

Assessment of ground water quality in and around Kinwat region district Nanded

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Article Chronicle :

Received :

01.07.2013;

Revised :

01.11.2013;

Accepted :

25.11.2013

SUMMARY : The present research work deals with the limnology of two ground water samples selected from in and around Kinwat region, dist. Nanded. Total ten physico chemical parameters such as total dissolved solids, sulphate, pH, dissolved oxygen biochemical oxygen demand, chemical oxygen demand, total hardness, chlorides, calcium and magnesium were tested for a period of one year. Considering all the aspects and problems from the present study, it was concluded that there must be regular monitoring of water quality is necessary.

HOW TO CITE THIS ARTICLE : Tirpude, H.A., Hussain, Sayyed and Mane, Vinod (2013). Assessment of ground water quality in and around Kinwat region district Nanded. *Asian J. Environ. Sci.*, **8**(2): 111-113.

Key Words :

Ground water, pH,
Total dissolved solids

Groundwater makes up about twenty per cent of the world's fresh water supply, which is about 0.61% of the entire world's water. Including oceans and permanent ice global, groundwater storage is roughly equal to the total amount of freshwater stored in the snow and ice pack. Including the north and south poles, this makes it an important resource which can act as a natural storage that can buffer against shortages of surface water, as in during times of drought.

At present nearly 1/5 of all of the water used in the world is obtained from ground water resources. Agriculture is the greatest user of water accounting for 80 per cent of all consumption. It takes roughly speaking 1000 tons of water to grow one ton of grain and 2000 tons of water to grow one ton of rice. Animal husbandry and fisheries all require abundant water. Some of the 15% of world's cropland is irrigated. The present irrigation area in India is 60 m. ha. m. of which about 40% is from ground water (Kulkarni, 1990).

The area selected for the study is a Taluka of Nanded district, Maharashtra which is a tribal area. The Kinwat taluka is located at one hundred twenty five kilometers away from Nanded city

and fifty kilometers away from Adilabad district of Andhra Pradesh. The climate of Kinwat Taluka is generally hot and dry except the southwest monsoon season. Four distinct seasons may be divided in a year. The hot season begins in March and extends up to the first week of June. In summer Kinwat Taluka remains maximum temperature of about 44°C and in winter if fall even low as 15°C.

EXPERIMENTAL METHODOLOGY

Water samples were collected at monthly intervals. Samples were collected in clean bottles through out the period of study Nov. 2010 to Oct. 2011. All the parameters were measured by applying methods as prescribed by APHA, guidance manual of NEERI (1986) and Trivedi and Goel (1986).

EXPERIMENTAL FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

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Total dissolved solids :

Total dissolved solid denotes the various types minerals present in water in the dissolved form. However, if some organic substances are also present as more often in polluted water, they may also contribute to the dissolved solids. The contents of total dissolved solids from ground water stations were in the range of 438 to 582 mg/l at station -I, 442 to 576 mg/l at station -II, The samples showed the total dissolved solids with a maximum of 582 mg/l in the month of September 2011 at station- I while the minimum value of 442 mg/l in the month of April 2011 at station-II. Dhembare *et al.* (1997) noted the level of total dissolved solid from 100 to 500 mg/l in all the ground water samples from dug well of Pravara area, Maharashtra.

pH:

pH is really a measure of the relative amount of free hydrogen and hydroxyl ions in the water. The pH recorded were in the range from 7.3 to 7.6 at station - I, 7.2 to 7.6 at station-II, The maximum pH value recorded was 7.6 at station - I and II in the month of September 2011. Jameel (2002) found pH

value in the mild alkaline range of 7.6 to 8.6. From ground water in Tiruchirapalli indicating the presence of very weak basic salts.

Dissolved oxygen :

In the present study the concentrations of dissolved oxygen recorded were in the range of 2.4 to 3.7 mg/l at station -I, 2.6 to 4.9 mg/l at station -II, The maximum value of dissolved oxygen was recorded as 4.9 mg/l in the month of November 2010 at station - II Dissolved oxygen is one of the important parameters that measure the extent of organic as well as biological pollution load to a water body.

Biochemical oxygen demand :

During winter season the biochemical demand values are low. This is because after monsoon the winter temperature retards the rate of reproduction of microorganisms. The highest amount of organic matter brought in by the surface run off of heavy rains. In the present investigation the range of Biochemical oxygen demand was 5.7 mg/l to 13.8 mg/l at station -I, 4.5 to 14.0 mg/l at station - II. Ingole *et al.* (2009)

Table 1 : Result of the physico-chemical parameters of Site 1 (Sainagar)

Month	TDS	pH	DO	BOD	COD	TH	Cl	Ca	Mg	SO ₄
Nov. 2010	504	7.5	3.5	5.7	8.5	340	118	92	85	140
Dec. 2010	482	7.5	3.2	6.1	9.6	310	136	106	90	136
Jan. 2011	468	7.4	3.2	6.9	10.6	330	140	118	103	130
Feb. 2011	450	7.4	2.8	7.6	13.4	284	172	130	118	122
Mar. 2011	448	7.5	2.5	9.2	14.6	310	188	132	130	120
April 2011	438	7.4	2.5	10.6	20.4	360	230	146	136	128
May 2011	450	7.3	2.4	10.8	26.6	386	248	158	152	140
June 2011	482	7.4	2.6	12.4	21.8	430	262	152	157	188
July 2011	500	7.5	2.8	13.8	18.6	486	236	140	120	192
Aug. 2011	534	7.5	3.6	10.6	12.6	430	198	118	110	210
Sept. 2011	582	7.6	3.5	10.2	11.2	418	150	102	92	186
Oct. 2011	532	7.6	3.7	6.2	9.6	382	132	98	91	150

All parameters are in mg/L except pH

Table 2 : Results of the physicochemical parameters of Site 2 (Hegdewar Nagar)

Month	TDS	pH	DO	BOD	COD	TH	Cl	Ca	Mg	SO ₄
Nov. 2010	501	7.3	4.9	4.5	7.0	342	124	82	92	132
Dec. 2010	488	7.2	3.5	6.7	10.3	300	140	110	110	138
Jan. 2011	470	7.4	2.8	7.1	11.4	320	156	126	104	128
Feb. 2011	468	7.5	2.7	8.0	12.4	300	162	134	110	120
Mar. 2011	458	7.3	2.6	8.4	12.8	320	194	144	126	118
April 2011	442	7.3	2.6	10.0	18.6	370	212	160	142	126
May 2011	462	7.5	2.8	11.8	24.0	390	256	164	148	136
June 2011	474	7.3	3.0	13.0	18.8	434	274	160	156	160
July 2011	512	7.4	3.2	14.0	16.8	470	220	152	138	180
Aug. 2011	532	7.5	3.8	11.8	13.6	468	212	110	120	218
Sept. 2011	576	7.6	3.8	9.4	8.8	428	168	90	100	194
Oct. 2011	544	7.4	4.1	8.6	8.4	386	112	86	90	166

All parameters are in mg/L except pH

a range of 3.2 to 8 mg/l of BOD.

Chemical oxygen demand :

Boyd (1975) observed the positive correlation between chemical oxygen demand and biochemical oxygen demand. In the present investigation, the range of chemical oxygen demand was 8.5 mg/l to 26.6 mg/l at station- I, 7.0 mg/l to 24.0 mg/l at station -II, Ingole *et al.* (2009) a range of 1.9 to 8.15 mg/l of COD.

Total hardness :

The range of total hardness values recorded was 284 mg/l to 486 mg/l at station-I, 300 mg/l to 470 mg/l at station – II. The hardness in water is mainly due to its calcium and magnesium contents. Gonsalves and D'Souza (1998) studied the impact of water from soft drink factory on ground water at Madkai, Goa. The values of total hardness recorded were 3035 mg/L during pre monsoon, 5444 mg/l during the monsoon season.

Chlorides :

In the present investigation, chloride levels ranges from 118mg/l to 262 mg/l at station - I, 124 mg/l to 274mg/l at station-II. Generally the concentrations of chloride impart a salty taste to water. For people who are not accustomed to high chloride content, it may cause a laxative effect (Rao *et al.*, 2002). Jadhavar *et al.* (2010) found a range of 64 to 168.5 mg/l chlorides in ground water of Nagothane region of Maharashtra.

Calcium :

Calcium is derived mainly from weathering of silicate minerals like feldspar, amphiboles and pyroxenes because of the abundance of such minerals in most rock types and their solubility. Calcium is presented abundant anywhere in ground water (Karanth, 1987). In the present investigation, the concentration of calcium recorded was in the range of 92 to 158 mg/l at station- I, 82 to 164 mg/l at station-II.

Magnesium :

In the present investigation, the levels of magnesium concentration were recorded from 85 to 157 mg/l at station - I, 90 to 156 mg/l at station- II. Khajuria and Dutta (2010) recorded range of 86 to 241.17mg/l magnesium in tube well water of Cristian colony in J& K.

Sulfate :

In the present study concentrations of sulphate were in the range of 120 to 210 mg/l at station-I, 118 to 218 mg/l at station -II, Dhembare and Padhe (1997) recorded the concentration of sulphate from the ground water of Sonai area of Maharashtra with a maximum value of 267 mg/l and a

minimum value of 1.mg/l.

Conclusion :

The data of present study reveal that there must have to give some primary treatment to maintain the water quality.

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