

# Soil Available Sulfur Content Assay Kit

**Note:** Take two or three different samples for prediction before test.

**Operation Equipment:** Spectrophotometer

**Catalog Number:** NA0654

**Size:**50T/48S

## Components:

Acid soil extract solution: 80 mL × 1, stored at 4 ° C.

Alkaline soil extract solution: 80 mL × 1, stored at 4 ° C.

Reagent 1: 1.5 mL×1, storage at 4°C.

Reagent 2: 10 mL×1, storage at 4°C.

Reagent 3: 20 mL×1, storage at 4°C.

Reagent 4: 10 mL×1, storage at 4°C.

Standard: 1 mL×1, storage at 4°C. 3200 mg/L Sulfur (S) standard solution.

## Product Description:

Sulfur is an essential constituent element of sulfur-containing amino acids and proteins, which directly participates in the growth and development of crops and affects the quality of crops. Soil sulfur mainly comes from parent material, irrigation water, atmospheric sedimentation and fertilization, which plays an important role in agriculture, forestry and animal husbandry. Therefore, through the determination of the effective sulfur content in the soil, the rational application of sulfur fertilizers plays a key role in improving the yield and quality of crops.

Sulfur extracted from the soil basically exists in the form of  $\text{SO}_4^{2-}$ . In an acidic medium,  $\text{SO}_4^{2-}$  reacts with  $\text{Ba}^{2+}$  to form a white precipitate of  $\text{BaSO}_4$  with little solubility. The effective sulfur content of the soil is determined by the barium sulfate turbidimetric method.

## Reagents and Equipment Required but Not Provided:

Spectrophotometer, adjustable transferpettor, balance, mortar, centrifuge, water-bath/metal bath, thermostatic oscillator, 1mL glass cuvette, sieve (40 mesh, or smaller), ice and distilled water.

## Sample preparation:

Fresh soil samples are air-dried, sieved through a 40 mesh sieve. According to the quality of the soil samples (g): the volume of the extract solution (mL)=1:5 (recommended to weigh about 0.2 g of soil sample and add 1 mL of extract solution), and shake to extract 1 h, then centrifuge at 10000 g and 25°C for 10 min. Take the supernatant for measurement.

## Procedure:

1. Preheat spectrophotometer for 30 min, adjust the wavelength to 440 nm and set the counter to zero with distilled water.

2. Leave the reagent kit at room temperature for 30 minutes before the experiment.
3. Dilute the standard solution with extract solution to prepare 80, 40, 20, 10, 5 mg/L standard solution
4. Add reagent to a 1.5mL EP tube:

Reagent name (μL)	Test tube (T)	Blank tube (B)	Standard tube (S)
Sample	500	-	-
Extract solution	-	500	-
Standard solution	-	-	500
Reagent 1	20	20	20
Open the lid and digest for 5 minutes at 90 °C. After taking out, let it cool down naturally at room temperature.			
Reagent 2	125	125	125
Reagent 3	250	250	250
Reagent 4	125	125	125
Mix well and react at 25°C for 20min. Measure the absorbance A at 440nm in a 1mL glass cuvette, and record it as A <sub>B</sub> , A <sub>T</sub> and A <sub>S</sub> . Calculate $\Delta A = A_T - A_B$ , $\Delta A_S = A_S - A_B$ . Blank tube and standard tube only need to be measured once.			

Note: the cover must be opened for 90°C digestion, so that the reagent will be completely released. If the water bath is used for decocting, the water in the water bath should be prevented from splashing into the EP pipe, thus affecting the test data.

#### Calculation:

1. According to concentration of standard solution and absorbance to create the standard curve, take standard solution as X-axis, ΔAs as Y-axis. Take ΔA into the equation to obtain x (mg/L).

2. Calculation:

$$\text{Effective sulfur content (mg/kg)} = x \times V_e \div (W \times 10^{-3}) = x \div W$$

V<sub>e</sub>: extract solution volume, 1 mL;

10<sup>-3</sup>: 1g=10<sup>-3</sup> kg.

W: soil weight, g;

#### Note:

1. The cover must be opened for 90°C digestion, so that the Reagent I will be completely released. If the water bath is used for decocting, the water in the water bath should be prevented from splashing into the EP pipe, thus affecting the test data.
2. Before extraction, confirm the acidity and alkalinity of the soil. According to the acidity and alkalinity of the soil, choose acidic or alkaline soil extract solution.
3. When the measured absorbance exceeds the linear range, it is recommended to increase the quality of the soil sample or dilute the sample with the extraction solution and perform extraction again.
4. It should be tested immediately after the shaking. If it is found that the precipitation does not fall to the bottom of the EP tube in time, it is recommended to shake again and test after mixing.

**Experimental Example:**

Weigh 0.2 g of acid soil sample, add 1 mL of extract solution, Shake Extraction for 1 h, then operate according to the determination steps, measure and calculate  $\Delta A_T = A_T - A_B = 0.502 - 0.013 = 0.489$ , according to the standard curve  $y = 0.0123x - 0.0149$ , get  $x = 34.30$ , calculate:

Available sulfur content (mg/kg soil sample) =  $x \div W = 40.97 \div 0.2 = 204.85$  mg/kg soil sample.

**Related Products:**

NA0650/NA0409 Soil Available Boron Content Assay Kit

NA0657/NA0416 Acid Soil Available Phosphorous Content Assay Kit

NA0361/NA0360 Soil  $\beta$ -1,4-Glucanase Activity Assay Kit

**Technical Specifications:**

The lowest detection limit: 2.8927 mg/L in alkaline soil and 1.4447 mg/L in acidic soil

Linear range: 5-80 mg/L in alkaline soil; 5-80 mg/L in acid soil