SCOPE

This method is for the determination of chloride on soils that contain excessive concentrations of either soluble salts or exchangeable sodium or both

PRINCIPLE

Chloride in water and in soil can be determined by Silver Nitrate Method. It is based on the principle that in neutral or slightly alkaline sample, potassium chromate can indicate the endpoint of the silver nitrate titration of chloride. Silver Chloride is quantitatively precipitated before red silver chromate is formed.

TEST PRECAUTIONS

The end point is sharper if the titration is done under a yellow light.

EQUIPMENT

a) Balance, precision of at least 0.001 g

LABORATORY WARE

a) Erlenmeyer Flasks, 250Ml
b) Pipettes, graduated
c) Beakers
d) Wash bottle
e) Microburette, 10 mL
f) Volumetric Flasks, 1000 mL., 100 mL.
g) Pipettor

CHEMICALS AND REAGENTS

a) Potassium chromate, 5% solution. Dissolve five (5) g of K_2CrO_4 in 50 mL distilled water add a solution of $AgNO_3$ dropwise until a slight permanent red precipitate is produced. Stand overnight and filter. Dilute to 100 mL with deionized water.
b) Standard Silver Nitrate, 0.005 M. Dissolve 0.8495 g of $AgNO_3$ in deionized water to exactly one (1) liter. Keep in brown bottle, away from light. To standardize, titrate ten (10) mL of 0.01 M KCl (0.1864 g of KCl dissolved in 250 mL water) against $AgNO_3$ solution until the appearance of reddish brown precipitate. Use four (4) drops of K_2CrO_4 as indicator. Compute for concentration (M) of standard $AgNO_3$ as follows:

$$\text{Molarity (M) of } AgNO_3 = \frac{M_{KCl} \times V_{KCl}}{V_{AgNO3} \text{ used}}$$

HEALTH AND SAFETY

Wear proper PPE. Use laboratory coat, close shoes, gas masks or dust 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.

Observe careful and proper handling of chemicals containing inorganic salts, strong alkali bases, strong acids and oxidizing agents. Potential direct body contact (e.g. ingestion, inhalation) may cause severe irritation and inflammation to the skin, eyes, respiratory tract and digestive tract. Severe exposure to these corrosive substances may cause serious health problems and death.

Avoid mixing incompatible chemicals to reduce risks of fire and explosion inside the laboratory. Keep locked up and away from incompatibles such as moisture.

K_2CrO_4 may cause an allergic skin reaction, genetic defects, cancer and damage to organs (blood, kidneys, liver) through prolonged or repeated exposure, very toxic to aquatic life with long lasting effects Precautionary statements (GHS-US): P201- Obtain special instructions before use. P202- Do not handle until all safety precautions have been read and understood. Do not breathe mist. Contaminated work clothing should not be allowed out of the workplace and avoid release to the environment.

PROCEDURE

1. Prepare a blank.
2. Add four drops of K_2CrO_4 indicator, while swirling, to the blank and to the sample preserved from the carbonate-bicarbonate determination.
3. Titrate under a bright light with 0.005 M $AgNO_3$ solution from a 10 mL microburette to the first permanent reddish brown color. The titration blank correction with the volume of the sample at the end point usually increases regularly from about 0.03-0.20 mL as the volume increases from 2-12 mL.
   Note: (1) Titrate from yellow until dark orange color
   (2) Titrate blanks first to establish the point of color of change.