Soil Total Boron Content Assay kit

Note: The reagents of this product have changed, please pay attention to and strictly follow the instructions.

Operation Equipment: Spectrophotometer/microplate reader

Cat No: BC3035

Size: 100T/96S

Components:

Extractant: Powder×1, Storage at 2-8℃.

Extraction reagent: Liquid 110 mL×4, Storage at 2-8.

Reagent I: Liquid 11 mL×1, Storage at 2-8℃.

Reagent II: Powder×2, Storage at 2-8℃. Each tube dissolved with 2.5 mL of distilled water before use. It can be divided into small tubules and preserved at 2-8℃ for 1 weeks. Avoid repeating freeze/thaw cycles.

Product Description:

Boron is one of the seven essential micronutrients for plant growth and development. The content of boron in soil directly affects the growth of plants. It can promote the conversion and transport of sugars in plants, and is also an element necessary for the normal development and pollination of growing points and reproductive organs.

Boron and methylimine form brown-yellow complexes under weak acid conditions and have characteristic absorption peaks at 420nm. The content of total boron in soil can be calculated by detecting the wavelength change at 420nm.

Required but Not Provided:

Spectrophotometer/microplate reader, desk centrifuge, water-bath/ constant temperature incubator, adjustable pipette, Muffle furnace, crucible, crucible tongs, micro glass cuvette/96 well flat-bottom plate (Non-polystyrene material), ice and distilled water.

Protocol

I. Preparation:

1. Fresh soil sample natural air dry or 37℃ oven air dry, 100 mesh sieve;
2. According to the ratio of soil quality (g): extractant quality (g) is 1:4 (it is recommended to weigh about 0.1g soil sample and add 0.4g extractant), slowly add the extractant into the crucible, and stir evenly while adding;
3. Then melt in Muffle furnace at 550℃ for 10min; Then melt at 920℃ for 30min;
4. Remove the crucible while it is hot, transfer the molten substance into the beaker, stir while adding 4mL of extraction liquid, cover if necessary, prevent the solution from sputtering, dissolve for 30min;
5. Then 5000g was centrifuged at room temperature for 10minutes, and the supernatant was taken

to be measured.

II. Determination procedure:

1. Preheat ultraviolet spectrophotometer for 30 minutes, adjust wavelength to 420 nm, set the counter to zero with distilled water.
2. Operation table: (The following reagents were added to micro glass cuvette/96 well flat-bottom plate)

Reagent Name (μL)	Test tube (A_T)	Blank tube (A_B)
Sample	40	-
Reagent I	80	80
Reagent II	40	40
Distilled water	40	80
Thoroughly mixed and placed in darkness at 25℃ for 1h; (Strict attention to avoid light)		
Take 0.2mL of reaction liquid in micro glass cuvette/96 well flat-bottom plate, measure the absorption value A at 420nm, and record A_T, A_B. Calculate $\Delta A_T = A_T - A_B$. The blank tube only needs to be tested 1-2 times.		

III. Calculation total boron content in soil:

1. The calculation formula of micro glass cuvette is as follows:

   Standard curve: y=0.3897x-0.2359, R^2=0.9995.

   Soil total boron content (mg/kg) =$(\Delta A_T + 0.2359) \div 0.3897 \times V_T \div (W \times V_S \div V_E)$

   $= 51.32 \times (\Delta A_T + 0.2359) \div W$

   V_T: Total volume of reaction, 0.2mL;

   V_S: The sample volume is added to the reaction system, 0.04mL;

   V_E: Add extraction liquid volume, 4mL;

   W: Sample mass, g.

2. The calculation formula of 96 well flat-bottom plate determination is as follows:

   Standard curve: y=0.1949x-0.2359, R^2=0.9995.

   Soil total boron content (mg/kg) =$(\Delta A_T + 0.2359) \div 0.1949 \times V_T \div (W \times V_S \div V_E)$

   $= 102.64 \times (\Delta A_T + 0.2359) \div W$

   V_T: Total volume of reaction, 0.2mL;

   V_S: The sample volume is added to the reaction system, 0.04mL;

   V_E: Add extraction liquid volume, 4mL;

   W: Sample mass, g.

Note:

1. Strictly control the temperature and avoid light when developing color, so as to avoid light decomposition of color developing agent.

2. If $A_T > 1.2$ or $\Delta A_T > 0.8$, it is recommended that the customer dilute the sample and re-determine, pay attention to the calculation formula multiplied by the dilution multiple; If the measured light absorption value is too low or close to the blank value, it is recommended that the customer increase the sample size and re-determine, pay attention to the simultaneous modification of the calculation formula.