FUMARIC ACID

Prepared at the 53rd JECFA (1999) and published in FNP 52 Add 7 (1999), superseding specifications prepared at the 35th JECFA (1989) and published in FNP 49 (1990). ADI "not specified" established at the 35th JECFA in 1989.

SYNONYMS INS No. 297

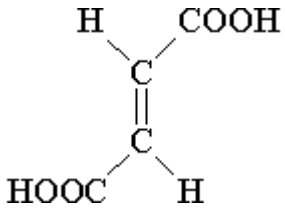
DEFINITION

Chemical names *trans*-Butenedioic acid, *trans*-1,2-Ethylene-dicarboxylic acid

C.A.S. number 110-17-8

Chemical formula $C_4H_4O_4$

Structural formula



Formula weight 116.07

Assay Not less than 99.0% calculated on the dried basis

DESCRIPTION Odourless, white crystalline powder or granules

FUNCTIONAL USES Acidity regulator, flavouring agent (see "Flavouring agents" monograph, JECFA no. 618)

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Soluble in ethanol; slightly soluble in water and in diethyl ether

pH (Vol. 4) 2.0 - 2.5 (1 in 30 solution)

1,2-Dicarboxylic acid Place 50 mg of the sample in a test tube, add 2 to 3 mg of resorcinol and 1 ml of sulfuric acid, shake, heat at 130° for 5 min and cool. Dilute with water to 5 ml and add sodium hydroxide solution (2 in 5) dropwise to render the solution alkaline, cool and dilute with water to 10 ml. A greenish blue fluorescence is observed under an ultraviolet lamp.

Test for double bond Add 10 ml of water to 0.5 g of the sample and dissolve by boiling. Add 2 or 3 drops of bromine TS to the hot solution. The colour of bromine TS disappears.

PURITY

Loss on drying (Vol. 4)	Not more than 0.5% (120^{o}, 4 h)
Melting range (Vol. 4)	286 - 302^{o} (closed capillary, rapid heating)
Sulfated ash (Vol. 4)	Not more than 0.1% Test 2 g of the sample (Method I)
Maleic acid (Vol. 4)	Not more than 0.1%
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 Erlenmeyer flask, add 50 ml of methanol, and dissolve the sample by warming gently on a steam bath. Cool, add phenolphthalein TS, and titrate with 0.5 N sodium hydroxide to the first appearance of a pink colour that persists for at least 30 sec. Perform a blank determination and make any necessary correction. Each ml of 0.5 N sodium hydroxide is equivalent to 29.02 mg of $C_4H_4O_4$.