Soil Available Potassium Content (Turbidimetric Method) Assay Kit

Note: It is necessary to predict 2-3 large difference samples before the formal determination.

Operation Equipment: Spectrophotometer/Microplate reader

Cat No: BC3045

Size: 100T/48S

Components:

Extract solution: Liquid 70 mL×2, store at RT.

Reagent I: Formaldehyde 3 mL×1, required but not provided, store at RT.

Reagent II: Liquid 3 mL×1, store at 4℃.

Reagent III A: Liquid 10.2 mL×1, store at 4℃.

Reagent III B: Powder×2, store at 4℃. Before use, add 2.805mL Reagent III A into a bottle of Reagent III B and mix it thoroughly. The unused reagent could be stored at 4℃ for 1 weeks.

Reagent IV: Liquid 3 mL×1, store at 4℃.

Standard: Liquid 1mL×1, 20μmol/mL potassium standard solution, store at 4℃.

Product Description:

Available potassium is a kind of potassium easily absorbed by plants, and one of important indexes to characterize soil potassium supply. It is important to measure soil available potassium content changes for cultivated land fertility evaluation and application of potassium fertilizer.

Potassium ion in the soil interacts with sodium tetraphenylboron to form potassium tetraphenylborate insoluble white precipitate. The turbidity is proportional to the concentration of potassium ion in a certain range, and available potassium content can be calculated by measuring absorbance of 420 nm.

Required reagents and equipment:

Spectrophotometer/microplate reader, centrifuge, transferpettor, oscillator, micro glass cuvette/96 well flat-bottom plate, mortar, 30-50 mesh sieve, formaldehyde and distilled water.

Protocal:

I. Sample treatment

After drying naturally, fresh soil samples should be passed through 30-50 mesh sieve. The ratio of soil mass (g): extraction solution volume (mL) is 1:5~10 (it is recommended to weigh about 0.2 g of soil sample and add 1 mL of extract solution), extract it by shaking for 1 hour. Centrifugate at 10000 rpm for 10 minutes at 25℃, take the supernatant and place it for test.

II. Measurement operation

1. Preheat spectrophotometer/microplate reader for 30 minutes, adjust wavelength to 420 nm, set spectrophotometer counter to zero with distilled water.
2. Dilute 20μmol/mL standard solution with **extract solution** to generate 1.2, 1, 0.8, 0.6, 0.4, 0.3, 0.2μmol/mL standard.

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3. Sampling table

Reagent（μL）	Test tube (T)	Control tube (C)	Blank tube (B)	Standard tube (S)
Sample	50	50	-	-
Extract solution	-	-	50	-
Standard solution	-	-	-	50
Reagent I	25	25	25	25
Mix well and place at room temperature for 5 minutes.				
Reagent II	25	25	25	25
Working solution	75	-	-	75
Reagent III A	-	75	75	-
Reagent IV	25	25	25	25
Mix well and place at room temperature for 5 minutes. Measure the absorption value at 420 nm in the micro glass cuvette/96 well flat-bottom plate, and record it as A_T, A_C, A_B and As. Calculate $\Delta A_S=A_S-A_B$, $\Delta A_T=A_T-A_C$. Blank tube and standard curve only need to be test one or two times.				

III. Calculation:

1. Drawing of standard curve:

Standard solution concentration as x axis and its corresponding absorption value (ΔAs) as y axis, the standard equation is y=kx+b. Bring ΔA_T into the formula to get x (μmol/mL).

2. Calculation of soil available potassium content.

Soil available potassium(mg/kg)= $x\times10^{-3}\times V_E\div W\times39=0.039x\div W$

10^{-3}: Unit conversion coefficient, 1μmol=10^{-3}mmol;

V_E: Volume of extract solution, 1 mL;

W: Sample mass, kg;

39: Relative molecular mass of K^+.

Note:

1. Extract solution will crystallize at low temperature(4℃) and can dissolve by shaking.
2. Formaldehyde is a toxic substance with irritant odor. It is suggested that this test be operated in a ventilating cabinet.
3. If the $A_T<0.15$, it is recommended to increase soil sample weight or reduce extract solution before determination; If $A_T>1$, it is recommended to dilute the sample with extract solution before determination.

Experimental example:

1. Take 0.2g soil sample 1 to 1ml extract solution, shock and centrifuged for 1 hour, operate as the procedure after taking the supernatant, test and calculate $\Delta A_T=A_T-A_C=0.218-0.062=0.156$, according to the standard curve y = 0.7128x-0.0301, x =0.261, calculate content by sample weight: Soil available potassium(mg/kg)=$0.039x\div W=0.039\times0.261\div0.0002=50.895$mg/kg weight.

2. Take 0.2g soil sample 2 to 1ml extract solution, shock and centrifuged for 1 hour, operate as the procedure after taking the supernatant, test and calculate $\Delta A_T=A_T-A_C=0.218-0.062=0.156$, according to the standard curve y = 0.7128x-0.0301, x =1.089, calculate content by sample weight: Soil available potassium(mg/kg)=0.039x÷W=0.039×1.089÷0.0002=212.355mg/kg weight.

Related products:

BC0040/BC0045 Soil Nitrate Nitrogen Content Assay Kit
BC0150/BC0155 Soil Cellulase (S-CL) Activity Assay Kit
BC0280/BC0285 Soil Alkaline Phosphatase (S-AKP/ALP) Activity Assay Kit
BC3100/BC3105 Soil Nitrate Reductase (NR) Activity Assay Kit
BC1510/BC1515 Ammonium nitrogen in soil Content Assay Kit

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