D-TAGATOSE

Prepared at 61st JECFA (2003), published in FNP 52 Add 11 (2003), superseding specifications prepared at the 57th JECFA (2001), published in FNP 52 Add 9 (2001). An ADI "not specified" was established at the 63rd JECFA (2004).This ADI does not apply to individuals with hereditary fructose intolerance arising from 1-phosphofructoaldolase (aldolase B) or fructose 1,6-diphosphatase deficiency.

SYNONYMS D-*lyxo*-Hexulose

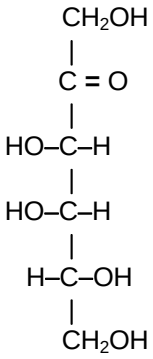
DEFINITION D-Tagatose is a ketohexose, an epimer of D-fructose inverted at C-4, with a sweet taste. It is obtained from D-galactose by isomerization under alkaline conditions in the presence of calcium.

Chemical names D-Tagatose

C.A.S. number 87-81-0

Chemical formula $C_6H_{12}O_6$

Structural formula



Formula weight 180.16

Assay Not less than 98% on the dry basis

DESCRIPTION Virtually odourless, white or almost white crystals

FUNCTIONAL USES Sweetener, texturizer, stabilizer, humectant, formulation aid

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Very soluble in water, very slightly soluble in ethanol

Specific rotation (Vol. 4) $[\alpha]_D^{20}$: -4 to -5.6° (1% aqueous solution)

Melting range (Vol. 4) 133 – 137°

Reaction with alkaline Proceed as directed for the measurement of reducing substances

cupric tartrate (Vol. 4) (Method II). A copious red precipitate of cuprous oxide is formed.

Chromatography The retention time for the major peak in the chromatogram of the sample solution corresponds to that for D-tagatose in the chromatogram of reference standard D-tagatose (available from Arla Foods Ingredients amba, Skanderborgvej 277, 8260 Viby, Denmark) using the conditions described in the METHOD OF ASSAY.

PURITY

Loss on drying (Vol. 4) Not more than 0.5% (102°, 2 h)

Total ash (Vol. 4) Not more than 0.1%

Lead (Vol. 4) Not more than 1mg/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

Determined by liquid chromatography (see Volume 4) using the following procedure.

Preparation of sample solution: Weigh accurately about 50 mg of dry sample into a 10-ml volumetric flask and add about 8 ml of purified, deionized water. Bring sample to complete dissolution and dilute to mark with purified deionized water. Filter through a 0.2 μm filter.

Preparation of reference solution: Use dry standard D-tagatose. Prepare a solution of the reference material as described for the sample solution.

Apparatus: Liquid chromatograph equipped with a refractive index detector and an integrator.

Conditions:

Column:	Biorad Aminex HPX-87C (length 30 cm, diameter 7.8 mm, particle size 9 μm) or equivalent
Column temperature:	85°
Mobile phase:	Deionized water with 50 ppm calcium acetate
Flow rate:	0.6 ml/min
Injection volume:	20 μl

Procedure: Separately inject equal volumes of the sample solution and the reference solution into the chromatograph. Record the chromatograms and measure the response of D-tagatose peak. Calculate the content of D-tagatose in the sample solution by the following formula:

$$\% \text{ D-Tagatose} = 100\ (A_S/A_R)\ (W_R/W_S)$$

Where

A_S = Peak area of sample solution

A_R = Peak area of reference solution
W_S = Weight of dry sample (mg)
W_R = Weight of dry reference standard (mg)