

SODIUM NITRATE

Prepared at the 44th JECFA (1995), published in FNP 52 Add 3 (1995) superseding specifications prepared at the 17th JECFA (1973), published in FNP 4 (1978) and in FNP 52 (1992). Metals and arsenic specifications revised at the 63rd JECFA (2004). An ADI of 0-3.7 mg/kg bw was established at the 44th JECFA (1995). Nitrate should not be used for infants below 3 months

SYNONYMS Chile saltpetre, cubic or soda nitre; INS No. 251

DEFINITION

Chemical names Sodium nitrate

C.A.S. number 7631-99-4

Chemical formula NaNO_3

Formula weight 85.00

Assay Not less than 99.0% on the dried basis

DESCRIPTION Clear, colourless, odourless, transparent crystals, or white granules or powder; deliquescent in moist air

FUNCTIONAL USES Antimicrobial preservative, colour fixative

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Freely soluble in water; slightly soluble in ethanol

Test for sodium (Vol. 4) Passes test

Test for nitrate (Vol. 4) Passes test

PURITY

Loss on drying (Vol. 4) Not more than 2% (105°, 4 h)

Nitrite Not more than 30 mg/kg
See description under TESTS

Lead (Vol. 4) Not more than 2 mg/kg
Determine using an atomic absorption technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the method described in Volume 4, "Instrumental Methods."

TESTS

PURITY TESTS

Nitrite

Principle:

A spectrophotometric determination using a reaction between nitrite, sulfanilamide and N-(1-naphthyl) ethylenediamine dihydrochloride to produce a pink coloured complex which is measured by its absorbance at 540 nm.

Reagents

- Sulfanilamide Solution: Dissolve 2 g of sulfanilamide in 1000 ml dilute hydrochloric acid TS.
- Coupling reagent: Dissolve 0.2 g of N-(1-naphthyl)-ethylene- diamine dihydrochloride in water and dilute to 100 ml. Keep the reagent in a brown bottle in a refrigerator.
- Nitrite standard: Dissolve 0.750 g of sodium nitrite (previously dried for 4 h over silica gel) in water and dilute to 1000 ml (500 µg nitrite/ml). Dilute 10 ml of this stock solution to 100 ml with water (50 µg nitrite/ml). Finally dilute 10 ml of this preparation to 1000 ml with water (0.5 µg nitrite/ml).

Procedure

Standard curve:

Pipette into 100 ml volumetric flasks 0, 5, 10, 20 and 50 ml of nitrite standard (corresponding to 0, 2.5, 5, 10 and 25 µg of nitrite) and dilute to about 80 ml with water. Add to each of the flasks 10 ml of sulfanilamide solution and mix. After 3 min add 1 ml of coupling reagent, dilute to mark with water, mix and let stand for 15 min. Measure the absorbance of the solutions against water at 540 nm using 10 mm cuvettes. Draw a standard curve with the absorbance as a function of amount of nitrite (it shall be a straight line).

Sample:

Accurately weigh about 1 g of the sample to the nearest 0.001 g. Dissolve in water and dilute to 100 ml. Pipette 20 ml into a 100 ml volumetric flask and dilute to about 80 ml with water. Add 10 ml of sulfanilamide solution and mix. After 3 min add 1 ml of coupling reagent, dilute to mark with water, mix and let stand for 15 min. Measure the absorbance of the solution against water at 540 nm using 10 mm cuvettes. Read on the standard curve the amount of nitrite corresponding to the actual absorbance.

Calculation

$$\text{Content of nitrite} = \frac{A \times 5}{W} \text{ mg / kg}$$

where

A = Amount of nitrite read from the standard curve (µg)

W = Weight of sample (g)

METHOD OF ASSAY

Weigh accurately about 0.4 g of the dried sample and dissolve in about 300 ml of water in a 500 ml round flask. Add 3 g of a powder of Devarda's alloy and 15 ml of sodium hydroxide solution (2 in 5), and connect with a spray-preventing device and condenser to the flask. Allow to stand for 2 h. Transfer 50 ml of 0.1N sulfuric acid to a receptacle and use this to collect 250 ml of the distillate, and titrate the excess sulfuric acid with 0.1N sodium hydroxide, using 3 drops of methyl red/Methylene blue TS as the indicator.

Perform a blank test in the same manner as the sample to make any necessary correction. Each ml of 0.1N sulfuric acid is equivalent to 8.5 mg of NaNO_3 .