis of borewell's water of hingoli road nanded city during 2015-2016

Parameter	Unit	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>	S <sub>9</sub>	S <sub>10</sub>
Temperature	°C	28.6	28.2	28.5	27.8	26.4	26.8	27.6	28.4	28.6	28.2
PH		6.8	7.2	6.9	7.1	7.0	6.5	7.0	6.8	6.4	7.3
Electric conductivity	Mhos/cm	480	532	412	482	304	540	532	304	296	722
T.D.S		84.2	57.3	73.1	84.8	65.4	54.2	94.2	59.4	83.7	75.3
Total alkalinity	Ppm	220	320	412	417	500	480	430	340	360	498
Total hardness	Ppm	160	180	145	189	112	117	127	175	120	184
DO	Ppm	1.64	1.72	1.28	1.86	1.48	1.80	1.53	1.67	1.42	1.82
BOD	Ppm	2.52	2.80	2.85	2.68	2.94	2.69	2.24	2.94	2.36	2.54
COD	Ppm	33.2	45.9	52.5	48.3	87.3	89.4	63.8	49.4	47.49	84.4
Chloride	Ppm	44.0	62.2	60	98.6	78.4	116.2	89.4	126.2	73.6	103.5
Nitrate	Ppm	4.5	5.40	12.8	8.2	9.7	10.5	2.80	10.1	2.31	2.20
Sulphate	Ppm	56.2	81.5	40.5	33.8	79.1	84.2	68.5	58.6	70.9	34.6
Phosphate	Ppm	.90	1.28	1.85	.71	1.62	1.40	1.20	1.60	2.1	1.60
Fluoride	Ppm	0.56	1.04	0.24	0.08	1.01	.42	1.24	.65	1.1	0.38
Copper	Ppm	0.02	0.01	0.07	0.01	0.09	0.02	0.02	0.03	0.022	0.05
Zinc	Ppm	0.04	0.02	0.01	0.06	0.01	0.07	0.08	0.09	0.086	0.05
MPN	No/100ml	32.2	48.1	18.2	44.0	54.1	16.2	12.8	19.2	17.2	14.3

**Notation of site**

- S<sub>1</sub>:- M.G.M institute of eng
- S<sub>2</sub>:- Gandhinagar
- S<sub>3</sub>:- Hingoli naka
- S<sub>4</sub>:- Maharana pratap chowk
- S<sub>5</sub>:- Government B.Ed college
- S<sub>6</sub>:- Dattanagar
- S<sub>7</sub>:- Mastanpura
- S<sub>8</sub>:- Maltekadi
- S<sub>9</sub>:- Tata showroom
- S<sub>10</sub>:- Guru govind sing airport

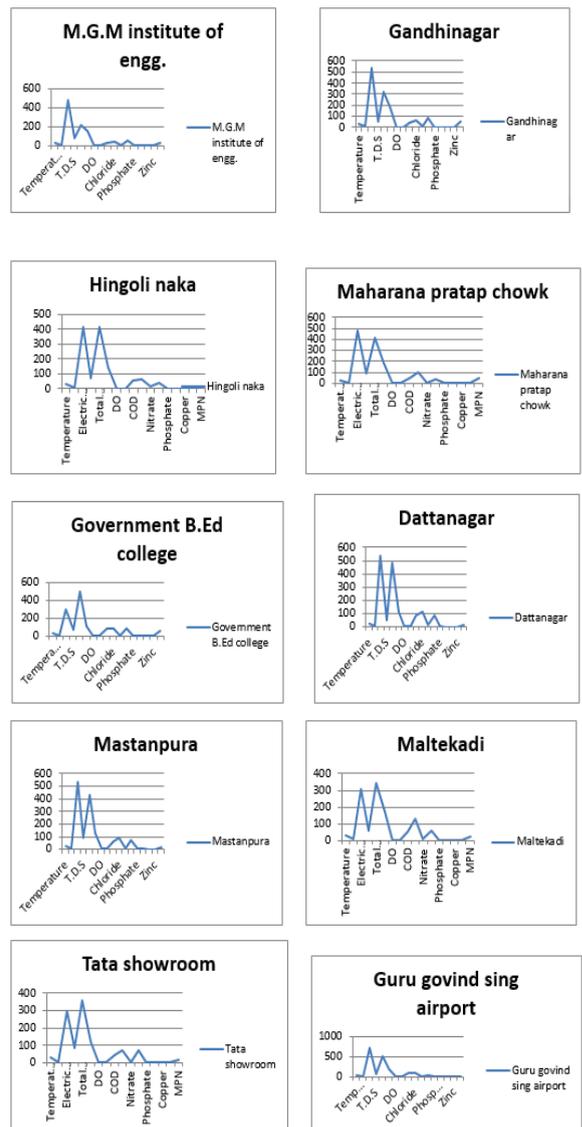
**1. RESULT AND DISCUSSION**

Temperature is one of the most essential parameter in water. It has drastically impact on growth and activity of ecological life and is greatly affects the solubility of oxygen in water. The temperature of bore well's water has found to be in the range of 27°C-29°C. pH values are normal drinking water ranges 6.5 - 8.5 on pH meter scale. Most natural water is alkaline in nature due to presence of bicarbonate and carbonate pH in the present study varies from 6.4 - 7.3. kataria et al{2011} also reported similar observation analysis of drinking water at Bhopal city electrical conductivity varied from 296-722 mhos/cm the acceptable value of EC in drinking water ranges 500-800

mhos/cm at 25°C. TDS analysis has great implications in the control of biological and physical waste water treatment processes. Alkalinity of water is due to the presence of hydroxide, carbonate and bicarbonate. Desirable limit is 200mg/l and maximum permission limit 600mg/l. In the present study it varied from 220 - 500 ppm. In the present study total hardness ranged from 112 - 190 mg/l. These high values may be due to the addition of calcium and magnesium salt. DO, BOD and COD in the present study ranges from 1.28-1.86 mg/lit, 2.24-2.94 mg/lit and 33.22-89.45 respectively the findings are similar with those of kataria {1990,1995,2000} and kataria et al {2006,2008,2010 and 2011}

Chloride, nitrate, sulphate, phosphate and fluoride has ranged in the present studies from 44.0-126.2 mg/ lit, 2.31-12.8 mg/lit, 33.8-84.2 mg/lit, 71-1.85 mg/lit and .08-1.24 mg/lit respectively. The presence of sulphate has less effect on the taste of water compared to the presence of chloride. The desirable limit of sulphate in drinking water prescribed by ICMR is 200-400 mg/l. Copper and zinc found in the range of 0.022-0.074 and 0.01-0.097ppm respectively and MPN 12.8-48.1 No/100ml.

The high concentration of sulphate may cause diarrhea and intestinal disorders. Fluoride is essential for human beings as a trace element but higher concentration of it cause fluorosis which made permanent disability in bone and teeth. The concentration of fluoride between 0.6-1.0 mg/lit in potable water protects teeth decay and enhances bone development {Kundu et al 2001}



## 5. CONCLUSION

All physical and chemical properties of water were within desirable limits. The physico chemical characteristics of water in Nanded city has no harmful for drinking purpose.

## Reference

1. Trivedy RK and goel p.k {1986} chemical and biological methods for water pollution studies, environmental publication, karad, Maharashtra
2. APHA {2005} standard methods for the examination of water and waste 21st end, Washington d.c.
3. ISI, Indian standard specification for drinking water, new delhi {1983}
4. Medudhula thirupathaiah .ch.samatha.chinta sammaiah. Analysis of water quality using physico-chemical parameter in lower manair reservoir of karimnagar district, andrapradesh international journal of environmental sciences vol 3 no 1 {2012}
5. Simpi B.hiremath s.m, murthy K.N.S, Chandrashekarappa K.N, patel A.N and puttiash E.T. analysis of water quality using physic-chemical parameter hosahalli tank in shimoga dist, Karnataka, India global journal Inc 11 {3} {2012}
6. H.C kataria, manisha gupta, mukesh kumar sandhya kushwaha, sherwati kashyap, sonal trivedi, rani bhadoriya and naval kishor bandewar. Study of physic-chemical parameter of drinking water of Bhopal city with reference to health impacts current world environment vol 6{1}95-99 {2011}
7. Nighojkar abhineet and er.d. dohare physic-chemical parameters for testing of present water quality of khan river at indore. India Int. res. J. environment sci 3{4}{2014}p.p 74.81.
8. S.P Bhalme and P.B. Nagarnaik analysis of drinking water of different places a review. International journal og engineering research and applications 3{2} 2012 p.p 3155-3158
9. Kundu, N. et.al., Geochemical appraisal of fluoride contamination of groundwater in the Nayagarh district, Orissa, Env. Geol. 41: 451-460 (2001)