CheKine™ Micro Soil Available Potassium Content Assay Kit

Cat #: KTB4048 Size: 48 T/48 S 96 T/96 S

	Micro Soil Available Potassium Content Assay Kit		
REF	**Cat #:** KTB4048	LOT	**Lot #:** Refer to product label
	Applicable sample: Soil sample		
	Storage: Stored at 4℃ for 6 months, protected from light		

Assay Principle

Readily available potassium refers to the potassium in the soil that is easily absorbed and utilized by plants. It is one of the important indicators characterizing the soil potassium supply status. Timely measurement and understanding of the content and changes of readily available potassium in the soil are crucial for evaluating the fertility of cultivated land and guiding the application of potassium fertilizers. CheKine™ Micro Soil Available Potassium Content Assay Kit provides a simple, convenient, and rapid method for detecting the readily available potassium content in soil samples. The principle of this assay is that potassium ions react with sodium tetraphenylborate to form an insoluble white precipitate of potassium tetraphenylborate. The turbidity produced is proportional to the potassium ion concentration within a certain range, and the content of readily available potassium in the soil is determined by measuring the turbidity at 420 nm.

Materials Supplied and Storage Conditions

Kit components	Size		Storage conditions
	48 T	96 T	
Reagent Ⅰ	70 mL	70 mL×2	4℃
Reagent Ⅱ	7.5 mL	15 mL	4℃, protected from light
Reagent Ⅲ	6 mL	12 mL	4℃, protected from light
Standard	1 mL	1 mL	4℃

Note: Before formal testing, it is recommended to select 2-3 samples with large expected differences for pre-experiment.

Materials Required but Not Supplied

- Microplate reader or visible spectrophotometer capable of measuring absorbance at 420 nm
- 96-well plate or microglass cuvette, precision pipettes, disposable pipette tips
- Oven, 30-50 mesh sieve, centrifuge, constant temperature water bath, analytical balance
- Deionized water, formaldehyde

Reagent Preparation

Reagent I: Ready to use as supplied. Equilibrate to room temperature before use, if crystals or precipitates formed, simply shake the solution until they dissolve. Store at 4℃.

Reagent II: Ready to use as supplied. Equilibrate to room temperature before use. Store at 4℃.

Reagent III: Ready to use as supplied. Equilibrate to room temperature before use. Store at 4℃, protected from light.

Standard: 20 μmol/mL potassium standard solution. Ready to use as supplied. Equilibrate to room temperature before use. Store at 4℃.

Standard preparation: Use 20 μmol/mL potassium standard solution, prepare standard curve dilution as described in the table.

Num.	Standard Volume	Reagent I Volume (μL)	Concentration (μmol/mL)
Std.1	40 μL 20 μmol/mL Standard	960	0.8
Std.2	500 μL of Std.1 (0.8 μmol/mL)	500	0.4
Std.3	500 μL of Std.2 (0.4 μmol/mL)	500	0.2
Std.4	500 μL of Std.3 (0.2 μmol/mL)	500	0.1
Std.5	500 μL of Std.4 (0.1 μmol/mL)	500	0.05
Std.6	500 μL of Std.5 (0.05 μmol/mL)	500	0.025

Notes: Always prepare fresh standards per use; Diluted Standard Solution is unstable and must be used within 4 h.

Sample Preparation

Note: Fresh samples are recommended.

Fresh soil samples should be air-dried naturally or dried in an oven at 37℃, then passed through a 30-50 mesh sieve. Weigh 0.2 g of soil sample, add 1 mL of Reagent Ⅰ, and shake for extraction for 1 h. Centrifuge at 10,000 rpm for 10 min at 25℃ (if there are still impurities in the supernatant after centrifugation, it is recommended to centrifuge the supernatant again until it is clear). Collect the supernatant for further testing.

Assay Procedure

1. Preheat the microplate reader or visible spectrophotometer for more than 30 min, and adjust the wavelength to 420 nm, visible spectrophotometer was returned to zero with deionized water.

2. Operation table (The following operations are operated in the 1.5 mL EP tube):

Reagent	Test Tube (μL)	Control Tube (μL)	Standard Tube(μL)	Blank Tube(μL)
Supernatant	50	50	0	0
Standard	0	0	50	0
Reagent Ⅰ	0	0	0	50
Formaldehyde	25	25	25	25
Vortex mix thoroughly and let it sit at room temperature for 5 min				
Reagent Ⅱ	50	50	50	50
Reagent Ⅲ	75	0	75	0
Deionized water	0	75	0	75

After mixing thoroughly, allow the reaction to proceed accurately at room temperature for 5 min. Then, transfer 190 μL to a 96-well plate or a micro glass cuvette. Measure the absorbance at 420 nm. Record the absorbance values as A_{Test}, $A_{Control}$, $A_{Standard}$, and A_{Blank}, respectively. Calculate $\Delta A_{Test}=A_{Test}-A_{Control}$, $\Delta A_{Standard}=A_{Standard}-A_{Blank}$.

Note: 1. Formaldehyde is toxic and has a pungent odor, so it is recommended to experiment in a fume hood.

2. The standard curve and blank tube needs to be determined only once, and a control well should be set up for each measurement well. Before the experiment, it is suggested that 2-3 samples with large expected differences should be selected for pre-experiment. If ΔA_{Test} is less than 0.1, the sample volume can be appropriately increased, and the calculation formula should be adjusted accordingly. If ΔA_{Test} is greater than 0.7, the sample supernatant can be further diluted by Reagent I, and the calculation result should be multiplied by the dilution multiple.

Data Analysis

Note: We provide you with calculation formulae, including the derivation process and final formula. The two are exactly equal. It is suggested that the concise calculation formula in bold is final formula.

1. Drawing of standard curve:

With the concentration of the standard solution as the x-axis and the $\Delta A_{Standard}$ as the y-axis, draw the standard curve, get the standard equation, and bring the ΔA_{Test} into the equation to get the x value (μmol/mL).

2. Calculation of soil available potassium content:

Available potassium content (mg/kg)=$x\times10^{-3}\times V\div W\times39$**$=0.039\times x\div W$**

Where: 10^{-3}: Conversion factor, 1 μmol=10^{-3} mmol; V: Volume of Reagent I, 1 mL; W: Sample mass, kg; 39: Relative molecular mass of potassium ion.

Typical Data

Typical standard curve:

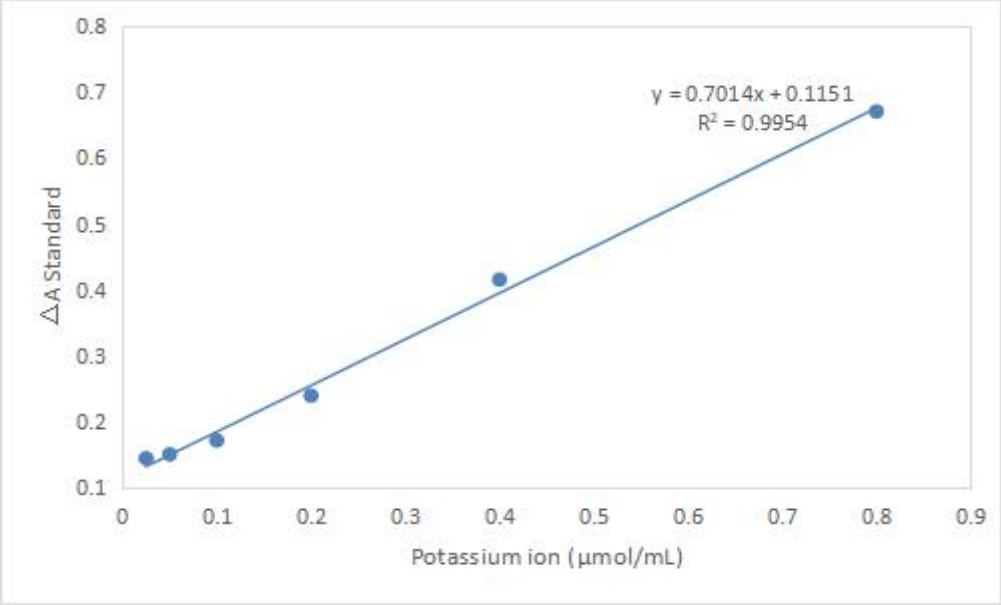

Figure1. Potassium ion standard curve

Examples:

Take 0.2 g of fresh soil sample that has been dried in a 37℃ oven and use 96-well plate to calculate ΔA_{Test}=0.385-0.169=0.216, x=0.143. The content calculated according to the soil sample mass is as follows:

Available potassium content (mg/kg)=0.039×0.143÷0.0002=27.89 mg/kg.

Recommended Products

Catalog No.	Product Name
KTB4023	CheKine™ Mirco Soil Peroxidase (S-POD) Activity Assay Kit
KTB4024	CheKine™ Mirco Soil Acid Protease (S-ACPT) Activity Assay Kit
KTB4025	CheKine™ Mirco Soil β-Xylosidase (S-β-XYS) Activity Assay Kit

Disclaimer

The reagent is only used in the field of scientific research, not suitable for clinical diagnosis or other purposes. For your safety and health, please wear a lab coat and disposable gloves.