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PHYSICO-CHEMICAL INVESTIGATION OF DRINKING WATER SAMPLES OF ADJACEMENT VILLAGES OF PANVEL

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Abstract:

This research is based on an examination of drinking water parameters in a number of villages in Panvel, Maharashtra, India. A sample was collected from each of Panvel's six villages. Water was studied in detail in terms of colour, temperature, acidity, hardness, pH, sulphate, chloride, DO, BOD, COD and alkalinity. Some water analysis reports with physicochemical parameters have been provided for the parameter exploration study. Guidelines for various physicochemical parameters have also been provided for relating the value of a real water sample. The current study found that some of the water samples did not meet drinking water standards.

Key Words: *Drinking Water, COD, Panvel,*

Introduction:

Water is an inorganic, transparent, tasteless, odourless, and nearly colourless chemical substance that is the main constituent of the Earth's hydrosphere and all known living organisms' fluids. Despite the fact that it contains no calories or organic nutrients, it is essential for all known forms of life [1-4]. Water is also known as life. Pollution is commonly attributed to the industrial revolution. The revolution brought about a slew of industrial activities that degraded the environmental quality of the affected area [5]. The activities also gave birth to various sources of pollution, which must be identified first in order to investigate the current state of pollution in the area. A human being consumes approximately two litres of water per day on average throughout his life. Pollution affects all aspects of the environment in different ways. Water pollution, on the other hand, has been scrutinized because water is an essential component of life on Earth. The most significant factors contributing to increased water pollution are population growth, increased industrialization, and urbanization. To improve the quality of drinking water, various treatment methods are used [6-7]. Water should be free of organic and inorganic pollutants, pesticides, heavy metals, and other contaminants. As well as all its parameter like pH, Dissolved Oxygen, Chloride, Total Dissolved Solid, Total Alkalinity, Calcium, Magnesium, Total Hardness, and Electrical Conductivity should be within acceptable limit. The present work is an attempt to measure Physico-Chemical Analysis of Drinking Water Samples of Different villages of Panvel region.

Experimental:

Samples and methods:

All the samples were collected in the month of February 2022 The Drinking water samples were collected from Khanda colony, Adai, Vihighar, Vichumbe, Nere and Taloja. The samples were collected in clean polythene bottles. The bottles were washed before sampling and tightly closed after collection. The temperature of the samples was measured in the field itself. The samples were kept in refrigerator at 6 ℃.

Temperature, pH, Total dissolved solid (TDS), Total hardness (TH), Acidity, Electric Conductance (EC), Dissolved Oxygen (DO), and Chemical Oxygen Demand were determined using physicochemical properties of drinking water samples (COD). The analysis was carried out in accordance with standard procedures [8]. The pH was determined using a standard pH meter; electric conductance was determined using an Equiptronics auto conductivity meter; total dissolved solids were determined using standard methods; total hardness was determined using an EDTA titrimetric method; and chemical oxygen demand (COD) was determined using an open reflux technique. Analytical grade chemicals were used in the analysis.

Result and discussion:

The results of the study were compared to the standards. The drinking water in the study area is colorless and odorless. The temperature was found to be between 27 and 35 degrees Celsius. The higher temperature in the current study could be attributed to the fact that it was conducted during the summer. The pH values of the water sample are shown, and they are in the range of 6.48 to 7.54. The ideal pH range for drinking water is between 6.5 and 8.5. The pH of all samples is within the required range for drinking water standards. The conductivity of the water sample under investigation ranges from 360 to 1910 mho/cm. A high conductivity value indicates the presence of more electrolytes in water samples under study. The total hardness of Drinking water samples of Khanda colony, Adai, Vihighar and Vichumbe was found well within the needed limits and is safe for drinking purpose. However, the total hardness for water samples from Nere and Taloja was found much higher than the required limits for drinking water standards.

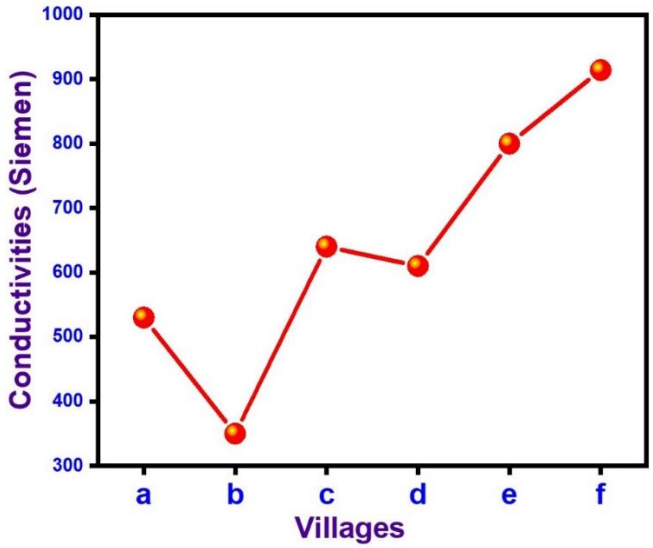
Total dissolved solid (TDS) is a measurement of the total amount of inorganic and organic substances in a liquid. TDS levels in drinking water are limited to 500 mg/L. The current study's findings indicate that the TDS of drinking water samples from Khanda colony, Adai, Vihighar, and Vichumbe are within the acceptable limit, while others are above it. The dissolved oxygen (DO) and chemical oxygen demand (COD) values for all samples under consideration are all within acceptable limits. All of the heavy metals found in the water samples were found to be within the allowable limit.

Physico-Chemical Analysis of Drinking Water Samples of nearby villages in Panvel

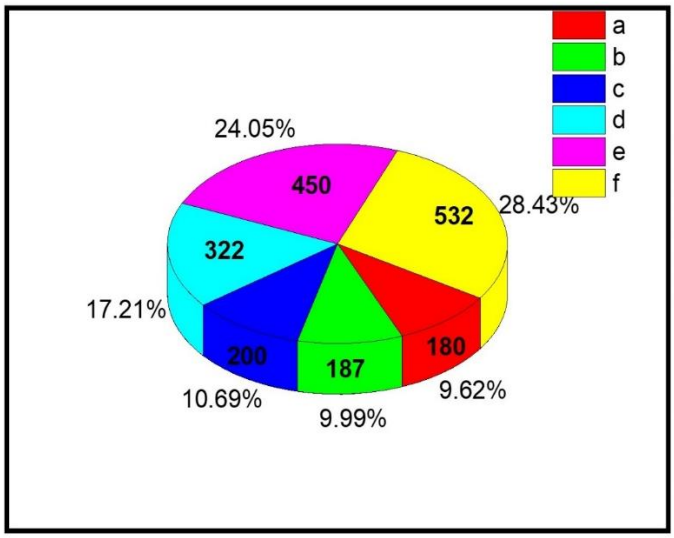
(a = Khanda colony, b = Adai, c = Vihighar, d = Vichumbe, e = Nere, f = Taloja)

1) pH

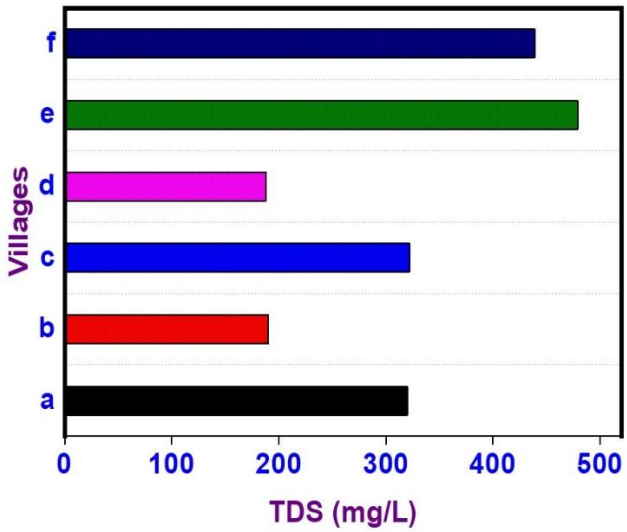
2) Conductivity



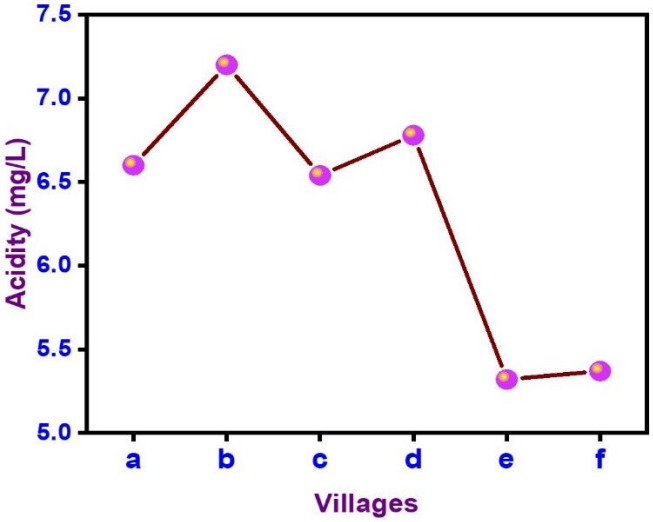
3) Total Hardness



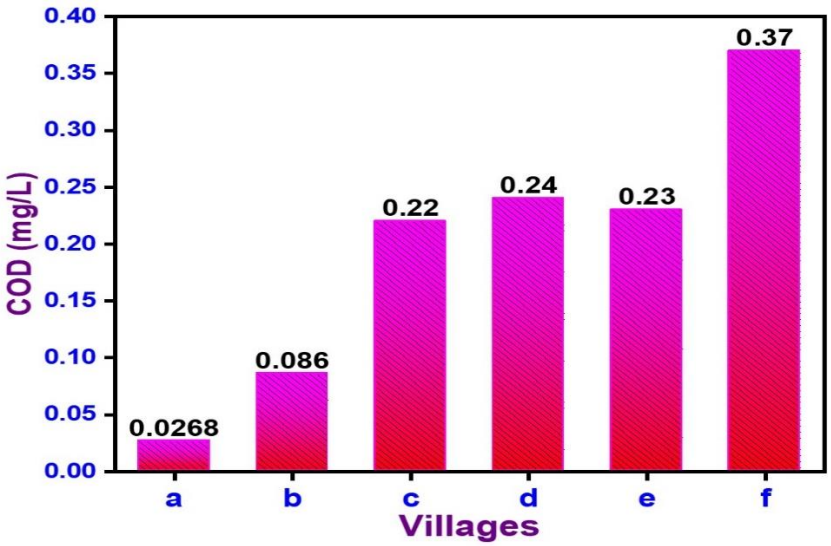
4) Total Dissolved Solid (TDS)



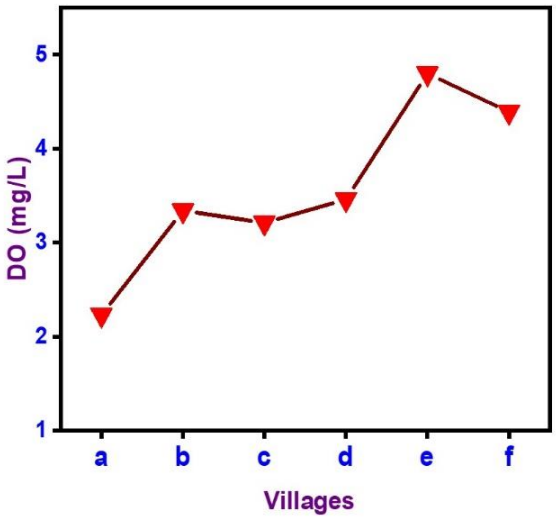
5) Acidity



6) Chemical Oxygen Demand (COD)



7) Dissolved Oxygen (DO)



Standard required perimeter of water quality parameters in drinking water set by different agencies are specified [9-10].

Parameters	ISI (1983)		WHO (1984)		BIS	
	HDL	MPL	HDL	MPL	HDL	MPL
pH	6.5-8.5	6.5-9.2	7.0-8.5	6.5-9.5	7.0-8.3	8.5-9.0
TH (mg/L)	300	600	200	600	200	600
TDS (mg/L)	500	2000	---	---	500	2000
COD (mg/L)	150	255	---	255	150	255

HDL- Highest Desirable Level, **MPL**-Maximum Permissible Level, **ISI**- Indian Standard Institute, **WHO**- World Health Organization, **BIS**- Bureau of Indian Standard

Conclusion:

The chemical analysis of drinking water samples from the study zone reveals significant variations. Some of the water samples do not meet drinking water standards. The water quality in drinking water samples from Khanda colony, Adai, Vihighar, and Vichumbe has been determined to be suitable for drinking. However, regular chemical analysis is required to ensure that the water quality in this area is not polluted. The drinking water quality in Nere and Taloja does not meet drinking water standards, so it is not suitable for drinking but can be used after appropriate technological measures are implemented.

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