FERROCYANIDES of CALCIUM, POTASSIUM and SODIUM

Prepared at the 17th JECFA (1973), published in FNP 4 (1978) and in FNP 52 (1992). Metals and arsenic specifications revised at the 57th JECFA (2001). An ADI of 0-0.025 mg/kg bw was established at the 18th JECFA (1974)

SYNONYMS Yellow prussiate of lime, potash or soda; hexacyanoferrate of calcium, potassium or sodium; INS No. Calcium salt 538, Potassium salt 536, Sodium salt 535

DEFINITION

Chemical names: Calcium (or Potassium or Sodium) ferrocyanide,
Calcium (or Potassium or Sodium) hexacyanoferrate (II)

C.A.S. number: 1327-39-5, Calcium salt
13943-58-3, Potassium salt
13601-19-9, Sodium salt

Chemical formula: $Ca_2Fe(CN)_6 \cdot 12H_2O$
$K_4Fe(CN)_6 \cdot 3H_2O$
$Na_4Fe(CN)_6 \cdot 10H_2O$

Formula weight: Calcium salt 508.3
Potassium salt 422.4
Sodium salt 484.1

Assay: Not less than 99.0% of the respective ferrocyanide

DESCRIPTION Yellow crystals or crystalline powder

FUNCTIONAL USES Anticaking agent

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4): Soluble in water; potassium and sodium salts are insoluble in ethanol

Test for ferrocyanide: To 10 ml of a 1% solution of the sample add 1 ml of ferric chloride TS. A dark blue precipitate is formed. (Retain the mixture for the Test for calcium).

Test for calcium (Vol. 4): Passes test
Test the mixture from the Test for ferrocyanide

Test for potassium (Vol. 4): Passes test

Test for sodium (Vol. 4): Passes test

PURITY

Cyanide: Not detectable

Dissolve 10 mg of copper sulfate in a mixture of 8 ml of water and 2 ml of ammonia TS. Wet a strip of filter paper with this solution, and place the wet paper in a stream of hydrogen sulfide. When one drop of a 1% solution of the sample is placed on the brown reagent paper, a white circle should not be produced.

Ferricyanide

Not detectable
Dissolve about 10 mg of the sample in 10 ml of water and place one drop of this solution on a spot plate. Add one drop of a 1% solution of lead nitrate, followed by a few drops of a solution prepared by saturating cold 2 N acetic acid with benzidine. No blue precipitate or blue coloration should appear.

Arsenic (Vol. 4)

Not more than 3 mg/kg (Method II)

Lead (Vol. 4)

Not more than 5mg/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.”

METHOD OF ASSAY

Weigh 3 g of the sample to the nearest 0.1 mg and transfer into a 400-ml beaker. Dissolve in 225 ml of water, and add cautiously about 25 ml of sulfuric acid TS. Add, with stirring, 1 drop of orthophenanthroline TS, and titrate with 0.1 N ceric sulfate until the colour changes sharply from orange to pure yellow. Each ml of 0.1 N ceric sulfate is equivalent to 50.83 mg of $Ca_2Fe(CN)_6 \cdot 12H_2O$; 42.24 mg of $K_4Fe(CN)_6 \cdot 3H_2O$ or 48.41 mg of $Na_4Fe(CN)_6 \cdot 10H_2O$.