

Full Proceeding Paper

EVALUATION OF PHYSICO-CHEMICAL PARAMETERS OF GROUNDWATER OF THE VILLAGES OF OSMANABAD DT., MAHARASHTRA, INDIA

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ABSTRACT

The analysis deals with the investigation of physicochemical parameter of ground water of the different villages of dist. Osmanabad (MS). The physicochemical parameter like, temperature, pH, electrical conductivity, total dissolved solids, turbidity, total hardness, calcium, magnesium, sodium, potassium, chloride, fluoride, Nitrate, Sulphate was determined. The results were compared with standards given by WHO and IS 10500. In the investigation, it is found that the ground water of some villages like kangara, irla gets slightly polluted.

Keywords: Groundwater, physicochemical parameter, water quality, WHO, Standard range.

INTRODUCTION Rural living is the key stone of Human ecology. Large villages in the less developed countries typically combine the traditional environmental health problems especially due to polluted water. Physico-chemical analysis is very importance to know the quality of water. Water is a good polar solvent and often referred to as the universal solvent. Substances that dissolve in water, e.g., salts, acids, alkalis, and some gases especially oxygen, carbon dioxide (carbonation) are known as hydrophilic (water-loving) substances, while those that are immiscible with water (e.g., fats and oils), are known as hydrophobic (water-fearing) substances. Water quality refers to the chemical, physical and biological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose. It is most frequently used by reference to set of standards against which compliance can be accessed. The most common standards used to assess water quality relate to health of ecosystem, safety of human contact and drinking water. The ground water sample collected from two sources like bore well and dub well. Such

as the water sample of chillwadi, ruibhar and rajuri collected from the bore well similarly the sample of irla, dhoki collected from the dub well.

MATERIAL AND METHODS

The sample was collected from the different villages of Dist. Osmanabad and the sample was collected into the sterilized glass bottle in the morning hours between 09 to 11 AM in the month of Nov-14. The collected sample brought to the lab immediately for the experiment to study about the various water quality parameters as per the standard procedures (APHA, AWWA and WEF, 1992). pH of the samples was recorded using a pH meter (Toshniwal Instr. Pvt. Ltd. No. 54). Acidity and alkalinity values determined by titration methods (APHA et al., 1995), chloride by argentometric method (APHA et al., 1995, Manivasakam, 1996) and nitrate brucine method (Manivasakam, 1996).

RESULTS AND DISCUSSION

The physico-chemical parameters of the water sample of various villages of dist. Osmanabad shown in table 1.

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Table 1: Result of Physicochemical Parameters of Different Villages of Osmanabad Dist.

Sr.N	Village	Tem p.	Color	Odour	Turb	pH	T.D.S.	T.H.	Ca	Mg	Cl	Na	K	Fe	F	So ₄	NO ₃
1.	Chillwadi	29	cl	ol	1.3	84	687	252	27	44	176	160	1	0.1	0.15	24	31
2.	Ruibhar	29	cl	ol	3.2	7.9	650	482	117	46	160	24	2	0.1	0.15	50	29
3.	Rajuri	29	cl	ol	2.1	7.4	752	552	118	61	192	56	7	0.2	0.1	28	23
4	Kangara	29	cl	ol	2.4	7.6	1318	900	200	96	356	129	160	0.5	0.1	102	53
5.	Arni	29	cl	ol	3.2	7.8	360	280	61	31	24	22	2	0.1	0.3	13	11
6.	Jagli	29	cl	ol	2.6	7.8	422	300	77	26	60	33	1	0.1	0.1	22	16
7.	Irla	29	cl	ol	2.1	7.4	1395	1240	248	149	426	130	22	0.2	0.25	149	52
8.	Wanewadi	29	cl	ol	3.1	7.7	656	372	83	39	144	119	2	0.1	0.35	24	27
9.	Gowardhan wadi	29	cl	ol	2.4	7.9	659	340	72	38	148	118	1	0.1	0.25	25	27
10.	Dhoki	29	cl	ol	3.1	7.6	1434	1280	245	160	486	136	22	.1	.58	12	52
11.	Kothegaon	29	cl	ol	2.2	8.2	723	368	7	46	170	101	3	0.2	0.46	58	32
12.	Dhorala	29	cl	ol	2.3	8.3	832	276	75	21	168	114	4	0.2	0.64	47	35
13.	Goriwadi	29	cl	ol	1.4	7.3	1143	968	194	116	368	110	2	0.3	0.64	291	14
14.	Takwiki	29	cl	ol	2.3	8	764	528	62	89	156	65	1	0.2	0.4	154	9
15	Osmanabad	29	cl	ol	2.1	7.3	691	532	144	41	160	52	1	0.1	0.25	24	39

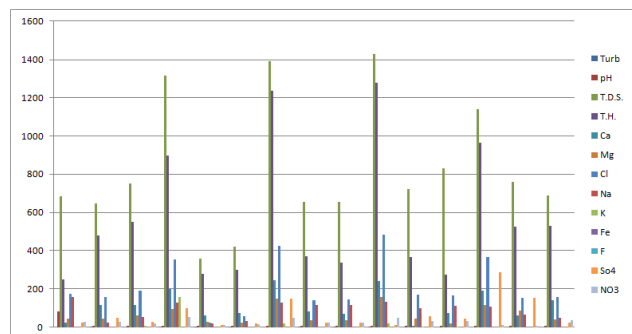


Fig.1. Physicochemical Parameters of Different Villages of Osmanabad Dist.

Temperature

According to the biological importance temperature plays a very important role the temperature of the collected water from the villages shown in table 1. is 29 C during study period. similarly the odour and color of the collected sample from the villages were odorless and colorless respectively.

pH

The pH is very important parameter to decide the water quality. The standard range for ground water 7.0 to 8.5 according to the WHO. The pH values recorded during the studies of various villages of Osmanabad dist. The pH is in the range of given by the WHO but the higher pH values obtain from sample of Chillwadi (pH-8.4), Dhorala (pH -8.3), Kolhgaon (pH-8.2). Carbon dioxide bicarbonates which are responsible for increase in pH.

Turbidity in NTU

Turbidity into water is due to the colloidal and extremely small dispersion. But in the study of turbidity in the water sample of these villages it is found that the turbidity in the water sample of some villages in more than standard range given by the ISI (10500-91). In jagji turbidity is 0.6 and Kangara, wadi and goriwadi having the turbidity is 0.4 NTU. Similarly in Chilwadi, Dhorala, Takwiki having 0.3 NTU.

Electrical Conductivity in MS / cm

Electrical conductivity (EC) is a measurement of the dissolved material in an aqueous solution, which relates to the ability of the material to conduct electrical current through it. EC is measured in units called Seimens per unit area (e.g. mS/cm, or miliSeimens per centimeter), and the higher the dissolved material in a water sample, the higher the EC will be in that material.

Total Dissolve Solids (TDS) in mg/l

The TDS are the total amount of mobile charged ions, including minerals, salts or metals dissolved in water. If water containing more than 500 mg/L of TDS is not considered desirable for drinking water but in unavoidable cases 1500mg/L is also allowed. In the study of ground water of these villages the TDS at high level of Kangara (1318), Irla (1395), Dhoki (1434), Goriwadi (1143).

Total Hardness (TH) in mg/l

Water becomes hard by being in contact with soluble, divalent, metallic cations. The two main cations that cause water hardness are calcium (Ca²⁺) and magnesium (Mg²⁺). Hardness of water leads to heart diseases and kidney stone. The total hardness range given by WHO up to 500 mg/L. The hardness of ground water of villages of Osmanabad dist. In which the Kangara (1318mg/l), Irla (1395mg/l), dhoki (1434 mg/l), goriwadi (1143mg/l) has higher value.

Calcium (Ca²⁺) in Mg/l

The Calcium ion is also responsible for hardness of water. According to the WHO the standard range is 100mg/l. In the study of ground water of Osmanabad dist. Villages it is found that calcium in water

sample of Ruibhar (117mg/l), Rajuri (118mg/l), Kangara (200mg/l), Irla (248mg/l), Dhoki (245mg/l), Goriwadi (194mg/l) and Osmanabad (144mg/l) have more value than standard.

Magnesium (Mg²⁺) in mg/l

The Magnesium in the range is 150mg/l given by the WHO and the sample of water under investigation found that all water sample in the acceptable limit except dhoki and Irla. Which indicate the more value i.e. 160 mg/l and 149 mg/l respectively.

Sodium (Na⁺) in mg/l

The investigated water sample of these villages found below the standard range 200mg/l. The water of all these villages has limited concentration on sodium ion.

Potassium (K⁺) in mg/l

The potassium in the water is due to the weathering of rocks. The percentage of potassium increase due to disposal of waste water. The potassium concentration in the Kangara (160mg/l) has high value as compare to other.

Chloride (Cl⁻) in mg/l

The accepted values for chloride ion is below mg/l. In the present analysis it is found that the villages such as Kangara (356 mg/l), Irla (426mg/l), Dhoki (486mg/l), Goriwadi (368mg/l) the chloride concentration was found out of the limit.

Fluoride (F⁻) in mg/l

The accepted value for fluoride is 1.5gm/l by the WHO and in the analysis of water samples it is found that all the value are accepted and below standard limit.

Nitrate (NO₃⁻) in mg/l

The standard limit given by the ISI for Nitrate is 45gm/l. So according to the limit given by ISI the analysis of water sample in which Kangara (53mg/l), Irla (52mg/l) and Dhoki (52mg/l) are above the standard limit.

Sulphate (So₄⁻) in mg/l

Sulphate may be leached from the soil and is commonly found in most water supplies there are several other sources of sulphate in water. Decaying plant and animal matter may release sulphate into water. Sulphate is generally considered to be non-toxic. The consumption of drinking water containing high amounts of magnesium of sodium sulphate may result in intestinal discomfort, diarrhea and consequently dehydration, when someone drinks water that contains greater than 250 milligrams per litre (mg/L) of sulphate. But in the analysis it is found that the concentration of sulphate is under the limit in all samples.

Iron (Fe) in mg/l

Iron concentration in drinking water is typically less than 0.3mg/L. Iron concentration of higher than 0.3mg/L in drinking water are noticeable. In the analysis it is found that the iron concentration is below the given range except kangara (0.5mg/l).

CONCLUSION

In the present investigation it is found that the ground water of some villages like kangara, Irla slightly polluted.

REFERENCES

1. Murhekar Gopalkrushna H. Assessment of Physico-Chemical Status of Ground Water Samples in Akot city (M.S.), Vol. 1(4), 117-124, July (2011), ISSN 2231-606X.
2. Mishra K.R., Pradip, Tripathi, S.P. Groundwater Quality of Open Wells and Tube Wells, Acta Ciencia Indca, XXXIIC, 2, 179 (2002.)
3. Gupta V., Agarwal J., Sharma S.; Adsorption Analysis of Mn (VII) from Aqueous Medium.
4. Iwuoha G.N. and Osuji L.C., Changes in Surface Water Physico-chemical Parameters following the Dredging of

- Otamiri nd Nworie Rivers, Imo State of Nigeria, Vol. 2(3), 7-11, March (2012) Res. J. Chem.Sci.International Science Congress Association 7.
5. J.D. Khandekar, P.H. Bhagwat & M. B. Wasu, Study Of Physico-Chemical Parameters And Presence Of Heavy Metals In Bore Well Water At Himalaya Vishwareidential Area Wardha, Sci. Revs. Chem. Commum : 2(3),2012, 179-182 ISSN 2277-2669.
 6. Pawar S.K. and Pulle J.S. (2005). Studies on physicochemical parameter in pethwalaj dam, Nanded Dist. Maharashtra, India.
 7. Rao and Venkatewharulu (2000), Physico Chemical Characteristic of under groundwater in nagercoil town (south) IJEP24 (i)53-56.
 8. Kavita Sahni and Sheela Yadav, Seasonal Variations in Physico-Chemical Parameters of Bharawas Pond, Rewari, Haryana Asian J. Exp. Sci., Vol. 26, No. 1, 2012; 61-64.
 9. Sayyed Hussain, Syed Yousuf Hussain, Vidya Pradhan, Mazahar Farooqui, Fluoride ion Concentration Of Ground Water From Dharmabad, District Nanded, Maharashtra, Volume-1, Issue-3 Sept-Nov2011.
 10. S.A. Manjare, S.A. Vhanalakar and D.V. Muley, Analysis Of Water Quality Using Physico-Chemical Parameters Tamdalge Tank In Kolhapur District, Maharashtra, Vol. 1, Issue 2, Dec-2010, pp 115-119, ISSN 0976-2612.
 11. P.N. Kamble, S.J. Kokate, H.R. Aher and S.R. Kuchekar, Seasonal Variation In Physico-Chemical Parameters Of Khandakwasala Reservoir, Vol. 1, No. 1 (2008), 63-67.
 12. K.L. Sathidanandamurthy and H.N. Yajurvedi, A study on physicochemical parameters of an aquaculture body in Mysore city, Karnataka, India, October 2006, 27 (4) 615-618 (2006
 13. Kodarkar M.S. (1992) Methodology for Water Analysis Physico Chemicals, Biological and Microbiological. Indian Association of Aquatic Biologist (IAAB), Hyderabad Publication, pp.2-50.