ZA3000

Analysis of B (Citrate Soluble Boron) in Fertilizer Certified Reference Material (Flame Method)

INTRODUCTION: Boron is a nutritional component that facilitates cell division and strengthens cell walls. In the Fertilizers Regulation Act (Law No. 127 of 1950), there is a specification for the minimum contents of nutritional components to ensure the quality of a fertilizer and the labeling of the contents according to the solubility is mandated. ZA3000 series instruments employ the polarized Zeeman method for BKG corrections even for the flame method. The accurate BKG corrections and a very stable baseline allow the analysis of boron at low concentrations with a high temperature burner. When citrate soluble boron in a fertilizer certified reference material was analyzed, the analysis value corresponding to the certified value was obtained.

INSTRUMENT CONDITIONS

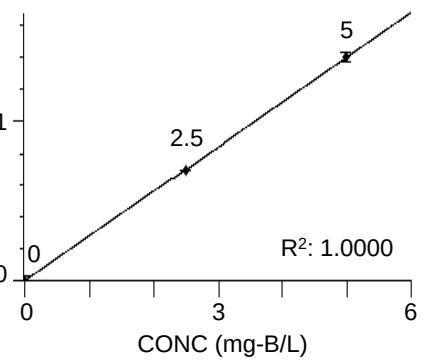
Element	: B	Atomizer	: H.T. Burner
Instrument	: ZA3000	Flame	: N_2O-C_2H_2
Atomization	: Flame	Fuel (C_2H_2)	: 7.0 L/min
Wavelength	: 249.8 nm	Oxidant (N_2O)	: 160 kPa
Lamp Current	: 10.0 mA		6.0 L/min
Slit Width	: 0.4 nm	Burner Height	: 10.0 mm

MEASUREMENT PARAMETERS

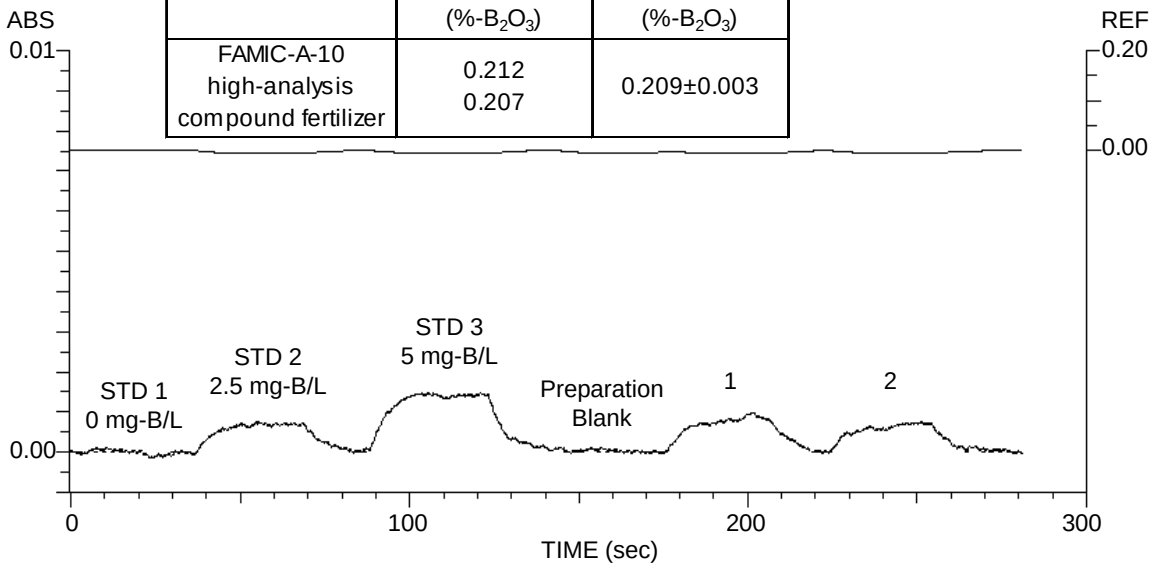
Meas. Mode	: Working Curve
Signal Mode	: BKG Corrected
Curve Order	: Linear
Calculation	: Integration
Time Constant	: 5.0 sec
Calculation Time	: 5.0 sec
Delay Time	: 5 sec

NOTE : [Preparation] 1 g of the fertilizer was weighed out. 150 mL of 2% citric acid solution was added and the mixture was shaken to mix for 1 hour. The volume was made up to 250 mL with water and the filtrate obtained by filtering through 3 kinds of filter papers was used as the sample for the measurement. Refer to Testing Methods for Fertilizers (2011) for the details of the preparation.
All the concentrations for the calibration curve and sample solutions are the numerical values as B. Then, those values were converted to the concentrations as B_2O_3.

	CONC (mg-B/L)	Mean ABS	SD	RSD	REF
STD 1	0.000	-0.00001	0.00001	- %	0.00046
STD 2	2.500	0.00070	0.00000	0.00 %	-0.00550
STD 3	5.000	0.00140	0.00003	2.14 %	-0.00530
Blank	ND	0.00002	0.00001	50.00 %	-0.00547
1	2.636	0.00074	0.00004	5.41 %	-0.00504
	2.636 (mg-B/L) × 0.25 (L) × 3.22 / 1.000 (g) = 0.212 (%-B2O3)				
2	2.423	0.00068	0.00005	7.35 %	-0.00529
	2.423 (mg-B/L) × 0.25 (L) × 3.22 / 0.941 (g) = 0.207 (%-B2O3)				



	Analysis value (%-B_2O_3)	Certified value (%-B_2O_3)
FAMIC-A-10 high-analysis compound fertilizer	0.212 0.207	0.209±0.003



KEY WORDS

Bio/Medical Science/Food/Pharmaceutical, Fertilizer/Fodder, Agriculture, Fertilizer, Citrate Soluble Boron, Boron, B, Flame, AA, ZA3000, Environment

Atomic Absorption Photometer AA

Sheet No. AA120034-00