Soil Available Boron Content Assay Kit

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

Operation Equipment: Spectrophotometer/ Microplate reader

Catalog Number: NA0409

Size:100T/96S

Components:

Reagent 1:6 mL×1, storage at 4℃.

Reagent 2: Powder×1, storage at 4℃. Before use, add 12 mL of distilled water to dissolve.

Reagent 3: Powder×1, storage at 4℃. Before use, add 12 mL of distilled water to dissolve.

Reagent 4: 10 mL×1, storage at 4℃.

Reagent 5: Powder×1, storage at 4℃. Before use, add 5 mL of distilled water to dissolve.

Standard: powder×1, storage at 4℃. 10 mg of boric acid. Add 0.81 mL of distilled water to prepare 200 μmol/mL standard solution.

Product Description:

Boron is an indispensable trace element for the normal development of plants, and can promote the lush growth of plants and the normal development of reproductive organs. According to the available phosphorus content in the soil, reasonable supply of boron is one of the key measures to improve crop yield and quality.

Boron and methylimine form a brown-yellow complex under weak acid conditions, with a characteristic absorption peak at 420 nm, and the effective boron content in the soil can be calculated

Reagents and Equipment Required but Not Provided:

Spectrophotometer/ Microplate reader, adjustable transferpettor, balance, mortar / homogenizer, centrifuge, water-bath, micro glass cuvette/ 96-well plate, sieve (40 mesh), ice and distilled water.

Procedure:

I. Sample preparation:

Fresh soil samples is air-dried and pass through a 40 mesh sieve. According to the ratio of soil quality (g): distilled water volume (mL) to 1: 2 (recommended to weigh about 0.2g soil sample, add 1mL distilled water), add distilled water, and extract in boiling water for 10min , Let it cool down, add 50 μL of reagent 1, shake for 5 min. Add 100 μL of reagent 2, shake for 3 min. Add 100 μL of reagent 3, shake thoroughly to fade the purple, and then centrifuge at 8000 g and 25 °C. for 10 min.

II. Determination：

1. Preheat spectrophotometer/ microplate reader for 30min, adjust the wavelength to 420 nm and set the counter to zero with distilled water.
2. Dilute the 200μmol/mL standard solution with distilled water to prepare 1.5、1、0.5、0.25、0.125、

0.0625、0.03125 μmol/mL standard solution

3. Add reagent to a 1.5mL EP tube:

Reagent name	Blank tube (B)	Test tube (T)	Standard tube (S)
sample（μL）	-	40	-
Standard solution（μL）	-	-	40
Reagent 4（μL）	80	80	80
Reagent 5（μL）	40	40	40
H_2O（μL）	80	40	40
Mix well and let react solution stand in the dark at 25℃ for 1 h. Measure the absorbance A at 420nm in a micro glass cuvette/ 96-well plate, and record it as A_B, A_T and A_S. Calculate $\triangle A = A_T - A_B$, $\triangle A_S = A_S - A_B$.			

III. 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 (μmol/mL).
2. Calculation:

Effective boron content (mg/kg) =10.81× x× Vs ÷ 1000÷(W÷ 1000)=13.51×x÷W

Vs：Total sample volume，1.25mL；

10.81：Molecular weight of boron ，10.81μg/μmol；

1000：1mmol=1000μmol，1kg=1000g。

W: soil weight, g;

Note:

1. Strictly control the temperature and avoid light during color development to prevent the color developer from decomposing.

2. When the A is greater than linear range absorbance, it is recommended to further dilute the sample and measure.

Experimental Example:

1. Take about 0.2 g of treated soil sample, add 1 mL of distilled water, operate according to the sample processing steps, centrifuge the supernatant, operate according to the determination steps, use 96 well plate to measure and calculate $\Delta A = A_T - A_B = 0.210 - 0.146 = 0.064$, bring in the standard curve $y = 0.9827x + 0.0033$, and get $x = 0.0618$.

Effective boron content (mg/kg soil sample) = 13.51× x÷W = 13.51× 0.0618÷0.2 = 4.1746 mg/kg soil sample.

Related Products：

NA0654/NA0413 Soil Available sulfur Content Assay Kit

NA0657/NA0416 Acid Soil Available Phosphorous Content Assay Kit