

2.6.03

AOAC Official Method 949.03 Boron (Water-Soluble) in Fertilizers

Titrimetric Method

First Action 1949

Final Action

(Not applicable in presence of >5% urea or urea-formaldehyde resins.)

Weigh 2.5 g test portion into 250 mL beaker. Add 125 mL H₂O, boil gently ca 10 min, and filter hot through Whatman No. 40 paper, or equivalent, into 400 mL beaker. Wash solids well with 6 portions hot water and dilute to ≥200 mL with H₂O. Heat filtrate just to bp. Add 15 mL 10% BaCl₂ solution to precipitate sulfates and phosphates, and add powdered Ba(OH)₂, cautiously with stirring, until just alkaline to phenolphthalein, avoiding large excess. Boil in open beaker ≥60 min to expel NH₃. (Solutions colored by organic matter should be boiled longer.) If necessary, add H₂O to keep volume to ≥150 mL. Add and stir 1–2 teaspoonfuls Filter-Cel or other inert filtering aid, and filter with suction through packed paper pads into 500 mL Pyrex Erlenmeyer. Wash precipitate 6 times with hot boiled water. (Avoid too large wash volumes which increase volume in flask to point of dangerous bumping in next step.)

Make filtrate just colorless to phenolphthalein with HCl (1 + 5), add methyl red, and make just pink with the acid. Add 5 or 6 boiling stones and stirring rod, cover with watch glass, and boil 5 min to remove CO₂. Cool in cold water while covered. Wash cover glass, stirrer, and sides of flask. Titrate to yellow of methyl red with standard 0.05M NaOH, 936.16 (see A.1.12). Add 20 g D-mannitol and 1 mL or more phenolphthalein, shake, and wash down sides of flask. Titrate to pink end point. Determine blank in exactly same manner as test portion.

$$1 \text{ mL } 0.05\text{M NaOH} = 0.000540 \text{ g B}$$

or

$$0.00477 \text{ g Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$$

Or,

$$(\text{Titer} - \text{blank}) \times \text{factor} =$$

$$\text{lb Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}/\text{ton} \text{ (factor} = 3.807 \text{ for } 0.05\text{M NaOH)}$$

References: *JAOC* **32**, 422(1949); **33**, 132(1950);
36, 623(1953); **38**, 407(1955).

CAS-7440-42-8 (boron)