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Potassium Nitrate

KNO_3 101.10

Potassium nitrate CAS RN®: 7757-79-1; UNII: RU45X2JN0Z.

DEFINITION

Potassium Nitrate contains NLT 99.0% and NMT 100.5% of KNO_3.

IDENTIFICATION

- **A. Identification Tests—General, *Potassium* ⟨191⟩:** Meets the requirements
- **B. Identification Tests—General, *Nitrate* ⟨191⟩:** Meets the requirements

ASSAY

- **Procedure**

[Note—Use water that is free of carbon dioxide and ammonia.]

Cation-exchange column: Transfer strongly acidic styrene-divinylbenzene cation-exchange resin (16- to 50-mesh) to a 2-cm diameter chromatographic column to a depth of about 20 cm.

Sample solution: 4 mg/mL of Potassium Nitrate in water

Analysis: Pass 100 mL of *Sample solution* through the *Cation-exchange column* at a rate of 5 mL/min, and collect the eluate in a 500-mL conical flask. Wash the resin in the column with water at a rate of 10 mL/min, collecting the eluate in the conical flask. Add 0.15 mL of phenolphthalein TS to the flask, and after 5 min titrate with 0.1 N sodium hydroxide VS to a pink endpoint. Continue collecting the wash from the column, and continue titrating, if necessary, until a 50-mL increment of eluate requires no further addition of sodium hydroxide. Each mL of 0.1 N sodium hydroxide is equivalent to 10.11 mg of KNO_3.

Acceptance criteria: 99.0%–100.5%

IMPURITIES

- **Chloride and Sulfate, *Chloride* ⟨221⟩:** A 500-mg portion shows no more chloride than corresponds to 0.21 mL of 0.020 N hydrochloric acid (0.03%).
- **Chloride and Sulfate, *Sulfate* ⟨221⟩**

Sample solution: 100 mg of Potassium Nitrate in 10 mL of water. Add 15 mL of 6 N hydrochloric acid, and evaporate to dryness on a steam bath. To the residue add 7 mL of 6 N hydrochloric acid, and evaporate to dryness on a steam bath. Dissolve the residue in 35 mL of water and, if necessary, neutralize with hydrochloric acid using a litmus paper indicator. Filter, if necessary, to obtain a clear *Sample solution*.

Acceptance criteria: The *Sample solution* shows no more sulfate than corresponds to 0.10 mL of 0.020 N sulfuric acid (0.1%).

Change to read:

- ▲**Arsenic ⟨211⟩, *Procedures, Procedure 1*** ▲(CN 1-Jun-2023) **:** NMT 3 ppm

Change to read:

- ▲**Lead ⟨251⟩, *Procedures, Procedure 1*** ▲(CN 1-Jun-2023)

Sample solution: 500 mg in 20 mL of water

Acceptance criteria: NMT 10 ppm

Change to read:

- ▲**Iron ⟨241⟩, *Procedures, Procedure 1*** ▲(CN 1-Jun-2023) **:** NMT 10 ppm

- **Limit of Sodium**

Standard stock solution: [Note—Sodium chloride is previously dried at 105° for 2 h.] 2.542 µg/mL of sodium chloride in water. This solution contains 1.0 µg/mL of sodium.

Sample stock solution: 2 mg/mL of Potassium Nitrate. [Note—The concentration of potassium nitrate in this solution may be modified by using a different quantity or by further dilution to bring the absorption response within the working range of the atomic absorption spectrometer.]

Instrumental conditions

(See *Atomic Absorption Spectroscopy* ⟨852⟩.)

Mode: Atomic absorption spectrophotometry

Analytical wavelength: Sodium emission line of 589 nm

Lamp: Sodium hollow-cathode

Flame: Oxidizing

Blank: Water

Analysis: Transfer 5.0 mL of the *Sample stock solution* to each of three 25-mL volumetric flasks. To these flasks, respectively, add 0.0, 5.0, and 10.0 mL of the *Standard stock solution*, dilute with water to volume, and mix. These flasks contain 0.0, 0.20, and 0.40 µg of added sodium/mL, respectively. [NOTE—Concentrations of sodium in these solutions may be modified to fit the linear or working range of the atomic absorption spectrophotometer.]

Determine the absorbances of these solutions. Plot the absorbances of the three solutions versus concentration, in µg/mL of added sodium, draw the straight line best fitting the plotted points, and extrapolate the line until it intercepts the concentration axis. From the graph determine the concentration, C, in µg/mL of sodium, of the solution containing 0.0 mL of the *Standard stock solution*.

Calculate the percentage of sodium in the portion of Potassium Nitrate taken by multiplying C by 0.25.

Acceptance criteria: NMT 0.1%

• **LIMIT OF NITRITE**

Solution A: 1 mg/mL of sulfanilic acid

Solution B: 1 mg/mL of *N*-(1-naphthyl)ethylenediamine dihydrochloride. [NOTE—When stored in a low-actinic glass bottle, this solution may be used for 1 week.]

Standard stock solution: 15 µg/mL of sodium nitrite (10 µg/mL of nitrite)

Standard solutions: Transfer 1.0 and 2.0 mL of *Standard stock solution* to separate 50-mL beakers, and add 19 and 18 mL of water to the respective beakers.

Sample solution: Transfer 4.0 g of Potassium Nitrate to a 50-mL beaker, add 20 mL of water, and swirl to dissolve.

Analysis: To the beakers containing the *Standard solutions* and the *Sample solution* add 5.0 mL of *Solution A* and 5.0 mL of diluted hydrochloric acid, and allow to stand for 3 min. Add 5.0 mL of *Solution B* to each beaker, mix, and allow to stand for 15 min. Determine the absorbances of the solutions at 550 nm.

Acceptance criteria: The absorbance of the solution from the *Sample solution* does not exceed that of the solution from the *Standard solution* containing 20 µg of nitrite (5 µg/g).

ADDITIONAL REQUIREMENTS

• **PACKAGING AND STORAGE:** Preserve in tight containers.

Auxiliary Information - Please check for your question in the FAQs before contacting USP.

Topic/Question	Contact	Expert Committee
POTASSIUM NITRATE	Documentary Standards Support	SM22020 Small Molecules 2
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM22020 Small Molecules 2

Chromatographic Database Information: Chromatographic Database

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