

FERRIC AMMONIUM CITRATE

Prepared at the 28th JECFA (1984), published in FNP 31/2 (1984) and in FNP 52 (1992). Metals and arsenic specifications revised at the 63rd JECFA (2004). A PMTDI of 0.8 mg/kg bw for iron was established at the 29th JECFA (1985).

SYNONYMS	Iron ammonium citrate, ammonium ferric citrate, ammonium iron citrate, ammonium iron (III) citrate, INS No. 381
DEFINITION	A complex salt of undetermined structure, composed of iron, ammonia and citric acid; there are two types of salts - brown and green - containing different amounts of iron
Chemical names	Ferric ammonium citrate, ammonium iron (III) citrate
Assay	Not less than 16.5% and not more than 22.5% of iron (Fe) for the brown salt, and not less than 14.5% and not more than 16.0% of iron (Fe) for the green salt.
DESCRIPTION	<p>Brown salt: thin, transparent brown, reddish brown, or garnet red scales or granules, or a brownish yellow powder; odourless or has a slight ammoniacal odour</p> <p>Green salt: thin, transparent green scales, granules, powder, or transparent green crystals; odourless</p>
FUNCTIONAL USES	Nutrient, dietary supplement (brown salt) Nutrient, dietary supplement, anticaking agent for sodium chloride (green salt)
CHARACTERISTICS	
IDENTIFICATION	
<u>Solubility</u> (Vol. 4)	Very soluble in water; insoluble in ethanol
<u>Test for iron and ferric salts</u>	Ignite 0.5 g of the sample gently, and dissolve the residue in 5 ml of dilute hydrochloric acid TS. The solution gives positive tests for <i>iron</i> and for <i>ferric salts</i> .
<u>Test for citrate</u>	To 5 ml of a 1-in-10 solution of the sample add 0.3 ml of potassium permanganate TS and 4 ml of mercuric sulfated TS and then heat the mixture to boiling. A white precipitated forms.
<u>Test for ferric and ammonium salt</u>	Dissolve 0.5 g of the sample in 5 ml of water, and add 5 ml of sodium hydroxide TS. A reddish brown precipitate forms and ammonia is evolved when the mixture is heated.
PURITY	
<u>Ferric citrate</u>	Add potassium ferrocyanide TS to a 1 in 100 solution of the sample. No blue precipitation forms.

Oxalate

Transfer 1 g of the sample into a 125-ml-separator, dissolve in 10 ml of water, add 2 ml of hydrochloric acid, and extract successively with 50-ml portion and one 20-ml portion of ether. Transfer the combined ether extracts to a 150-ml beaker, add 10 ml of water, and remove the ether by evaporation on a steam bath. Add 1 drop of glacial acetic acid and 1 ml of calcium acetate solution (1 in 20) to the residual aqueous solution. No turbidity is produced within 5 min.

Sulfates

Not more than 0.3%

Dissolve a 100 mg sample in 1 ml of diluted hydrochloric acid TS, and dilute to 30 to 40 ml with water. Proceed as directed in the Limit Test for Sulfates, beginning with the addition of 3 ml of barium chloride TS. Any turbidity produced does not exceed that shown in a control containing 0.6 ml of 0.01 N sulfuric acid.

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."

METHOD OF ASSAY

Transfer about 1 g of the sample, accurately weighed, into a 250 ml glass-stoppered Erlenmeyer flask, and dissolve in 25 ml of water and 5 ml of hydrochloric acid. Add 4 g of potassium iodide, stopper, and allow to stand protected from light for 15 min. Add 100 ml of water, and titrate the liberated iodine with 0.1 N sodium thiosulfate, using starch TS as the indicator. Perform a blank determination and make any necessary correction. Each ml of 0.1 N sodium thiosulfate is equivalent to 5.585 mg of iron (Fe).