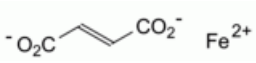
Edition: BP 2025 (Ph. Eur. 11.6 update)

Ferrous Fumarate

General Notices

(Ph. Eur. monograph 0902)



$C_4H_2FeO_4$ 169.9 *141-01-5*

Action and use

Treatment of iron-deficiency anaemia.

Preparations

Ferrous Fumarate Capsules

Ferrous Fumarate Oral Suspension

Ferrous Fumarate Tablets

Ferrous Fumarate and Folic Acid Tablets

Ph Eur

DEFINITION

Iron(II) (*E*)-butenedioate.

Content

93.0 per cent to 101.0 per cent (dried substance).

CHARACTERS

Appearance

Fine, reddish-orange or reddish-brown powder.

Solubility

Slightly soluble in water, very slightly soluble in ethanol (96 per cent).

IDENTIFICATION

A. Thin-layer chromatography (2.2.27).

Test solution To 1.0 g add 25 mL of a mixture of equal volumes of hydrochloric acid R and water R and heat on a water-bath for 15 min. Cool and filter. Use the filtrate for identification test C. Wash the residue with 50 mL of a mixture of 1 volume of dilute hydrochloric acid R and 9 volumes of water R and discard the washings. Dry the residue at 100-105 °C. Dissolve 20 mg of the residue in acetone R and dilute to 10 mL with the same solvent.

Reference solution Dissolve 20 mg of fumaric acid CRS in acetone R and dilute to 10 mL with the same solvent.

Plate TLC silica gel F_{254} plate R.

Mobile phase anhydrous formic acid R, methylene chloride R, butanol R, heptane R (12:16:32:44 *V/V/V/V*).

Application 5 µL.

Development In an unsaturated tank, over a path of 10 cm.

Drying At 105 °C for 15 min.

Detection Examine in ultraviolet light at 254 nm.

Results The principal spot in the chromatogram obtained with the test solution is similar in position and size to the principal spot in the chromatogram obtained with the reference solution.

B. Mix 0.5 g with 1 g of resorcinol R. To 0.5 g of the mixture in a crucible add 0.15 mL of sulfuric acid R and heat gently. A dark red semi-solid mass is formed. Add the mass, with care, to 100 mL of water R. An orange-yellow colour develops and the solution shows no fluorescence.
C. The filtrate obtained during preparation of the test solution in identification test A gives reaction (a) of iron (2.3.1).

TESTS

Sulfates (2.4.13)

Maximum 0.2 per cent.

Heat 0.15 g with 8 mL of dilute hydrochloric acid R and 20 mL of distilled water R. Cool in iced water, filter and dilute to 30 mL with distilled water R.

Elemental impurities

Any method that fulfils the requirements of general chapter 2.4.20. *Determination of elemental impurities* may be used.

Element	Maximum content (ppm)
Arsenic	1.5
Chromium	200
Cobalt	20
Lead	3
Nickel	50
Vanadium	40

Ferric ion

Maximum 2.0 per cent.

In a flask with a ground-glass stopper, dissolve 3.0 g in a mixture of 10 mL of hydrochloric acid R and 100 mL of water R by heating rapidly to boiling. Boil for 15 s. Cool rapidly, add 3 g of potassium iodide R, stopper the flask and allow to stand protected from light for 15 min. Add 2 mL of starch solution R as indicator. Titrate the liberated iodine with 0.1 M sodium thiosulfate. Carry out a blank test. The difference between the volumes used in the 2 titrations corresponds to the amount of iodine liberated by ferric ion.

1 mL of *0.1 M sodium thiosulfate* is equivalent to 5.585 mg of ferric ion.

Zinc

Maximum 500 ppm.

Atomic absorption spectrometry (*2.2.23, Method I*).

Test solution Dissolve 0.500 g in a mixture of 2.5 mL of *hydrochloric acid R* and 20 mL of *water R*, heating slightly if necessary. Allow to cool, filter if necessary and dilute to 25.0 mL with *water R*. Dilute 1.0 mL of the solution to 10.0 mL with *water R*.

Reference solutions Prepare the reference solutions using *zinc standard solution (10 ppm Zn) R* and diluting with a 1 per cent *V/V* solution of *hydrochloric acid R*.

Source Zinc hollow-cathode lamp.

Wavelength 213.9 nm.

Atomisation device Air-acetylene flame.

Loss on drying (*2.2.32*)

Maximum 1.0 per cent, determined on 1.000 g by drying in an oven at 105 °C.

ASSAY

Dissolve with slight heating 0.150 g in 7.5 mL of *dilute sulfuric acid R*. Cool and add 25 mL of *water R*. Add 0.1 mL of *ferroin R*. Titrate immediately with *0.1 M cerium sulfate* until the colour changes from orange to light bluish-green.

1 mL of *0.1 M cerium sulfate* is equivalent to 16.99 mg of $C_4H_2FeO_4$.

STORAGE

In an airtight container, protected from light.

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