

# Standard Reference Material<sup>®</sup> 1595a

## Tripalmitin

### CERTIFICATE OF ANALYSIS

**Purpose:** This Standard Reference Material (SRM) is intended for use in preparing calibrants for measurement of total glycerides in clinical samples.

**Description:** A unit of SRM 1595a consists of one bottle containing approximately 2 g of high purity tripalmitin powder.

**Certified Value:** A NIST certified value is a measured property value for which NIST has the highest confidence in its accuracy in that all known or suspected sources of bias have been investigated or taken into account [1]. The certified value delivered by SRM 1595a is for chemical purity, measured as the mass fraction of tripalmitin (expressed in percent) in the material [2].

The certified value for chemical purity was determined using a quantitative <sup>1</sup>H-nuclear magnetic resonance spectroscopy (q<sup>1</sup>H-NMR) primary ratio measurement procedure [3,4]. This value is metrologically traceable to the International System of Units (SI) unit of mass, expressed as a mass fraction of tripalmitin in the SRM, through use of the NIST PS1 Primary Standard for quantitative NMR (Benzoic Acid) as a calibrant [5].

Measurand	Mass Fraction (%) <sup>(a)</sup>	Mass Fraction Uncertainty (%) <sup>(a)</sup>
Tripalmitin	99.90	[99.68, 100.000] <sup>(b)</sup>

- (a) The certified value is expressed as the median and an interval bound by the 2.5th and 97.5th percentiles of the purity analysis result. The percentiles define an uncertainty interval about the median that specifies a range of values attributable to the measurand with a confidence level of approximately 95 % [6]. To propagate the uncertainty surrounding the certified value, values can be drawn from a beta distribution having the shape parameter values:  $\alpha = 1105.45$ ;  $\beta = 1.23458$ . This distribution closely approximates the measured purity result for the SRM. For guidance on using and propagating this uncertainty, see reference 7.
- (b) Alternatively, the uncertainty can be approximated for some suitable applications of the SRM by a normal distribution along the symmetric value interval  $99.85 \pm 0.15$  %. The number after the  $\pm$  symbol is the expanded uncertainty specifying a range of values attributable to the measurand with a confidence level of approximately 95 %.

**Period of Validity:** The certified value delivered by **SRM 1595a** is valid within the measurement uncertainty specified until **31 December 2033**. The certified value is nullified if the material is stored or used improperly, damaged, contaminated, or otherwise modified.

**Maintenance of Certified Values:** NIST will monitor this SRM over the period of its validity. If substantive technical changes occur that affect the certification, NIST will issue an amended certificate through the NIST SRM website (<https://www.nist.gov/srm>) and notify registered users. SRM users can register online from a link available on the NIST SRM website or fill out the user registration form that is supplied with the SRM. Registration will facilitate notification. Before making use of any of the values delivered by this material, users should verify they have the most recent version of this documentation, available through the NIST SRM website (<https://www.nist.gov/srm>).

**Safety:** SRM 1595a IS INTENDED FOR LABORATORY USE. Consult the Safety Data Sheet for additional information.

**Storage:** SRM 1595a should be stored in a tightly-closed bottle at or below room temperature (–20 °C to 23 °C is recommended). For extended periods of storage after opening, the material should be kept at or below room temperature in a desiccator. The bottle should be allowed to warm to room temperature before opening. An open bottle can be reused until the material reaches its expiration date, provided that the bottle is tightly closed and stored under these conditions.

**Use:** SRM 1595a, stored as described above, should be used without preliminary drying. The minimum sample size is 5 mg.

## REFERENCES

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- [7] Possolo, A.; *Evaluating, Expressing, and Propagating Measurement Uncertainty for NIST Reference Materials*; NIST Special Publication (NIST SP) 260-202; U.S. Government Printing Office: Washington, DC (2020); available at <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.260-202.pdf> (accessed Apr 2024).
- [8] Toman, B.; Nelson, M.A.; Lippa, K.A.; *Chemical Purity Using Quantitative <sup>1</sup>H-Nuclear Magnetic Resonance: A Hierarchical Bayesian Approach for Traceable Calibrations*; Metrologia, Vol. 53, pp. 1193–1203 (2016).
- [9] Nelson, M.A.; Mulloor, J.; Lang, B.E.; Toman, B.; Possolo, A.; Perry, W.J.; Lyle, A.N.; *Certification of Standard Reference Material® 1595a Tripalmitin*; NIST Special Publication 260-243; National Institute of Standards and Technology, Gaithersburg, MD (2024) available at <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.260-243.pdf> (accessed Apr 2024).

### If you use this SRM in published work, please reference:

Nelson MA, Mulloor J, Lang BE, Toman B, Possolo A, Perry WJ, Lyle AN (2024) Certification of Standard Reference Material® 1595a Tripalmitin. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 260-243. <https://doi.org/10.6028/NIST.SP.260-243>.

*Certain commercial equipment, instruments, or materials may be identified in this Certificate of Analysis to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.*

*Users of this SRM should ensure that the Certificate of Analysis in their possession is current. This can be accomplished by contacting the Office of Reference Materials 100 Bureau Drive, Stop 2300, Gaithersburg, MD 20899-2300; telephone (301) 975-2200; e-mail [srminfo@nist.gov](mailto:srminfo@nist.gov); or the Internet at <https://www.nist.gov/srm>.*

\* \* \* \* \* End of Certificate of Analysis \* \* \* \* \*

# APPENDIX A

**Source:** The SRM source material was obtained from a commercial supplier.

**Analysis:** Analyses for chemical identity, purity, and assessment of homogeneity were performed by NIST using ten units of SRM 1595a Tripalmitin, sampled at regular intervals across the entire production lot. A q<sup>1</sup>H-NMR measurement procedure using an internal standard approach was implemented for the determination of purity. The uncertainty in the certified purity value reflects the 95 % coverage interval of the q<sup>1</sup>H-NMR measurement result, calculated using a Bayesian statistical procedure [8]. No trend in mass fraction of tripalmitin was observed amongst the SRM production lot with respect to filling order and there is no significant heterogeneity at the 95 % level of confidence. The SRM contains less than 0.01 % moisture. The mass fraction of non-volatile inorganic impurity content, measured as ash residual, was determined to be less than 0.02 %.

Details of the production of this SRM are described in NIST Special Publication 260-243, available at <https://doi.org/10.6028/NIST.SP.260-243> [9].

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