TEST METHODS MANUAL

Laboratory Services Division Bureau of Soils and Water Management Department of Agriculture

TM-LSD-04-19

| SECTION : SOIL CHEMISTRY | Issue No.: 3 | Effective date: July 1, 2022 |
|--|-----------------|------------------------------|
| SUBJECT : SOIL SALINITY/ALKALINITY - SULFATE | Revision No.: 0 | Page 1 of 5 |
| (TURBIDIMETRIC METHOD) | | |

SCOPE

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

PRINCIPLE

Sulfate ion is precipitated in hydrochloric acid medium with barium chloride to form barium sulfate of uniform size. The absorbance of the suspension is measured by a transmission photometer and the sulfate concentration is determined by comparison of the reading with standard curve.

TEST PRECAUTIONS

The turbidimetric method requires exact duplication of the conditions under which the suspension is formed. The speed and extent of formation, stability and optical qualities of the suspension are affected by the temperature of the solution, acidity, quantity of Barium Chloride added, time and rate of stirring, time of standing of the suspension before measurement and the presence of foreign salts or organic matter.

EQUIPMENT

- a) UV-Vis Spectrophotometer
- b) Vortex Mixer
- c) Analytical Balance, precision of 0.0001 g

LABORATORY WARE

- a) Volumetric Flask, 1000mL, 100mL, 50mL
- b) Test tubes, 30mL
- c) Beakers
- d) Pipettor
- e) Pipettes, graduated
- f) Wash bottle

CHEMICALS AND REAGENTS

- a) Standard Sulfate Solution, 250 mg/L.
- b) Gum Acacia, 0.25 %. Dissolve 0.25 g of powdered gum acacia in deionized water and dilute up to 100 mL.
- c) Saturated BaCl₂Solution. Dissolve 35 g of BaCl₂•2H₂O in 100 mL deionized water.

| Prepared by: | Reviewed by: | Approved by: | | |
|--|------------------------------|--------------------|--|--|
| embgamboa | Jp Sanchy | (AW | | |
| EZRA MÁÉ B. GAMBOA | FLORFINA P. SANCHEZ | GINĂ PUNILO, Ph.D. | | |
| Document Controller | Head, Soil Chemistry Section | Quality Manager | | |
| THIS IS A CONTROLLED DOCUMENT MAINTAINED ELECTRONICALLY. | | | | |
| THIS IS UNCONTROLLED WHEN DOWNLOADED, PRINTED AND PHOTOCOPIED. | | | | |

TEST METHODS MANUAL

aboratory Services Division Bureau of Soils and Water Management Department of Agriculture

TM-LSD-04-19

- d) HCl Solution, 6 M. Mix one (1) volume of HCl with one (1) volume of deionized water. (100 mL concentrated HCl in 100 mL deionized water).
- e) Mixed Reagent. Mix equal volumes of 0.25 % Gum Acacia and 6 M HCl in one container.

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. Limited Preview

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

For full access, kindly fill out the Document Request

Observe careful and proper handling of chemicals when using inorganic salts, strong alkali bases, strong acids and oxidizing agents. Potential direct body contac Form.estion, inhalation) may cause severe irritation and inflammation to the skin, eyes, respin Google Form link: re exposure to these corrosive substances may cause serious health damage or death.

https://forms.gle/RbCgCdA54prTS6oN7

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

PROCEDURE

Standard Curve Preparation

Thank you!

- 1. Pipet 20 mL of 250 mg/L SO₄ solution and dilute to volume in a 50 mL volumetric flask with deionized water. The resulting solution is 100 mg/L SO₄.
- Pipet 0, 1, 2, 3, 4, 5 mL of 100 mg/L SO4 solution into six (6) test tubes. Add deionized water to make up to five (5) mL volume. These solutions correspond to 0, 20, 40, 60, 80, 100 mg/L SO₄.
- 3. Add two (2) mL mixed reagent (0.25 % Gum Acacia & 6N HCl) and one (1) mL barium chloride into each test tube.
- 4. Mix well.

Determination of Sulfate in Soil Extract

- 1. Pipet five (5) mL of soil extract and develop the turbidity as in the standards.
- 2. Read absorbance at 445 nm in the spectrophotometer right after reading the standards.

THIS IS UNCONTROLLED WHEN DOWNLOADED, PRINTED AND PHOTOCOPIED.