

Description

Boron is an essential micronutrient in plants and is involved in maintaining robust cell walls, cell membranes and reproductive tissues. Although boron is common in the soil in its natural state as a borate mineral, the amount available to plants is quite small, and boron deficiency is the second most common micronutrient deficiency among crop plants. Supplementation to the soil via fertilisers and additives is often required, as a lack of or excess of boron may significantly lower crop yield. In the biotech industry, sodium borohydride is commonly used to conjugate antibodies and typically needs to be removed from the final product, especially for therapeutic antibodies. This detection kit provides a convenient and reliable means to measure boron. In the assay, borate complexes with azomethine-H to create a coloured compound that can be measured at 420 nm. The assay can be used with a variety of samples and is simple, sensitive and adaptable to high-throughput screening.

Specifications

Detection Method	Colorimetric (OD 420 nm)
Detection Range	0.05 - 10 ug/mL (0.05 - 10 ppm) boron with 100 uL sample (96-well)
Sample Type	Water, plant tissues, soil samples and antibody conjugation solutions
Species Reactivity	All
Assay Time	40 minutes
Kit Size	100 Assays
Equipment Required	Microplate reader
Storage	Shipped at room temperature. Store all components at 2-8 degrees C upon receipt.
Shelf Life	12 months after receipt
Shipping	Room Temperature

Kit Components

Component	Quantity	Storage
Reagent A	250 mg	2-8 degrees C
Reagent B	20 mL	2-8 degrees C
Standard (500 ug/mL boron)	150 uL	2-8 degrees C

Ordering Information

Assay Genie Cat. No.	Pack Size
BA0212	100 Assays

Assay Procedure

Note: This is a sample protocol. Protocols are batch/lot specific - always follow the instructions supplied with your kit.

1. Prepare 500 uL of 10 ug/mL Premix by mixing 10 uL of the 500 ug/mL Standard and 490 uL of water, then dilute the standards in 1.5-mL centrifuge tubes as described in the standard table (10, 6, 3 and 0 ug/mL).
2. Transfer 100 uL of each standard into separate wells of a clear, flat-bottom 96-well plate and transfer 100 uL of each sample into two separate wells (one Sample well and one Sample Background well).
3. Add 150 uL of water to all Sample Background wells.
4. Add 250 uL of water to a separate well on the plate (Water Blank well).

5. Prepare the Working Reagent (WR) fresh and use within 15 minutes of reconstitution; for each standard and sample well, weigh out 2 mg of Reagent A powder and dissolve in 160 uL of Reagent B.
6. Add 150 uL of WR to each standard and sample well, tap the plate lightly to ensure the well contents are mixed evenly, and incubate for 40 minutes at room temperature, protected from light.
7. Read the optical density at 420 nm.

Standard Dilution

No	Premix	+ dH2O	Boron (ug/mL)
1	150 uL	0 uL	10
2	90 uL	60 uL	6
3	45 uL	105 uL	3
4	0 uL	150 uL	0

Calculation

Subtract the blank value (Standard #4) from the standard values and plot the delta-OD against standard concentrations. Determine the slope and calculate the boron concentration of a sample as: $[\text{Boron}] = \frac{((\text{OD_SAMPLE} - \text{OD_BLANK}) - (\text{OD_SAMPLE BG} - \text{OD_H2O}))}{\text{Slope (per ug/mL)}} \times n$ (ug/mL), where OD_SAMPLE, OD_SAMPLE BG and OD_BLANK are the optical density readings of the sample, sample background and blank (Standard #4) respectively, and OD_H2O is the OD of the Water Blank well. If the calculated boron concentration is higher than 10 ug/mL, dilute the sample in water and repeat the assay, then multiply the result by the dilution factor n. Conversions: 1 ug/mL boron equals 1 ppm or 92.5 uM.

Notes

- Briefly centrifuge the Standard tube before opening.
- Samples should be transparent and precipitate-free. If samples are cloudy or have precipitates, centrifuge for 5 minutes at 14,000 x g and use the clear supernatant for the assay. See the Product FAQ for soil and plant sample preparation procedures.
- Reagents are for research use only. Refer to the MSDS for detailed safety information.

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Technical specifications are based on manufacturer documentation and may be updated. Protocols shown are summaries - always follow the instructions supplied with your kit/lot.