



Study of Physico-Chemical Parameters of Potable Water Sources Around Chandwad, Maharashtra, India

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ABSTRACT

Water is one of the most important of all natural resources known on earth. The safety of drinking water is important for health. Due to increased industrialization, use of fertilizers in agriculture, water is highly polluted and therefore it is necessary that the quality of potable water should be checked. During the study of physico-chemical parameters like temperature, pH, taste, dissolved oxygen, alkalinity, acidity and chloride within desirable limit as suggested by WHO. The objective of research is to understand potable water quality of well and lake around Chandwad Tehsil. Two wells and two lakes are reported to be high water pH while remaining sources are under limit from the overall research it can be concluded that there were no alarming effect on water quality of Chandwad tehsil. But it should be considered seriously so far as diseases outbreak is concerned.

Keywords: Potable Water, Physicochemical Parameters, Well Water, Lake Water, Chandwad

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INTRODUCTION:

Water is one of the most important of all natural resources known on earth(4). Water is super abundant on the planet as a whole, but fresh potable water is not always available at the right time or the right place for human or ecosystem use (3). The safety of drinking water is important for health. Water is the prime natural resource and India is one of the most populated country after China which is also facing problem and clean water shortage (11). In India almost 70% of the surface waters have polluted due to the discharge of domestic sewage and industrial effluents into natural water sources (6). The accelerated urbanization leads to urban river pollution causing damage to potable water ecosystem(5). Almost 200 million people in India do not have access to safe and clean drinking water and 90% of country's water resources are polluted(1).

Water shapes the earth's surface and regulates our climate and potable water is used for drinking, irrigation and transportation (9). Till July 2021, the relative humidity of Nashik district ranges from 43% to 62%. The normal annual rainfall in the district varies from about 500mm to 3400mm. Meanwhile, Chandwad Tehsil has received 156mm rainfall last year. People in Tehsil are totally dependent on Well & Lake for drinking water. Over 75% of farmers are depended on well for agricultural purpose.

The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life (8). Water is available in two basic form i.e. surface water and natural ground water according to the world health organization's 2017 report, safe drinking water is water that "does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages. The potability of water that is consumed defines the base line of protection against many diseases and infections (10).

MATERIAL AND METHODS

For the present investigation various water resources around chandwad tehsil were selected randomly. During this study period various physico-chemical parameters of potable water were studied. The water samples were collected from the region of Chandwad area and carried to laboratory.

The samples collected from Wells and Lakes around the area, from the month of July, December and April. The collected samples were stored in a clean bottle for analysis; To understand quality of the parameters (7)various testes are performed. i.e., pH, TDS, DO etc by according to (4). The physical parameters were measured on the same day of collection (2).

Parameters	Description	Instruments/ Methods
Temperature	Temperature plays an important role on biological activities and growth.	Water analyzer 371 instrument.
pH	pH of water is a measure of how acidic/basic water is.	Water analyzer 371 instrument.
Taste	Taste of water could be agreeable to disagreeable	By Tasting.
TDS	TDS is use to measure the amount of solids present in water.	Water analyzer 371 instrument.
DO	The amount of Oxygen available in water.	Titrimetric method.
Conductivity	Use to measure dissolve substance, chemicals, and minerals present in water.	Water analyzer 371 instrument.
Alkalinity	The measure of waters capability to neutralize the acids.	Titrimetric method.
Acidity	To determine corrosiveness of water.	Titrimetric method.
Chloride	Measurement of Chloride amount in water.	Titrimetric method

RESULT AND DISCUSSION

Various parameters are analyzed periodically and results of the water quality are summarized below.

Table no: - 1 Potable Water during July 2021 (Rainy season);

Parameters			WELL			LAKE		
	S1	S2	S3	S4	S1	S2	S3	S4
Temperature	24	23	24	22.8	25	27.3	25	28.2
pH	7.2	8.10	8	7.3	8.3	8.5	7.5	7.8
Taste	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Agree
TDS	250	300	165	151	600	758	946	775
DO	7.71	8.10	7.60	8.85	7.61	7.30	7.42	7.22
Conductivity	215	152	340	500	850	882	752	543
Alkalinity	75	110	116	170	100	70	108	89
Acidity	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab
Chloride	34.0	42	38	44.2	51.2	43	55	41

Table no:-2 Potable Water during December 2021 (Winter season);

Parameters			WELL			LAKE		
	S1	S2	S3	S4	S1	S2	S3	S4
Temperature	20	24	19	15	26	27	20	21
pH	7.2	7.5	7.8	8.1	6.5	7.4	7.2	8.2
Taste	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
TDS	354	534	646	631	624	614	784	895
DO	9.20	7.70	8.94	9.60	7.66	6.98	8.32	8.55
Conductivity	172	500	450	642	456	521	650	725
Alkalinity	73	127	118	180	97	75	106	84
Acidity	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab
Chloride	25.1	30.0	50	49.2	42	55.4	19	88

Table no:-3 Potable water during April 2022 (Summer season);

Parameters			WELL			LAKE		
	S1	S2	S3	S4	S1	S2	S3	S4
Temperature	34.4	36.8	33.2	36.2	36.1	36.8	35.6	34.7
pH	9.65	6.65	8.58	9.07	9.13	9.15	8.8	8.5
Taste	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
TDS mg	510	426	451	405	418	385	465	380
DO	7.78	6.18	6.94	6.02	6.12	6.08	7.10	7.20
Conductivity	912	857	906	816	800	803	822	850
Alkalinity	76	125	115	175	95	78	105	80
Acidity	Ab	Ab	Ab	Ab	Ab	Ab	Ab	Ab
Chloride	49	35	46.1	24.8	39	53.3	17.8	89.1

The studied parameters showing little change and seasonal fluctuation. Variation in quality parameters is due to seasonal change in environmental conditions.

Temperature-

Temperature is a critical water parameter hence it influences the dissolved oxygen available in water. During study there were fluctuations in water temperature depending upon the season(12). Studied samples are showing very little change in temperature and it is due to the atmospheric temperature. There were rise in temperature of well as well as Lake during the month of April up to 36.8°C. During rainy season the temperature of potable water was around 23-28°C. The minimum temperature was observed during the month of December i.e. 15°C.

pH -

The measurement of pH indicates the acidity and alkalinity of potable water. The pH of drinking water is important because it affect the solubility and availability of nutrients(12). Highest pH value was recorded at station -1 (well) is 9.65 pH during month of April And minimum at station -1 (lake) 6.5 pH during month of December.

Taste-

At the month of July the water taste of lake at station-1 is disagreeable due to contamination. There were no more effect on water taste around the area.

TDS-

The limit of total dissolved solids (TDS) is 500 mg/l (ICMR, 1975). During study the TDS values varied from the 150-986 mg/l

Dissolved Oxygen-

The dissolved oxygen varied from 6.02 mg/l to 9.60 mg/l. The maximum dissolved oxygen observed in winter season and minimum in April.

Conductivity-

The maximum conductivity was observed during the month of April i.e 912 us/cm whereas minimum was during July 152 us/cm. This indicates the potable water has different quality at different stations of well and lakes.

Alkalinity-

The total alkalinity value in the present study was fluctuated from season to season. Minimum value of alkalinity 70 mg/l was observed at station 2 (S2) of lake during July, while maximum 180 mg/l at station 4 (S4) of well during winter was observed.

Acidity -

There is absence of acidity observed in collected water sample. Hence only alkaline nature water is present around Chandwad region.

Chloride -

Chloride concentration is one of most important indicator of water pollution, it is one of the major anion found in water. During study the maximum chloride content was observed during the month of December at station 2 (S2) of lake i.e. 55.4mg/l and minimum 19 mg/l was found at station 3 (S3) in December.

CONCLUSION

The studied parameters indicate that due to municipal waste, domestic sewage, washing of clothes, agricultural runoff affects the quality of potable water to a certain extent. The physico-chemical parameters from Wells and Lakes around study area are as per the recommendations of WHO limits for drinking purposes. This study aimed to assess water quality during rainy, winter and summer seasons. From the overall study it can be concluded that there was no effect on the water quality of Chandwad region but it should be considered seriously so far as diseases outbreak is concerned.

REFERENCES

1. Ajay D.Chavhan, M.P. sharma and Renu Bhargava,(2010) water quality assessment of Godavari river hydro Nepal journal of water energy and environment. pp: 31-34.
2. B.C.behera, R.R. Mishra,J.K.patra, S.k dutta, H.N.Thatoi, (2014) physicochemical properties of water sample collected from mangrove ecosystem of Mahanadi river delta, Odisha, India. American journal of marine science. 2(1) pp: 19-24
3. D. R. Khanna, et al., (2012) Assessment of water quality of River Ganges during Kumbh mela 2010.
4. Devangee Shuklas, kinjal Bhadresha, Dr. N.K. Jown, Dr. H.A. Modi (Jul-Aug 2013) Physico chemical Analysis of water from various Sources & their Comparative Studies 5(3) PP 89-92.
5. Karhade Vedant Ramchandra & Jagadeesh Godihal , (2018) Water Quality Monitoring of Kham River, Aurangabad Maharashtra , India ; A study 6(1) PP:27-29.
6. Monika dubey, and N.C. Ujjania. (2013) Water Quality, And Pollution Status Of Tapi River, Gujarat ·1(3) pp: 261-266.
7. Monikandon Sukumaran and Kesavan Devarayan (2016) Assessment of Water quality of Kaveri River in Erode District, Tamil Nadu by a variance variable technique, International Journal of Science, Environment. 5(4) pp: 2017-2022.
8. Patil P.N, Sawant D.V, Deshmukh R.N, (2012) Physico-chemical parameters for testing of water – a review, International journal of environmental science 3(3) pp:1994-1207.
9. Pawan Kumar Singh and Pradeep Shrivastava (2015) Analysis of water Quality of River Narmada Vol, 7 (12) pp: 24073-24076
10. R.Bhutani, D.R.Khanna, D.B Kulkarni. M.Ruhela (2013). Assessment of Ganga River ecosystem at Haridwar, Uttarakhand India with refers the water Quality indices. 6(2), pp:107113.
11. Reshma bhalla and B.B.waykar (2013) Monitoring of water quality and pollution status of Godavari river in and around nashik region, Maharashtra. An international quarterly scientific journal,12(1) pp: 125-129.
12. Singh Namrata(2010) Physico chemical properties of polluted water of river Ganga at Varanasi, International journal of energy and Environment. 11(5), pp:823-832.

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