

Experiment 7

Aim



To find the pH of the given samples of solutions of solids or fruit juices using pH paper.

Theory



The pH is the measure of the acidic (or basic) power of a solution. It is a scale for measuring hydrogen ion concentration in a solution. The pH scale varies from 0 to 14. At 25 °C (298 K), a neutral solution has pH equal to 7. A value less than 7 on the pH scale represents an acidic solution. Where as pH value more than 7 represents basic solution. Generally a paper impregnated with the universal indicator is used for finding the approximate pH value. It shows different colour at different pH [Fig. 7.1(b)].

Materials Required



Test solutions of samples (a) a dilute acid (HCl or H_2SO_4 or CH_3COOH etc.); (b) a dilute base (NaOH or KOH); (c) a salt (such as NaCl , Na_2CO_3 , NH_4Cl etc.; 1 g salt in 10 mL distilled water); (d) soil water extract (dissolve 1 g of soil sample in 10 mL distilled water and filter to get a soil water extract); and (e) a fruit juice, five test tubes and a test tube stand, a measuring cylinder (10 mL), pH papers, and a glass rod.

PROCEDURE



1. Place five clean test tubes in a test tube stand.
2. Take the solutions of a dilute acid (say HCl), dilute base (say NaOH), salt (say NaCl), soil, and a fruit juice separately in five test tubes and label them.
3. Put one or two drops of each test solution on different strips of pH papers, using a glass rod [Fig. 7.1(a)]. Glass rod used for one sample must be washed with water before used for the other sample.
4. Note the pH by comparing the colour appeared on the pH paper with those on colour chart for pH paper [Fig. 7.1(b)].
5. For determining the pH of a fruit juice, squeeze the fruit and place 1 or 2 drop of the juice on the pH paper.

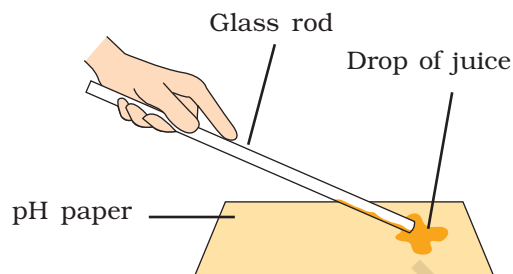


Fig. 7.1 : (a) Testing the pH of a sample by putting a drop on pH paper by glass rod

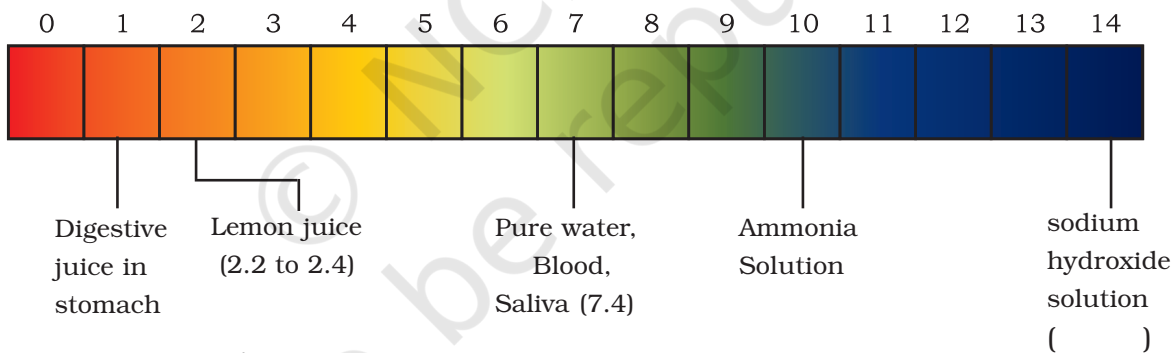


Fig. 7.1 : (b) Colour of universal indicator at different pH

OBSERVATIONS



Sl. No.	Sample	Approximate pH
1.	Dilute acid (HCl)	
2.	Dilute base (NaOH)	
3.	Salt solution (NaCl)	
4.	Soil water extract	
5.	A fruit () juice	

RESULTS AND DISCUSSION



As pH depends upon H^+ concentration and in an aqueous solution H^+ and OH^- ion concentrations are correlated, therefore, every acidic and basic solution shows different colour at different pH.

PRECAUTIONS



- The test sample solutions should be freshly prepared and the fruit juice samples should also be fresh.
- Glass rod used for one sample should be used for the other sample only after washing it with water.

NOTE FOR THE TEACHER

- It is advised to explain the pH value of salt solutions and differentiate between acid and acidic compounds, bases and basic compounds.
- Teachers may take a solid chemical like oxalic acid and juices of citrus fruits, carrot, grapes etc., for making solutions for determining their pH values. Students may be suggested to compare the pH values of juices of unripe and ripe fruits and note the change in pH during ripening.

QUESTIONS

- What do you mean by pH?
- What is the pH of pure water at $25^\circ C$ (298 K)?
- What according to you should be the pH of dil. HCl and dil. NaOH solutions? Observe and explain your findings.
- On opening the soda water bottle the dissolved CO_2 comes out, would the pH of the solution increase or decrease as the gas comes out? Explain your answer either way.