

EXPERIMENT--3

DETERMINATION OF pH OF A SAMPLE OF WATER

The term “pH” refers to the measurement of hydrogen ion activity in the solution. Since the direct measurement of the pH is very difficult, specific electrodes are needed for quick and accurate pH determination. pH is measured on a scale of 0 to 14, with lower values indicating high H^+ (more acidic) and higher values indicating low H^+ ion activity (less acidic). A pH of 7 is considered as neutral. Every whole unit in pH represents a ten-fold increase in or decrease in hydrogen ion concentration. Most natural waters possess the pH values ranging from 5.0 to 8.5. Rain water have a pH value of 5.4 to 6.0 which then reacts with the soils and minerals causing the reduction in H^+ ion concentration and thus the water may become alkaline with a pH of 8.0-8.5. More acid water ($pH < 5$) and more alkaline ($pH > 9$) and other immediate changes in the hydrogen ion concentration (pH) suggest that the quality of the water is adversely affected due to the introduction of some toxic contaminants in water bodies.

pH is measured using pH meter, which comprises a detecting unit consisting of a glass electrode, reference electrode, usually a calomel electrode connected by KCl Bridge to the pH sensitive glass electrode and an indicating unit which indicates the pH corresponding to the electromotive force is then detected. Before measurement, pH meter should be calibrated by using at least two buffers.

Precautions

1. The pH meter can be standardized by measuring the 7-pH buffer solution or any other solution of standard pH. Sometimes, the manufacturer of the pH meter may suggest other methods of standardizing, which too have to be followed.
2. The electrodes have to be inserted into the water so that it does not touch the bottom of the beaker. Bottom contact with damage may cause damage to the electrodes.
3. Any cause of slow response due to the polarization can be solved by washing the electrodes thoroughly.
4. Periodic check has to be conducted to check the electrodes

5. During the electrode storage, they have to be kept moist. And also follow the instructions of the manufacturer.

EQUIPMENT REQUIRED:-

1. pH meter
2. pH electrode filled with KCL solution
3. Buffer solutions of pH4 and pH 7
4. Clean beakers
5. Tissue papers
6. Distilled water
7. Thermometer

Procedure:-

- * Plug in the pH meter to power source and let it warm up for 5 to 10 minutes
- * Wash the glass electrode with distilled water and clean slowly with a soft tissue.
- * Note the temperature of water and set the same on the pH meter
- * Place the electrode in pH 7 buffer solution and set the value of 7 on the pH meter turning the Calibrate knob on the meter.
- * Take out the electrode, wash with DW and clean.
- * Dip the electrode in the pH 4 buffer solution. Adjust the value on the pH readout meter by the Slope switch . Repeat with pH 7 and pH4 buffers till a correct and stable reading is displaced.
- * While moving and cleaning the electrode, put the selector switch on standby mode. Turn to pH mode for recording the pH.

- * Now place the electrode in the water sample whose pH is to be determined.
- * You can take a number of simultaneous readings for different samples until the power is on



pH Meter

Note:- Click on the link below to see demo

https://www.youtube.com/watch?v=LzE-cwRFuoA&ab_channel=Solution-Pharmacy