SCOPE

This method is for the measurement of pH on soils that contain excessive concentrations of either soluble salts or exchangeable sodium or both.

PRINCIPLE

Soil pH value is determined with an H^+ ion-selective glass electrode (referenced with a standard calomel electrode) inserted into the soil filtrate from the saturated soil extract. The difference between the H^+ ion activities in the soil solution and the glass electrode gives rise to an electrometric potential difference that is related to the soil solution pH, or the active acidity.

It is determined by the concentration of hydrogen ions [H^+]. It is measured using the formula of negative logarithmic scale of the hydrogen ion concentration [H^+], pH = -log[H^+.]. The soil pH value is whether an acidic solution (less than 7) or an alkaline solution (greater than 7). So, as the hydrogen ion concentration goes up, the pH value goes down, which makes it more acidic, and vice versa with alkaline solution.

Soil pH is influenced by both acid and base-forming cations (positively charged dissolved ions) in the soil. Common acid-forming cations are hydrogen (H^+), aluminum (Al^{3+}), and iron (Fe^{2+}or Fe^{3+}), whereas common base-forming cations include calcium (Ca^{2+}), magnesium (Mg^{2+}), potassium (K^+) and sodium (Na^+).

The pH of soil changes over time, by monitoring and comparing the past and present soil test there is a probability to see if the soil acidity is increasing over time. Thus, we can prevent this trend from continuing.

TEST PRECAUTIONS

The pH values are dependent on temperature. It should be measured at constant temperature. If a precision greater than 0.1 pH unit is desired, the temperature of the standard solutions, the glass electrode, and the test solution must be within 2°C of one another.

Keep electrodes wet by returning them to storage solution whenever pH meter is not in use. Recommended solutions for short-term storage of electrodes vary with the type of electrode and manufacturer.

Clean the glass electrode periodically if necessary, by soaking it in a solution of a mild detergent and wiping it with a piece of tissue paper, to remove the film of soil that adheres to the electrode surface. A film of $CaCO_3$ that sometimes forms on the surface of the glass electrode during measurement of pH of calcareous soils may be removed by dipping the electrode for a few seconds in dilute HCl and rinsing it with water.

Replace electrodes when pH calibration buffers exceed ±0.05 pH units, even after recalibration, or when pH of quality control samples consistently exceeded expected error.

EQUIPMENT

a) pH meter equipped with glass and reference electrode, or combination electrode

LABORATORY WARE

a) Beakers
b) Wash bottle
c) Polyethylene container, 50 mL or 100 mL capacity

CHEMICALS AND REAGENTS

a) [illegible]
b) Deionized water
c) Filling Solution (KCl Solution, 4M).Dissolved 29.82 g dry KCl in deionized water using 100 mL volumetric flask.

HEALTH AND SAFETY

Wear proper personal protective equipment. Use laboratory coat, close shoes, gas mask or dusk masks and appropriate gloves when performing chemical analysis to mitigate the harmful effects of exposure on chemicals.

For Laboratory Use: always check the SDS and COA for each delivered chemical as to confirm if it is compliant with the specifications provided.

PROCEDURE

Calibration of the pH meter

1. Calibrate the pH meter using pH Buffers 7, 4, 10. Note that it can be a 2-point or a 3-point calibration.
2. The slope value is based on the specified performance requirement stated on the equipment user's manual. If the slope is not within the accepted percent slope of the equipment, recalibrate again.

pH Measurement

1. After filtering the saturated soil paste read pH of the soil extract and record. Rinse the probe between samples and remove excess water using lint-free wipes.
2. Read pH buffers every 10th. Samples for intermediate standard check.
3. Rinse the electrodes thoroughly and keep immersed in filling solution when not in use.