

Research Article

Assessment of Ground Water Quality in Gokunda Taluka Kinwat of Nanded District, Maharashtra (India).

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ABSTRACT

In the present study analysis of ground water quality in Gokunda Taluka Kinwat of Nanded District, this water may be used for drinking water in villages. The assessment of water quality with the standards suggested by the APHA (1992). For the investigation of parameters like temperature. PH, Total dissolved solids, Dissolved Oxygen Chlorides, Salinity, CO₂, Alkanity, Acidity. In the study periods reveals that the chemical parameters of water sources are well within the permissible limit as prescribed by WHO and IS 10:500 but the water it used by the drinking before proper treatment.

Keywords: Ground Water, Gokunda, temperature, PH, Total dissolved solids, Dissolved Oxygen Chlorides, Salinity, CO₂, Alkanity, Acidity

INTRODUCTION

Interaction between ground water and surface water are complex consequently, ground water pollutions, sometimes referred to as ground water contamination, and is not as easily classified as surface water pollution by its very nature, ground water aquifers are susceptible to contamination from sources that may not directly affect surface water bodies, and the distinction of point vs. Non point source may be irrelevant. Ground water has become the major source of water supply for domestic industrial and agriculture sectors of many countries.

It is estimated that approximately one third of worlds populations uses ground water for drinking purpose (UNEP) (1999) [1]. Intensive use of natural resources and increased human

activities are posing great threat to ground water quality [2] presence of more than 200 chemicals constituents in ground water has been documented including about 150 organic and 50 inorganic and ratio nucleotides The reported sources of these chemical in ground water are both natural as well as anthropogenic [3].

The connection between agricultural and ground water pollutions is well established [4,5] In developing countries, contamination of water supplies by organic chemicals is of lesser concern because most of the health problem are found to be associated with the presence of in organic chemicals and pathogenic organism in drinking water due to variation in the regional geology and water

rock. [6] interaction higher concentration of many elements can occur in ground water the chemical compositions of ground water is controlled by many factors that include composition of precipitation.

According to [6] in number of cases water resources have been affected in such a way that they are not available for further use without prior treatment contamination of surface water may disappear within a short period of time.

In present study the quality of ground water of Gokunda village Tq. Kinwat was focused to analysis the physicochemical properties of water. This assessment is aimed to provide a preliminary view on the current status of water quality for drinking purpose.

MATERIALS AND METHODS

STUDY AREA: - Gokunda village Tq. Kinwat is situated -150- km towards south east Nanded District of Maharashtra state of India. Kinwat is located at North Latitude 19.60 and East Longitude and at 78.20 meters 314 meters (1030 feet) altitude.

A total twenty ground water sample were collected from bore wells of study area Gokunda Tq. Kinwat. Using pre-cleaned sterilized poly propylene plastic bottles with necessary precaution was taken during collection of sample once in a day ,daily from selected sampling site for the period of 2 months i.e. from jan-2015 to Feb-2015 the sampling site selected 2 different sites i.e. East and West Gokunda area where the drinking water frequently used total parameters are PH ,total dissolved salt (TDS),dissolved oxygen ,Carbon dioxide ,temperature , total alkalinity, total acidity , chloride , salinity for the study. All the experiment was carried out in 5 times. The assessment of water quality was done by following publications [7,8].

SAMPLING SITE 1:-Bore well of Gokunda village behind B.P college to I.T.I and siddarth Nager it is North site of the village as it is the agricultural area water accumulates

around the bore well though rain fall and bring wastage water from village through different nalas waste material dumping of garbage of villagers are observed.

SAMPLING SITE 2:- Hand pump around the Eidgah road to ITDP office and Kalyan nager. A thick population area having facilities of bore well and deep well. Improper sanitation and waste water flow deposited around the bore water which causes contamination of chemicals and toxicants.

RESULTS AND DISCUSSION

In the present investigation the physicochemical parameters are represented in table no 1 and 2 and standard deviation are represented in table no. 3 & 4 and graphically represented in figure no.1 and 2. In the present investigation in the North side of B.P college to I.T.I and Sidharth Nager area TDS ranges in between 310 to 500 mg/lit, dissolved oxygen in the 2.4 to 3.2 mg/lit, CO₂ 0.20 to 0.81 mg/lit, chloride 0.02 to 0.06 mg/lit, pH 7.1 to 7.4 temperature 26.8 to 27.9°C, alkalinity 0.1 to mg/lit and acidity is nil recorded in the first sampling station. The first sampling station water quality is within the prescribed limit of WHO but this water is using before proper treatment.

In the second sampling station at south area Iddgah road to ITDP office and Kalyan nager the physicochemical parameters TDS ranges from 480 to 598 mg/lit, dissolved oxygen 2.6 to 3.2 mg/lit, CO₂ 0.10 to 0.81 mg/lit, chloride 0.02 to 0.07 mg/lit, pH 7 to 7.3 ,Temperature 26.8 to 27.8°C, alkalinity 0.1 to 0.3mg/lit and acidity was nil. The mean value North side of B.P college to I.T.I and Sidharth Nager area sampling station I statistical analysis the CO₂ Mean (3.7), SD (0.51) , SE (0.22) and CV (13.78) the Chloride Mean (14), SD (0.55) , SE (0.24) and CV (3.92) and Dissolved oxygen Mean (2.7), SD (0.13) , SE (0.05) and CV 4.81). For the sampling station second south area Iddgah road to ITDP office and Kalyan nager statistical analysis the Co₂ Mean (3.4), SD (0.13) , SE (0.05) and CV (3.82) the

Chloride Mean (12), SD (0.16) , SE (0.27) and CV (5.08) and Dissolved oxygen Mean (2.9), SD (0.08) , SE (0.03) and CV 2.75).

Total Dissolved Solids: Total dissolved solid denoted the various types, minerals present in water in the dissolved form. The contents of total dissolved solid in ground water stations were in the range of 310 to 500 mg/L at station- I) 480 to 598 mg /L at station II (Table No. 1&2) .

The sample showed the total dissolved solid with maximum of 310 mg /L in month of Jan-Feb.2015 at station I. While the minimum value of 480 mg / L in month of Jan –Feb. 2015 At station –II.

The high concentration of T.D.S increase water turbidity these in turn decrease the light penetration and thus affects the photosynthesis the high content elevates the density of water, influence osmoregulation of fresh water organism and reduces solubility of gasses like oxygen and utility of water for drinking irrigation and industrial purpose [9]. During the study of total dissolved solid ranged between 316 mg/L to 574 mg/ L. the present study reveals the total dissolved solid values are high during summer period and low in monsoon period similar result was obtain in the ground water of Kukatpally industrial area in Hyderabad [10] observe total dissolved solid with maximum value of 1531 mg / L. [11] Found the concentration of total dissolved solid in the range of 991.1 to 1276.3 mg/L from ground water of Nacharam industrial complex.

DISSOLVED OXYGEN: At given point parameter like temperature, transparency, nutrient load biomass determines presence of dissolved oxygen, in the present the study the concentration of dissolved oxygen recorded were in the range.2.4 to 3.2 mg/L at station –I ,2.6 to 3.2 mg/ L at station –II.(Table No1) The maximum value of dissolved oxygen was recorded as 3.2 mg /L in month Jan – Feb 2015. Dissolved oxygen is one of the important parameters that measure the extent of organic as well as biological pollution load

to a water body stated by Meenakshi Khajuriaand and S.P.S. Datta (2010) [12] noted 3.44 to 10.39 mg /L of DO in ground water Christian colony in Jammu and Kashmir .High dissolved oxygen content indicator well aerated nature of water with low organic pollution load in winter season. [13] reported increase in temperature of water in summer result in decrease of dissolved oxygen in Godavari River. Bobdey (2002) [14] reported maximum DO in winter season and minimum during summer. It is observe that increase in the temperature of river water resulted in to decrease of dissolved oxygen. Dissolved oxygen is an important factor in assessing water quality. Monitoring oxygen concentration also helps to know the ‘Health’ of water body and its one convenient way of ‘‘ Feeling the Pulse’’ of an aquatic ecosystem (ODEM 1971).

CARBON DIOXIDE: Carbon dioxide is normal component of all natural water. It is an end product of bacterial decomposition of respiratory process of plant and animal, in the present investigation minimum value of CO₂ where recorded during winter and maximum during summer. The minimum value of CO₂ during winter months may be due to its utilization through the photosynthetic activity by the aquatic saprophytes and phytoplankton. However the higher value of CO₂ can be attributed to the higher rate of decomposition organic matter by microorganism with consequent increased release of free CO₂ decrease in utilization in photosynthetic release end high respiratory activity of benthos and microbes. Indicate our result (minimum CO₂ contain was observed in station II, 0. 12 and highest CO₂ contain was observed at station I. 0.81 (Table No 1 and 2)

CHLORIDES:- Chlorides may be present in ground water due to discharge of sewage water of industrial waste in the present study chloride level minimum 12mg /L to 257 in a area South (Eidgah road to ITDP) to Maximum 14 mg/L to 256 in a area North(B.P

college to ITI and Sidharth nager colony) at two different sampling stations (Table NO 3,4). Similar result obtained by, Tirpude et. al (2015) found a chloride ranges from 16 mg/L to 256 mg /L at station –I Gokunda and 82mg/ L to 256 mg/ L at station –II Ghoti village . Jadhvar *et.al* (2010) found the range of 64to 168.5 mg/ L chlorides in ground water of Nagothane region of Maharashtra.

SALINITY: Salinity may be present in ground water due to discharge of sewage of industrial waste, in the present study the salinity is maximum in area of South (Eidgah road to ITDP) area is 28.93 mg/L (table NO. 5) and minimum salinity is present in area North (B.P college to ITI and Sidharth nager colony) is 27.12 mg/L

pH: The PH was almost similar in both the natural habited (NH) and fragile ecosystem habited (F) during the 2 months. It is an result of interaction of various substances in the water. In the natural habited a lowest pH of 7.1 in area of south side and highest PH of 7.2 in area of Northside (Table No.5) [14] found pH value in mild alkaline range 7.6 to 7.8. From ground water in Tiruchirapalli indicating the presence of very weak basic salts.

ALKALINITY: The alkalinity may be present maximum in area of North area 0.3mg/L and minimum in south area 0.2 mg/L (Table No. 5).

TEMPRETURE: The maximum temperatures are occurring in the month of February 27.2⁰C and minimum in month of January 26.1⁰C in north side and 70.1 ⁰C in south side to .(Table No.5)

CONCLUSION: Gokunda village having the distance of 2 k.m from Kinwat. Availability of ground water for drinking purpose is the ultimate source for the population of the village. In the present study different parameters are studied and concluded that the

water available in different areas bore well as well as deep well are safe for drinking purpose. it is concluded that before using for drinking purpose water should be treated by using R/O to avoide un wanted contamination of inorganic salts.

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5. 10. Sayani et al ... (1998) observed total dissolved solid with maximum value of 1531mg/L.
6. 11. Sultana et al.. (1990) found the concentration of total dissolved solid in the range of 991.1 to 1276.3 mg/L from ground water of Nacharam industrial complex.

7. 12. Meenakshi Khajuria and S.P.S Datta . (2010) noted 3.44 to 10.39 mg/L of DO in ground water in a colony in Jand K.
8. 13. Shinde et al... (1997) Shivanikar et al (1999) reported increase in temperature of water in summer results in decrease of dissolved oxygen in Godavari river.
9. 14. Bobdey (2002) reported maximum DO in winter season and minimum during summer. Monitoring oxygen concentration also helps to know the 'HEALTH' of water body and its one convenient way of "Feeling the Pulse" of an aquatic ecosystem (Odum 1971).

Table No.1: North Area (B.P College)

Sample No	TDS (ppm)	DO Mean	CO ₂ (SD)	CHLORIDE (SD)	PH	TEMPERATURE	ALKALINITY	ACIDITY
1	316	2.4	0.81	0.02	7.4	27.5	0.1	NILL
2	310	3.0	0.62	0.05	7.3	27.6	0.1	NILL
3	450	2.4	0.52	0.06	7.1	26.9	0.1	NILL
4	480	3.2	0.20	0.05	7.2	26.8	0.1	NILL
5	500	2.9	0.44	0.03	7.2	27	0.1	NILL

Table No.2: South Area (Eidgah Road)

Sample No	TDS (ppm)	DO Mean	CO ₂ (SD)	CHLORIDE (SD)	PH	TEMPERATURE	ALKALINITY	ACIDITY
1	574	3.2	0.18	0.02	7	26.6	0.3	NILL
2	480	3.0	0.12	0.03	7.2	27.5	0.2	NILL
3	544	2.6	0.10	0.05	7.1	27.8	0.2	NILL
4	574	2.9	0.12	0.06	7.3	26.8	0.2	NILL
5	598	3.2	0.16	0.07	7.1	26.9	0.1	NILL

Table No-3: North Area Showing The Mean, SD, SE, CV Values

S.r	PARAMETER	MEAN	SD	SE	CV
1	CO ₂	3.7	0.51	0.22	13.78
2	CHLORIDE	14	0.55	0.24	3.92
3	DO	2.7	0.13	0.05	4.81

Table No-4: South Area Showing The Mean, SD, SE, CV Values

S.r	PARAMETER	MEAN	SD	SE	CV
1	CO ₂	3.4	0.13	0.05	3.82
2	CHLORIDE	12	0.61	0.27	5.08
3	DO	2.9	0.08	0.03	2.75

Table No.5: Different Parameters Observed In Two Sampling Stations

AREA	CO ₂	CHLORIDE	SALINITY	DO	PH	ALKALINITY	TEMPERATURE
North	3.7	14	27.12	2.7	7.2	0.3	26.1
South	3.4	12	28.93	2.9	7.1	0.2	27.2