

SATISH CHANDRA MEMORIAL SCHOOL

KAUSHAL VIKAS (SKILL EDUCATION) FOR CLASS 9 | GUIDED BY: GOBINDA SIR

LABORATORY PRACTICAL REPORT: SOIL pH DETERMINATION

1. Aim & Principle

To determine the pH of various soil samples using pH test paper strips. Soil pH measures the hydrogen ion concentration in the soil solution, indicating whether the soil is acidic, neutral, or alkaline. The test is performed by mixing equal parts soil and distilled water into a slurry, dipping the pH strip into the clear supernatant liquid, and comparing the resulting color change against a standard color chart.

2. Materials Required

- Soil samples (dried and sieved)
- Distilled water (tap water must be avoided as it alters chemical readings)
- Clean beaker or glass container
- Glass rod or spoon for stirring
- Filter paper and funnel (optional, for obtaining clear filtrate)
- pH test paper strips or universal indicator paper with a standard color chart

3. Step-by-Step Procedure

1. **Prepare the Soil:** Take 10 g to 20 g of the dry, sieved soil sample and place it into a clean beaker.
2. **Add Water:** Pour an equal volume or double volume of distilled water (e.g., 20 ml to 50 ml) into the beaker to create a 1:1 or 1:2 soil-to-water ratio.
3. **Mix Thoroughly:** Stir the mixture vigorously with a clean glass rod or spoon for 2 to 3 minutes to dissolve all soluble chemical components.
4. **Let it Settle:** Allow the mixture to rest undisturbed for about 30 minutes to 1 hour so heavy soil particles settle down, leaving a clear supernatant liquid layer on top.
5. **Filter (Optional):** If the supernatant liquid remains muddy, filter the solution through filter paper in a funnel to obtain a clear filtrate.
6. **Test with pH Paper:** Dip a strip of pH test paper into the clear liquid solution for 2 to 3 seconds.
7. **Match the Color:** Remove the strip and immediately compare the wet color of the paper strip to the standard pH color reference chart to record the pH value.

4. Observations Table

Sample Type	Initial Color on pH Strip	Matched pH Value	Inference / Nature of Soil
Garden Soil A	Orange / Light Red	5.5 – 6.0	Moderately Acidic
Garden Soil B	Yellow-Green	6.8 – 7.2	Neutral
Roadside Soil C	Dark Green / Blue	7.8 – 8.5	Alkaline

5. Understanding the Results

- Acidic (pH 1.0 to 6.0):** Indicates high hydrogen ion concentration. Highly acidic soils are suitable for specific plants like blueberries and azaleas, but may require liming for general crops.
- Neutral (pH ~7.0):** Indicates a balanced soil solution with equal H⁺ and OH⁻ ions. This range (6.5 – 7.5) provides optimal availability of essential plant nutrients.
- Alkaline (pH 8.0 to 14.0):** Indicates basic conditions. Alkaline soils may restrict the availability of key micronutrients like iron and manganese, requiring corrective organic amendments or sulfur.

6. Conclusion

Testing soil pH using indicator paper provides a quick, cost-effective, and practical field method for assessing the chemical condition of agricultural and garden soils. By observing the distinct color shifts on the test strip and matching them against a standard color index, soils can be classified precisely into acidic, neutral, or alkaline categories.

From the experiment conducted, the following conclusions are drawn regarding plant growth and soil management:

- Acidic Soil Management (Garden Soil A):** Slightly to moderately acidic soils require application of agricultural lime (Calcium Carbonate, CaCO₃) to neutralize acidity and enhance crop yield for non-acid-loving plants.
- Optimal Growth Conditions (Garden Soil B):** Near-neutral soil provides the most favorable environment for soil microbial activity and maximum uptake of primary macronutrients (Nitrogen, Phosphorus, and Potassium).
- Alkaline Soil Management (Roadside Soil C):** Alkaline soils require organic compost, peat moss, or elemental sulfur treatments to lower the pH, preventing potential micronutrient deficiencies such as iron chlorosis.

Student Name: _____

Class _____ Sec _____ Roll no _____

ID No. _____

Guided & Verified By:

GOBINDA SIR

Satish Chandra Memorial School