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CheKine™ Micro Soil Total Titanium Content Assay Kit

Cat #: KTB4060 Size: 48 T/48 S 96 T/96 S

	Micro Soil Total Titanium Content Assay Kit		
REF	**Cat #:** KTB4060	LOT	**Lot #:** Refer to product label
	Detection range: 0.0016-0.1 mg/mL		**Sensitivity:** 0.0016 mg/mL
	Applicable sample: Soil		
	Storage: Stored at 4℃ for 6 months, protected from light		

Assay Principle

Titanium (Ti) is a widely distributed transition metal element in nature, closely associated with iron (Fe). The two elements exhibit a certain correlation. Titanium in soil plays a vital physiological role in plants: adequate Ti ensures higher seed-setting rates, reduces empty grains, and enhances plant resistance to stressors. CheKine™ Micro Soil Total Titanium Content Assay Kit provides a simple, convenient, and rapid method for Ti content detection in soil samples. Under acidic conditions, titanium ions react with diantipyrylmethane to form a yellow complex with a characteristic absorption peak at 390 nm. The color intensity is proportional to the Ti ion concentration within a specific range.

Materials Supplied and Storage Conditions

Kit components	Size		Storage conditions
	48 T	96 T	
Reagent Ⅰ	Powder×1 vial	Powder×1 vial	4℃
Reagent Ⅱ	Powder×1 vial	Powder×1 vial	4℃, protected from light
Reagent Ⅲ	4.8 mL	9.6 mL	4℃, protected from light
Standard	0.2 mL	0.2 mL	4℃, protected from light

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 510 nm
- 96-well microplate or microglass cuvette, precision pipettes, disposable pipette tips,15 mL centrifuge tubes
- Muffle furnace, low-temperature centrifuge, analytical balance
- Deionized water, concentrated hydrochloric acid (HCl)
- Crucible

Reagent Preparation

Extraction Buffer: Self-Prepared; Prepare fresh for each experiment. Mix HCl and deionized water at a 1:1 ratio (10 mL per sample required).

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

Working Reagent Ⅱ: Prepared before use; for the 48 T kit, add 3 mL of deionized water to Reagent Ⅱ; for the 96 T kit, add 6 mL of deionized water to Reagent Ⅱ and dissolve completely before use. Unused reagent can be stored at 4°C, protected from light, for up to 2 weeks.

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

Standard: 1 mg/mL Ti Standard Solution. Store at 4℃, protected from light. Prepare diluted standards as follows:

Note: The Extraction Buffer and Standard have certain irritant properties. It is recommended to take appropriate personal protective measures during use.

Num.	Standard Volume (μL)	Deionized Water (μL)	Concentration (mg/mL)
Std.1	50 μL of 1 mg/mL Standard	450	0.1
Std.2	200 μL of Std.1 (0.1 mg/mL)	200	0.05
Std.3	200 μL of Std.2 (0.05 mg/mL)	200	0.025
Std.4	200 μL of Std.3 (0.0125 mg/mL)	200	0.0125
Std.5	200 μL of Std.4 (0.0063 mg/mL)	200	0.0063
Std.6	200 μL of Std.5 (0.0031 mg/mL)	200	0.0031
Std.7	200 μL of Std.6 (0.0016 mg/mL)	200	0.0016

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

Sample Preparation

Note: Note: It is recommended to use fresh soil samples.

Weigh 0.1 g of soil into a crucible, add 0.5 g Reagent Ⅰ .Heat in a muffle furnace at 900℃ for 20 min. Immediately add 10 mL Extraction Buffer to dissolve the molten block (cover to prevent splashing). After complete dissolution, transfer to a 15 mL centrifuge tube. Centrifuge at 10,000 g, 25℃ for 10 min. Collect supernatant for testing.

Note: The experimental temperature is relatively high; handle with care. The Extraction Buffer must be added while the sample is still hot to dissolve the melt. If the sample is difficult to dissolve, gently stir with a glass rod to accelerate the dissolution process.

Assay Procedure

1. Preheat the microplate reader or visible spectrophotometer for more than 30 min, and adjust the wavelength to 390 nm, visible spectrophotometer was returned to zero with deionized water.

2. Operation table (The following operations are operated in a 96-well microplate or microglass cuvette):

Reagent	Test Well (μL)	Standard Well (μL)	Blank Well (μL)
Sample supernatant	40	0	0
Standard	0	40	0
Working Reagent Ⅱ	40	40	40
Extraction Buffer	40	40	80

Reagent Ⅲ	80	80	80

Mix thoroughly, incubate at 25℃ for 30 min, and record the absorbance at 510 nm. The Test Well is marked as A_{Test}, the Standard Well is marked as $A_{Standard}$, and the Blank Well is recorded as A_{Blank}. Finally calculate $\Delta A_{Test}=A_{Test}-A_{Blank}$, $\Delta A_{Standard}=A_{Standard}-A_{Blank}$.

Note: The Standard Well and Blank Well only need to be done once or twice. Before the experiment, it is recommended to select 2-3 samples with expected significant differences for a preliminary test. If ΔA_{Test} is less than 0.0016 mg/mL of the $\Delta A_{Standard}$, the sample amount can be appropriately increased. If ΔA_{Test} exceeds 0.1 mg/mL of the $\Delta A_{Standard}$, the supernatant can be further diluted with Extraction Buffer. Multiply the final result by the dilution factor, or reduce the amount of sample used for extraction.

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 and obtain the standard equation. The determination of ΔA_{Test} is substituted into the equation to get x (mg/mL).

2. Calculation of Total Ti Content

Total Ti (mg/kg)=$x\times V_{Total}\div(W\div1,000)=10,000\times x\div W$

V_{Total}: Extraction Buffer volume, 10 mL; W: Sample weight, g; 1,000: Conversion factor, 1 kg=1,000 g.

Typical Data

The following data are for reference only. And the experimenters need to test the samples according to their own experiments.

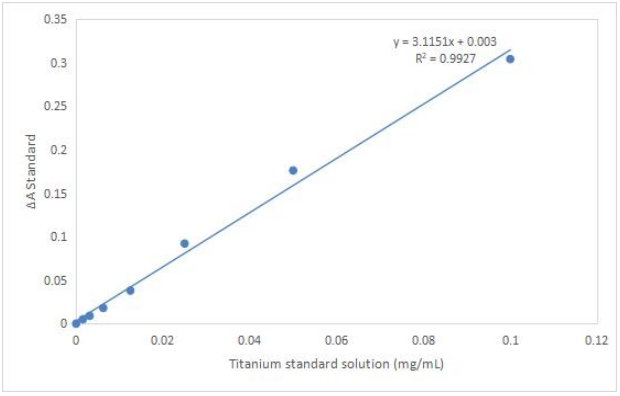

Figure 1. Standard curve of Ti

Examples:

Take 0.1 g of soil sample and analyze according to the above steps, use 96-well plate to calculate ΔA_{Test}=0.15-0.069=0.081, x=0.025. The total titanium content is calculated based on the soil sample mass as follows:

S-Total titanium content (mg/kg)=10,000×0.025÷0.1=2,500 mg/kg.

Recommended Products

Catalog No.	Product Name
KTB4012	CheKine™ Micro Soil Nitrate Nitrogen Assay Kit
KTB4014	CheKine™ Micro Acid Soil Available Phosphorous Assay Kit
KTB4041	CheKine™ Micro Soil Alkaline Phosphatase(S-AKP/ALP) Activity Assay Kit
KTB4050	CheKine™ Micro Soil Catalase (S-CAT) 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.