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Diploma in Pharmacy 1st Year
Social Pharmacy
Experiment

To study about the use of different types of water testing equipment.

Aim:

To study about the use of different types of water testing equipment.

Reference :

Dr. Gupta G.D , Dr. Sharma Shailesh , Dr. Sharma Anshu , " Practical Manual of Social Pharmacy " Published by Nirali Prakashan , Pg.No 75 - 78

Theory :

Water testing kit ranges from in-field testing of water for a single component to the multiple-component instrumental analysis in the laboratory. Hand held and Benchtop are the simple equipment such as electronic meters which are available to test parameters like pH, turbidity ie: The amount of particulate suspended in liquid and electrical conductivity of water. Water quality testing equipment are found in any laboratory environment which includes waste water testing and drinking water testing, they are also found in pharmaceutical and chemical testing laboratories. The water testing kits are also available in the food and beverage industry, and hydroponics

Benchtop and portable instruments are used to measure

1) Oxidation-Reduction Potential (ORP)
2) Dissolved Oxygen.
3) CO_2
4) Total Dissolved Solids (TDS)
5) Total Hydrocarbons

Meters which are capable of measuring 15 user-selectable parameters are termed as Multi parameter Meters. Waterproof instruments and meters that can test from a few drops of water are also available market

Different types of testing equipment's are:

1) **Benchtop pH Meter:** It is an instrument which is used to measure the acidity, alkalinity of any liquid or semi-solid preparation across many industries. The use of this instrument is in testing of waste water, food, drinking water and beverage. It is also used in chemical and pharmaceutical testing. A typical benchtop pH meters is made up of a measuring electrode, a meter and a reference electrode. The measuring electrode is made up of hydrogen ion [H] sensitivity and it measures pH of the sample that surrounds the glass bulb at the end.

   A small difference in the voltage output which changes with the concentration of H' ions in the sample is measured and displayed by the meter as the pH units. A number of benchtop pH meters are available with different combination of measurement mode including pH, mV and conductivity of the ions. Temperature compensation is one of the important factors as the pH electrodes are temperature dependent.

   The millivolt (mV) output from the electrode will change with respect to the change in temperature of the given sample. This causes a direct change in the Hion activity of the given sample and it causes the ionisation of compounds. Depending on the temperature compensation, the pH meter can be manual or automatic.

2) **Conductivity Meter (Benchtop Conductivity Meters):** They are used to measure the electrical conductivity of the aqueous solutions. Benchtop conductivity meters are used in hydroponic and aquaculture settings, but are found in any laboratory environment. A conductivity meter measures electrical conductivity, Total Dissolved Solid (TDS), pH of the solution, percentage of NaCl, resistance, and temperature of the given sample.
   A benchtop conductivity meter has a conductivity range of 0.001 to 1000 mS/cm and offers a linear, non-linear, automatic temperature compensation, or manual temperature compensation (MTC). Particular features of the meter include high

reproducibility, calibration reminders, multiple calibration points, and generous data storage.

3) **Dissolved Oxygen Analyser (Dissolved Oxygen Monitor):** Dissolved oxygen means the amount of oxygen present in the water and it is used as a common indicator of water quality. The level of oxygen too high or low can be harmful for aquatic life. Dissolved oxygen meters are also termed as dissolved oxygen analysers, are the most effective means of measuring oxygen level in water. It consists of a probe and a monitor for reading and recording oxygen level in water. The two types of oxygen meters are optical (luminescent meters) and electrochemical meters Electrochemical meters take faster readings but need to be calibrated before use. Optical meters last longer and do not need to be calibrated before each use, but their readings take longer and require more power.
4) **Portable Conductivity Meter (EC Meters):** It obtains the electrical conductivity of an aqueous solution. These hand-held meters test for electrical conductivity, pH, and percentage NaCl, mV/redox, resistance and temperature. A hand held is a portable conductivity meter can ascertain the conductivity over measurement ranges of 0.01 uS/cm to 1000 mS/cm. These meters also feature robust manual and automatic temperature compensation ranges from -20 to 120C. With their portability the other important features of an EC meter includes long battery life and data transfer capability.
5) **Portable Dissolved Oxygen Meter:** It give quick result for fresh and salted water, with measurement ranges from 0-99mg/L. to 0-50 ppm, with resolution of 01 mg/L. Operating temperature ranges from 0 to 50C. A portable dissolved oxygen meter also measure other parameters such as pH, biological oxygen demand (BOD), and oxygen uptake rates. A dissolved oxygen meter is built in barometers to obtain the pressure measurements in mmHg, mbar. Pascal's or PSI
6) **Portable pH Meter:** It is the equipment which measures the acidity or alkalinity of a sample by checking the ratio of protons to electrons using a probe. A portable meter allows to accurately checking the pH of a substance which is outside of the lab. This is handy for environmental studies like measuring water and soil quality. While purchasing a handheld pH meter, we should check the range of measurement, the procedure to take the measurements and whether an extra functionality is needed or not, such as the ability to load data directly onto a computer or phone.

7) **Total Hydrocarbon Analyser:** It analyses the total hydrocarbons for applications such as VOC monitoring, emission monitoring, gas leak detection, carbon absorbers, solvent recovery, coating process and control monitoring. Detection methods include a primary detection mechanism using a Flame lonisation Detector (FID).

Result : Use of different types of water testing equipment was studied.

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