

Study Of Physiochemical Parameters to Evaluate the Water Quality from Some Regions of Ralegaon Taluka, Dist. Yavatmal

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Abstract :

Drinking water is a vital constituent for all species of living organisms. Ground water is the most crucial natural resource, which supports human development & economic diversity. The water quality recommendation provides a limited value for each parameters of drinking water. The availability of favourable quality of drinking water is an crucial/vital feature for preventing disease. It is necessary to know details about different physico-chemical parameters such as pH, temperature, conductivity, alkalinity, turbidity, hardness, etc used for testing of water. Heavy metals like Pb, Cr, Fe, Hg, etc are the special concern because they produce chronic toxicity in aquatic life. Water samples are used for analysis through different locations of Ralegaon Taluka. The samples were analysed for their physico-chemical and microbiological quality to assess the contamination problems and to suggest appropriate solutions. In present study water quality is analysis by various standards & analytical methods. The results are interpreted to explain the quality of water, toxicity, water contaminations such as chemicals and microbial materials etc.

Keywords : Physico-chemical parameters, dissolved salts, metals, hardness, pH

Introduction :

Out of some of the most important components, Water is one of the most essential components responsible for the existence of life on earth. Ground water is highly influenced by either of natural or human activities¹. Though water pollution is old problem, modern age added some of the new problems like growing population, sewage disposal, industrial waste, radioactive waste, etc. These factors polluted our water resources so much that about 75 % rivers and streams, not only of India but also of all the countries, contain polluted waters. According to WHO, about 600 million cases of diarrhea and 46,00,000 childhood deaths are reported per year because of contaminated water. So it is a challenge before world to focus on pollution control and water management. As water shortage grows as a worldwide trouble, food safe future is also brought into consideration. Water has multiple uses like for drinking, irrigation, and transportation, washing and waste disposal for industries and used as a coolant for thermal power plants². Water quality refers to the chemical, physical, and biological characteristics of water based on the different standards³. Pollution of the water bodies first affects its physico- chemical parameters and hence systematically destroys the dependent things on it. Therefore the study of water pollution is important due to effluents from municipal sewage, livestock wastewater etc⁴. Among other pollutants, human activities in particular husbandry livestock and agriculture play an important role in contributing contamination of water⁵. Wastewater of livestock contains high concentrations of ammonia nitrogen, organic and inorganic nitrogen compound, and pathogenic bacteria⁶. Furthermore, serious environmental damage as a result of animal waste has been well documented which receive runoff of nutrient rich waste that caused oxygen depletion and increased the algae production⁷. The objective of the present study is to assess and identify and quantify the chemical components and properties of water samples collected.

Materials and methods :

Six water sample from different areas and different regions from ralegaon taluka district Yavatmal were collected for analysis. All the chemicals used for analysis are from GR/AR grade. Some of the

parameters are assessed in laboratory. Some parameters are analysed by sending the water samples to district water and soil analysis laboratory, Chandrapur by Krushi Prashikshan.

Types of samples and Locations :

Sample No.	Samples	Type of Source	Locations	Depth in Feet	Latitude N	Longitude E
1.	Sample 1	Bore well	Devdhari	200 feet	20.204275	78.676027
2.	Sample 2	Open well	Kinhi	35 feet	20.275484	78.720838
3.	Sample 3	Open well	Kinhi	27 feet	20.275388	78.720844
4.	Sample 4	Bore well	Wadki	250 feet	20.275491	78.720851
5.	Sample 5	Bore well	Wadki	200 feet	20.275496	78.720744
6.	Sample 6	Bore well	Wadki	300 feet	20.275565	78.720939

Sample region map :

Ralegaon taluka maps from where the samples are taken from wadki village



Results and DiscussionS :

The values of physico-chemical parameters are presented in the table below :

Sr.no.	Parameters	S1	S2	S3	S4	S5	S6	Limits
1.	PH	7.6	7.7	7.8	7.5	7.5	7.7	6.5 to 8.5
2.	Conductivity	0.69 $\mu\text{s/cm}$	0.39 $\mu\text{s/cm}$	0.40 $\mu\text{s/cm}$	0.60 $\mu\text{s/cm}$	0.52 $\mu\text{s/cm}$	0.92 $\mu\text{s/cm}$	0.5 to 3 $\mu\text{s/cm}$
3.	Temperature	28 ⁰ c	30 ⁰ c	29 ⁰ c	29 ⁰ c	30 ⁰ c	25 ⁰ c	0 to 40 ⁰ c
4.	Calcium	4.0	3.4	3.2	3.4	3.4	3.4	0 to 10 mg/L
5.	Magnesium	1.4	1.4	1.4	1.2	1.4	1.6	1 to 1.25 mg/L
6.	Sodium	1.16	0.97	1.12	1.07	1.22	1.18	0 to 5.0 mg/L
7.	Potassium	0.82	0.72	0.87	0.73	0.82	0.78	0 to 4.0 mg/L
8.	Carbonate	2.0	2.4	2.4	2.4	2.4	2.0	0 to 1.5 mg/L

9.	Bicarbonate	2.4	2.0	2.4	2.0	2.0	2.4	0 to 1.5 mg/L
10.	Chloride	2.4	2.4	2.4	2.0	2.4	2.4	0 to 250.0 mg/L
11.	Sulphide	0.58	00	00	00	0.04	0.56	0 to 2.0 mg/L
12.	Sodium containing capacity	0.70	0.62	1.12	0.70	0.79	0.74	Less than 10

Water quality analysis is required mainly for monitoring purpose of parameters⁸. Physical properties like odour, colour, pH, turbidity, and conductivity and chemical analysis includes TDS and TSS, Hardness etc are analysed by chemical methods. Water quality index (WQI) is important parameter used in the study so that the changes and variations in the quality of water of the samples can be measured. Assessment of water quality is carried out by different physicochemical parameters like TDS, Chlorides, pH, Carbonate, Bicarbonate, Calcium, etc by conventional method. The obtained results are carefully compared with standard values and the variation in them is used to assess the water quality. The average temperature of water samples of the study area was 28.6 °C and in the range of 28–29 °C. Temperature in this study was found within permissible limit of WHO (30 °C)⁹. Pure water is not good conductor of electricity due to absence of ions. The measured value of the conductivity of samples does not exceed the standard limits set by WHO. These results clearly shows that water in the region under study was not considerably ionized and has the lower level of ionic concentration activity due to small dissolve solids (Table 1). The measured values of pH for these samples are in good agreement with the limits set by WHO.

Presence of chlorides is mainly obtained from the dissolution of salts of hydrochloric acid as table salt (NaCl), NaCO₂ and added through industrial waste, sewage, sea water etc. Chlorides plays an importance for metabolic activities in human body and other main physiological processes. According to WHO standards, concentration of chloride should not exceed 250 mg/l. In the present investigation, the chloride value ranges from 3–4.4 mg/l.

Calcium is important trace element for human beings. Measured values of calcium are in the range that is from 3.0 to 4.0 which is in good agreement with the limits set by WHO. Sodium, the important trace element whose amount is responsible for different fatal diseases. In the present samples, the values of sodium obtained within the range 0 to 2 mg/L which is in good agreement with the limits set by WHO. The values of potassium are also in good agreement with ranges set by WHO.

Though, this study supports to assess the water quality, further detailed study can be carried out for a longer time and detailed results can be obtained by modern techniques of analysis. The obtained data can be made more comparable with scientific findings by the standardization of the sampling locations. The study can be extended by assessing concentration of different metals in human body through analysis of urine and blood to find impact on human health.

Conclusion :

Measured values of the different physicochemical parameters shows that drinking water of the study area is consistent with World Health Organization standards and suitable for drinking. It is observed that all the values of sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), chloride (Cl), pH, sulphide, etc fall under the permissible limit and there were no toxicity problem. Present investigation shows that water samples does not show extreme variations in the concentrations of studied parameters. With respect to the current investigation, the water samples are safe for drinking and different activities.

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