

# EXPERIMENT

## Aim

To determine the pH of vegetables and fruit juices and acids and bases of known and varied concentrations using pH paper.

## THEORY

pH of a solution is mathematically defined as the negative log of hydrogen ion concentration.  $\text{pH} = -\log \text{H}^+$   
If pH of the solution is  $<7$  the solution is acidic;  $\text{pH} > 7$  the solution is basic and  $\text{pH} = 7$  means the solution is neutral. pH of most of the fruit juices is less than 7. Fruits contain various acids as citric, malic and oxalic acid etc. In lab acid and bases of varied concentration may be prepared.

## MATERIAL REQUIRED

Test tube, dropper, measuring cylinder.

## PROCEDURE

- (i) Using pH Paper. Take some clean and dry test tubes and place various samples of vegetable and fruit juices in each of them.
- (ii) Now put one or two drops of each sample on different strips of pH paper Note the colour formed on each strip and compare the shade with those on the colour chart. Record the pH of the compared shade.
- (iii) Using Indicator Solution. Take 10 ml of different juices in different test tubes with the help of a measuring cylinder. Put a few drops of universal indicator in each of them. Note the colour of each solution and compare it with those on the indicator bottle. Record the approximate pH of each.

## OBSERVATION

pH of Vegetable and Fruit juices				
Sample	For pH paper		For indicator solution	
	Colour produced on pH paper	Approximate pH	Colour produced in solution	Approximate pH
Lemon juice				
Tomato juice				
Orange juice				
Pineapple juice				
Amla juice				
Mango juice				

## RESULT

pH of -----, -----, -----, ----- etc. are less than seven and are acidic samples.

pH of -----, ----- etc. are more than 7 and hence are basic samples.

## PRECAUTIONS

1. An equal no of drops of the universal indicator should be added to each test tube.
2. Colour change should be matched carefully.

## VIVA VOCE

**Q 1. What is the principle behind using pH paper to determine the acidity or basicity of a solution?**

**Ans.** pH paper contains indicator dyes that change color depending on the hydrogen ion concentration in a solution, allowing us to determine its pH

**Q 2. Why is it important to standardize the pH paper before use?**

**Ans.** Standardizing pH paper ensures accurate and consistent results by calibrating it against solutions of known pH.

**Q 3. How do you prepare a standard solution for calibrating pH paper?**

**Ans.** A standard solution is prepared by dissolving a known amount of a primary standard substance (e.g., potassium hydrogen phthalate) in distilled water to obtain a solution with a precisely known pH.

**Q 4. What precautions should be taken while handling and using pH paper?**

**Ans.** Precautions include avoiding contamination of the pH paper, handling it with clean and dry hands, and ensuring that it is not exposed to extreme temperatures or excessive moisture.

**Q 5. How can you determine the pH of a fruit juice using pH paper?**

**Ans.** Dip a strip of pH paper into the fruit juice, remove it, and compare the color change of the paper with the standard pH color chart to determine the approximate pH of the juice.

**Q 6. What factors can affect the accuracy of pH measurements using pH paper?**

**Ans.** Factors such as temperature, contamination of the sample, and improper calibration of the pH paper can affect the accuracy of pH measurements.

**Q 7. Why is it necessary to dilute highly acidic or basic solutions before measuring their pH using pH paper?**

**Ans.** Highly acidic or basic solutions can damage the pH paper and yield inaccurate results, so it is necessary to dilute them to a suitable concentration before measuring their pH.

**Q 8. Can pH paper be used to distinguish between different acids and bases based on their pH values?**

**Ans.** pH paper can provide an approximate indication of the acidity or basicity of a solution but cannot distinguish between different acids or bases solely based on their pH values.

**Q 9. How does the color change of pH paper correspond to different pH values?**

**Ans.** pH paper changes color based on the concentration of hydrogen ions in the solution, with different colors corresponding to different pH values according to a standard color chart.