ERYTHRITOL

New specification prepared at the 53rd JECFA (1999) and published in FNP 52 Add 7. ADI "not specified", established at the 53rd JECFA in 1999.

SYNONYMS Meso-erythritol; tetrahydroxybutane; erythrite.

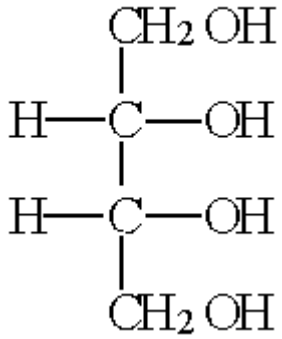
DEFINITION Obtained by fermentation of starch enzyme hydrolysate (from starches such as wheat and corn) by safe and suitable food grade osmophilic yeasts such as *Moniliella pollinis* or *Trichosporonoides megachilensis.* The heat-sterilized broth is filtered, purified by ion exchange resin, activated charcoal and ultrafiltration, crystallised washed and dried.

Chemical names 1,2,3,4-Butanetetrol

C.A.S. number 149-32-6

Chemical formula $C_4H_{10}O_4$

Structural formula



Formula weight 122.12

Assay Not less than 99% after drying

DESCRIPTION White, odourless, non-hygroscopic, heat-stable crystals. It has a sweetness approximately 60-80% that of sucrose.

FUNCTIONAL USES Flavour enhancer, humectant, carrier, sweetener.

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Freely soluble in water, slightly soluble in ethanol, insoluble in diethyl ether

Melting range (Vol. 4) Between 119 and 123º

Main Peak in HPLC The retention time of the major peak in the chromatogram of the Assay Solution corresponds to that in the chromatogram of the Standard Solution obtained in the Assay.

PURITY

Loss on drying (Vol. 4)	Not more than 0.2% (70°, 6 h, in a vacuum desiccator)
Sulfated ash (Vol. 4)	Not more than 0.1% Test 2 g of the sample (Method I)
Reducing substances (Vol.4)	Not more than 0.3% calculated as D-glucose (Method I)
Ribitol and glycerol	Not more than 0.1% See description under TESTS
Lead (Vol. 4)	Not more than 0.5 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

Ribitol and glycerol

In the chromatogram obtained from the *Assay Solution* as directed in the *Procedure* under *Method of Assay*, the elution pattern may include individual minor peaks representing glycerol and ribitol. The retention times for ribitol and glycerol, relative to erythritol (1.0), are approximately 0.93 and 1.10, respectively. Measure the peak responses for erythritol (*E*), glycerol (*G*), and ribitol (*R*), and calculate the total area (*T*). Calculate the percentage of glycerol in the sample by the formula % glycerol = 100*G/T*, and the percentage of ribitol by the formula % ribitol = 100*R/T*. The sum of the % glycerol and the % ribitol is not greater than 0.1%.

METHOD OF ASSAY

Determine the erythritol content of the sample by liquid chromatography.

Mobile phase
Deionized water

Standard Solution
Transfer about 2 g of Standard Erythritol, previously dried in a vacuum desiccator at 70° for 6 hr and accurately weighed to the nearest 0.1 mg (*W*), into a 50 ml volumetric flask, dissolve in and dilute to volume with deionized water and mix. Filter the solution through a disposable 0.45 µm filter before use in the 'Procedure'.

(Standard Erythritol may be obtained from Cerestar, EBS Vilvoorde R&D Centre, Centre of Fermentation Expertise, 84 Havenstraat, 1800 Vilvoorde, Belgium; Mitsubishi Chemical Corporation, Speciality Chemicals Company, Intermediate Chemicals Department, 5-2 Marunonchi 2-chome, Chiyodaq-ku, Tokyo 100-0005, Japan; or Nikken Chemicals Co., Ltd., Development Department, Sumitomo-Tsukiji Bldg., No. 4-414, kTsukiji 5-chome, Chuo-ku, Tokyo, 104-0045, Japan.

Assay

Prepare as directed for 'Standard Solution', using about 2 g of the sample, previously dried in a vacuum desiccator at 70º for 6 h and accurately weighed to the nearest 0.1 mg (*w*).

Chromatographic System

Use a high-pressure liquid chromatograph equipped with a constant-flow pulseless pump and fitted with a sensitive differential refractive index detector such as the RID-6A or equivalent. The column is packed with a strong cation exchange resin in the hydrogen form, such as MCI Gel-CK08EH, Shodex KC-811 or equivalent, consisting of a macroreticular sulfonated polystyrene-divinylbenzene copolymer, 8% crosslinked, 9 µm particle size. The column temperature is 60ºC. . The sample injector is preferably of the fixed-loop type (manual or automatic), capable of accurately injecting 30 µl. The integrator can be any modern data acquisition system with recording and processing capabilities. The operating flow rate is about 0.5 ml/min. The maximum pressure of the total system is about 50 kgf/cm^2.

System Start-up

Connect the injector outlet to the column inlet, and connect the column outlet directly to waste. Activate the pump and elute the system at a flow rate of 0.1 ml/min. Set the pressure limit control to about 15 kgf/cm^2 above the normal operating pressure. Increase the flow rate by increments of 0.1 ml/min up to the operating rate, and elute the column for 2 hours. Connect the column outlet to the detector tube, flush both the reference and sample cells for 30 min, and then zero the refractometer and adjust the sensitivity

System Suitability Test

The area responses of triplicate 30-µl injections of the *Standard Solution* show a relative standard deviation (100 × standard deviation/mean peak area) of not more than 1.0%.

Procedure

Chromatograph triplicate 30-µl portions of the *Standard Solution* and record the mean of the erythritol peak areas as *A*. In a similar manner, chromatograph triplicate 30-µl portions of the *Assay Solution* and record the mean of the erythritol peak areas as *a*.

Calculate the percentage of erythritol in the sample by the formula:
% Erythritol = 100(*W*/*w*)(*a*/*A*).