NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
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Reference Material 8645
Dried Corn Biomass Intermediate After Conversion
REFERENCE MATERIAL INFORMATION SHEET

Purpose: This Reference Material (RM) is intended for harmonizing measurements of total starch content in biomass intermediates or similar materials.

Description: A unit of RM 8645 consists of two Mylar packets of dried corn biomass intermediate obtained from a commercial ethanol production facility after conversion or fermentation. Each packet contains approximately 10 g of material.

Non-Certified Value: A non-certified value is a best estimate based on currently available information. However, it does not meet NIST's criteria for certification. A non-certified value is suitable for use in method development, method harmonization, and process control but does not provide metrological traceability to the International System of Units (SI) or other higher-order reference system [1]. The non-certified value for total starch on an as-received basis is provided below. The non-certified value is metrologically traceable to the materials and procedures used in its determination.

Measurand	Mass Fraction (as-received)[(a)] (%)
Total starch [(b)]	3.5 ± 1.0

[(a)] The value is expressed as $x \pm 2u(x)$, where x is the value and $u(x)$ is the standard uncertainty of x. While the best estimate of the mass fraction for the measurand lies within the interval $x \pm 2u(x)$, this interval may not include the true value. For guidance in propagating this uncertainty, see reference 2.

[(b)] Total starch is defined in this document as polysaccharides consisting of glucose monomers joined in α-(1,4)- linkages and includes the "resistant starch" that is recalcitrant to enzymatic hydrolysis. It also includes monomeric glucose; therefore, analytical methods for total starch should not use a washing step to remove soluble saccharides.

Period of validity: The non-certified value is valid within the measurement uncertainty specified until **01 May 2028**. The value assignment is nullified if the material is stored or used improperly, damaged, contaminated, or otherwise modified.

Maintenance of Non-Certified Values: NIST will monitor this material to the end of its period of validity. If substantive technical changes occur that affect the non-certified values during this period, NIST will update this Reference Material Information Sheet. 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).

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Safety: RM 8645 is intended for laboratory use only, not for human consumption.

Storage: RM 8645 should be stored at controlled room temperature (20 °C to 25 °C) in an unopened packet until needed. The value assignment does not apply to contents of previously opened packets as the stability of the measurands in opened packets has not been investigated.

Use: Prior to removal of a test portion for analysis, the contents of a packet of material should be mixed thoroughly. It is recommended that test portions for analysis equal to or greater than 100 mg be used.

Additional Information: The non-certified value x and the standard uncertainty $u(x)$ was determined using the robust consensus mean and its standard uncertainty of an interlaboratory study using multiple methods. Full details on the results of the interlaboratory study used to assign the non-certified value for RM 8645 (sample Biomass B in the interlaboratory study) are provided free of charge in reference 3.

Between-laboratory reproducibility is the main source of uncertainty. The material was found to be homogenous and the uncertainty associated with between-packet heterogeneity was negligible.

Resistant starch is defined as starch that is recalcitrant to digestion and enzymatic hydrolysis. Specific steps are often required to access this during a typical starch assay. Failure to include the necessary steps may result in a low bias of the measured total starch.

REFERENCES

[1] Beauchamp, C.R.; Camara, J.E.; Carney, J.; Choquette, S.J.; Cole, K.D.; DeRose, P.C.; Duewer, D.L.; Epstein, M.S.; Kline, M.C.; Lippa, K.A.; Lucon, E.; Molloy, J.; Nelson, M.A.; Phinney, K.W.; Polakoski, M.; Possolo, A.; Sander, L.C.; Schiel, J.E.; Sharpless, K.E.; Toman, B.; Winchester, M.R.; Windover, D.; *Metrological Tools for the Reference Materials and Reference Instruments of the NIST Material Measurement Laboratory*; NIST Special Publication 260-136, 2021 edition; National Institute of Standards and Technology, Gaithersburg, MD (2021); available at https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.260-136-2021.pdf (accessed Jan 2026).

[2] Possolo A.M.; *Evaluating, Expressing, and Propagating Measurement Uncertainty for NIST Reference Materials*; NIST SP 260-202 (2020); available at https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.260-202.pdf (accessed Jan 2026).

[3] Murray J.A.; *NIST 2019 Interlaboratory Study to Determine Starch Content in Corn Grain Biomass Intermediates;* NIST Internal Report (NISTIR) 8291 (2020); available at https://nvlpubs.nist.gov/nistpubs/ir/2020/NIST.IR.8291.pdf (accessed Jan 2026).

If you use this RM in published work, please reference:

Murray JA (2020) NIST 2019 Interlaboratory Study to Determine Starch Content in Corn Grain Biomass Intermediates. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Internal Report (NISTIR) 8291. https://doi.org/10.6028/NIST.IR.8291

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Certain commercial equipment, instruments, or materials may be identified in this Reference Material Information Sheet 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 RM should ensure that the Reference Material Information Sheet 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; or the Internet at https://www.nist.gov/srm.

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