TÜBİTAK
ULUSAL METROLOJİ ENSTİTÜSÜ

TÜBİTAK UME

TÜRKAK Reference Material Producer TS EN ISO 17034 AB-0001-RM

Certificate of the Reference Material

Name of the Material	:	Fructose
Material Code	:	UME CRM 1311
Issue Date	:	25.08.2016
Revision Date	:	21.09.2026 (Revision history can be found on the last page)
Validity Period of the Certificate	:	5 years from the sales date
Certified Values	:	

Parameter	Certified Value [1]	Uncertainty [2]
$\delta^{13}C_{VPDB\text{-}LSVEC}$	-10.97 ‰	0.67 ‰

[1] Certified value is determined by calculating average value of accepted comparison study results participated by 7 laboratories using EA-IRMS method. Measurement results are determined by measuring two independent units with three replicates in two different days by each laboratory. Measurement results are traceable to the international Vienna-Pee Dee Belemnite (VPDB-LSVEC) reference scale and expressed in parts per thousand relative difference ($\delta^{13}C_{VPDB\text{-}LSVEC}$,‰) from VPDB-LSVEC.

[2] The expanded uncertainty of certified value includes characterization, homogeneity, stability components and is stated as the standard uncertainty of measurement multiplied by the coverage factor *k*=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with GUM “Guide to the Expression of Uncertainty in Measurement”.

TÜBİTAK UME has been accredited by TÜRKAK as a reference material producer under the accreditation number AB-0001-RM in accordance with the TS EN ISO 17034:2018 standard.

Turkish Accreditation Agency (TÜRKAK) is a signatory to the European Cooperation for Accreditation (EA) Multilateral Agreement (MLA) and the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of reference material certificates.

Sales Date

Assoc. Prof. Mustafa ÇETİNTAŞ
Director

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Description

A unit contains approximately 1 gram of fructose (powder) in 5 ml amber glass vial with screw cap. Additional information about the material and the certification process is presented in the certification report.

Intended Use

This material is intended to be used for method validation, quality control and correction factor determination in $\delta^{13}C_{VPDB\text{-}LSVEC}$ measurements by EA-IRMS method.

Instructions for Use

All precautions must be taken in order to prevent contamination during the use of the bottle. Minimum sample intake amount is 0.2 mg. This material can be transferred at ambient temperature if the temperature does not exceed +60 °C for no longer than 4 weeks.

Storage Conditions

Material should be stored in dry conditions at (+20 ± 5) °C.

TÜBİTAK UME cannot be held responsible for changes that might happen to the material at customer's premises due to noncompliance to the instructions for use, and the storage conditions given in the certificate.

Safety Information

Usual laboratory precautions apply. It is strongly recommended that the material must be handled and disposed according to the safety guidelines where applicable. Please refer to the Safety Data Sheet before any use of the material.

Participants

Information about the laboratories participated in the characterization study is given in the table below.

Laboratory	Address
TÜBİTAK UME	TÜBİTAK Gebze Yerleşkesi, Barış Mah. Dr. Zeki Acar Cad. No:1, 41470 Gebze - Kocaeli / Türkiye
Akdeniz Üniversitesi	Akdeniz Üniversitesi, Gıda Güvenliği ve Tarımsal Araştırmalar Merkezi, Kampüs, 07058 Antalya / Türkiye
Altıparmak Gıda San. ve Tic. A.Ş.	Altıparmak Gıda San. ve Tic. A.Ş. Çavuşbaşı Cad. No:70 Çekmeköy - İstanbul / Türkiye
Arıgıda Kontrol ve Araştırma Laboratuvarı	Arıgıda Kontrol ve Araştırma Laboratuvarı, Bağlar Mah. Endüstri Sok. No:7, Kozan - Adana / Türkiye
Ege Üniversitesi (Argefar)	Ege Üniversitesi (Argefar), İlaç Geliştirme ve Farmakokinetik Araştırma ve Uygulama Merkezi, Çevre ve Gıda Analizleri Laboratuvarı, 35100 Bornova - İzmir / Türkiye
Türkiye Atom Enerjisi Kurumu (TAEK)	Türkiye Atom Enerjisi Kurumu (TAEK), Sarayköy Nükleer Araştırma ve Eğitim Merkezi, Saray Mah. Atom Cad. No:27, 06983 Kazan - Ankara / Türkiye
Türk Standartları Enstitüsü (TSE)	Türk Standartları Enstitüsü (TSE), TSE Gebze Kalite Kampüsü, Cumhuriyet Mah. Çayırova Tren İstasyonu Yanı, 2258 Sok. Gebze - Kocaeli / Türkiye

Methods and/or Techniques Used for the Determination of the Certified Values

Technique used in the characterization study:

Method/Technique	Parameter
Elemental Analyzer- Isotope Ratio Mass Spectrometry (EA-IRMS)	$\delta^{13}C_{VPDB\text{-}LSVEC}$

Revision History

Date	Remarks
25.08.2016	First issue.
21.09.2016	The uncertainty values are revised and the certificate is updated.
22.10.2018	Certificate is updated due to format change of the document.
03.07.2019	Certificate is updated due to TS EN ISO 17034 format change of the document.
16.12.2025	Certificate is updated due to corporate identity (logo) change of TÜBİTAK UME.
21.09.2026	VPDB scale is revised as VPDB-LSVEC.