© INTERNATIONAL JOURNAL FOR RESEARCH PUBLICATION & SEMINAR
ISSN: 2278-6848 | Volume: 13 Issue: 02 | April - June 2022
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Refereed & Peer Reviewe

Physico-chemical parameters for testing of water

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Abstract: People on earth are under tremendous threat due to undesirable changes in the physical, chemical and biological properties of water. Due to increasing population, use of fertilizers and man-made activity, water is becoming polluted day by day with different harmful impurities. Natural water contamination is due to leaching of soils, mining processing and weathering of rocks etc. Hence, it is necessary to check the quality of drinking water at regular time interval, because if we use such contaminated water, we will suffer from varied type of water borne diseases. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. It is necessary to know exactly the details of different physico-chemical parameters such as color, odor, acidity, hardness, pH, sulphate, chloride, dissolved oxygen and alkalinity used for testing of water quality.

Introduction:

Water is one of the most Important Compound to the Ecosystem. All living organisms on the earth need water for their survival and growth. As of now only earth is the planet having about 70 % of water. Better Quality of water Described by its Physical, Chemical and Biological Characteristics. But some Correlation was Possible among these Parameters and the Significant One would be Useful to Indicate Quality of water.

It is difficult to understand the biological phenomenon fully because the chemistry of water revels much about the metabolism of the ecosystem and explain the general hydro - biological relationship. The fundamental importance of water for life has influenced humanity at all times. This includes its essential function for life as well as the fascination and mystics which are derived from water. Water runs as a thread through human evolution. Its occurrence, availability, properties and behaviour, however, have become almost self-evident for us. We must counteract this development and re-establish an awareness of the uniqueness of water and of our responsibility for its sustainable usages.

Physico- Chemical Parameters

It is very essential and important to test the water before it is used for drinking, domestic, agricultural or industrial purpose. Water must be tested with different physic-chemical parameters. Selection of parameters for testing of water is solely depends upon for what purpose we going to use that water and what extent we need its quality and purity. Water does content different types of floating, dissolved, suspended and microbiological as well as bacteriological impurities. Some physical test should be performed for testing of its physical appearance such as temperature, color, odour, pH, turbidity, TDS etc, while chemical tests should be performed for its BOD, COD, dissolved oxygen, alkalinity, hardness and other characters. For obtaining more and more quality and purity water, it should be tested for its trace metal, heavy metal contents and organic *i.e*. pesticide residue. It is obvious that drinking water should pass these entire tests and it should contently require amount of mineral level. Only in the developed countries all these criteria are strictly monitored. Due to very low concentration of heavy metal and organic pesticide impurities present in water it needs highly sophisticated analytical instruments and well-trained manpower. Following different physic chemical parameters are tested regularly for monitoring quality of water.

Temperature: Temperature is also important because of its influence on water chemistry. **The rate of chemical reactions generally increases at higher temperature**. Water, particularly groundwater, with higher temperatures can dissolve more minerals from the surrounding rock and will therefore have a higher electrical conductivity.

pH: pH is really **a measure of the relative amount of free hydrogen and hydroxyl ions in the water**. Water that has more free hydrogen ions is acidic, whereas water that has more free hydroxyl ions is basic. Since pH can be affected by chemicals in the water, pH is an important indicator of water that is changing chemically.

Electrical Conductivity: This ability of conductance in water is **directly proportional to the concentration of the ions present in the water**. The Compounds which dissolve into the ions are known as the electrolytes. The more the number of ions present in the electrolyte, then the higher is the conductivity of water.

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Carbon dioxide: Carbon dioxide is the end product of organic carbon degradation in almost all aquatic environments and its variation is often a measure of net ecosystem metabolism. Therefore, in aquatic biogeochemical studies, it is desirable to measure parameters that define the carbon dioxide system. CO2 is also the most important green house gas on Earth. Its fluxes across the air-water or sediment-water interface are among the most important concerns in global change studies and are often a measure of the net ecosystem production/metabolism of the aquatic system.

Alkalinity: Alkalinity **tells you the buffering capacity in the basic pH range of the water**. You can have a high (or low) pH water with very little buffering capacity, meaning you can easily and quickly change the pH of the water; this also means the water is unlikely to change the pH of soils or potting mixes.

Dissolved Oxygen: Dissolved oxygen (DO) refers to the concentration of oxygen gas incorporated in water. **Oxygen enters water by direct absorption from the atmosphere, which is enhanced by turbulence**. Water also absorbs oxygen released by aquatic plants during photosynthesis.

Carbonate: Carbonates are moderately strong bases. Aqueous solutions are basic because **the carbonate anion can accept a hydrogen ion from water**. $CO_3^{2-} + H_2O \rightleftharpoons HCO_3^- + OH^-$ Carbonates react with acids, forming salts of the metal, gaseous carbon dioxide, and water.

Bicarbonate: Likewise, **if a strong base is introduced, it will react with the carbonic acid to form the bicarbonate anion, thus reducing the potential increase in pH**. The equilibrium will shift right. This buffer is actually used by the body to regulate blood acidity.

Biological Oxygen demand: Biochemical oxygen demand (BOD) represents the amount of oxygen consumed by bacteria and other microorganisms while they decompose organic matter under aerobic (oxygen is present) conditions at a specified temperature. When you look at water in a lake the one thing you don't see is oxygen.

Chemical oxygen demand: Chemical oxygen demand, or COD, is **the measure of the capacity of water to consume oxygen during the decomposition of organic matter in the water**. In other words, it's the amount of oxygen that's needed to oxidise the organic matter present in a quantity of water.

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