



Designation: D 6405 – 99 (Reapproved 2004)

Standard Practice for Extraction of Tannins from Raw and Spent Materials¹

This standard is issued under the fixed designation D 6405; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers extracting the tannin from raw and spent materials. The water extract obtained by this method is used to determine the tannin content of the original material. Analysis for total solids, soluble solids, and soluble non-tannins of the water extract from a material provides the information necessary to calculate the extractable tannin content of that material. The types of materials typically analyzed by this practice are products of plants such as woods, barks, leaves, nuts, fruits, roots, etc. and any of a wide variety of by-products (spent materials) from industrial processes utilizing plant products.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- D 1517 Definition of Terms Relating to Leather
- D 4903 Test Method for Total Solids and Water in Vegetable Tanning Material Extracts
- D 4904 Practice for Cooling Analytical Solutions
- D 6401 Test Method for Determining Non-Tannins and Tannin in Extracts of Vegetable Tanning Materials
- D 6402 Test Method for Determining Soluble Solids and Insolubles in Extracts of Vegetable Tanning Materials
- D 6403 Test Method for Determining Moisture in Raw and Spent Materials
- D 6404 Practice for Sampling of Vegetable Materials Containing Tannin

¹ This practice is under the jurisdiction of ASTM Committee D31 on Leather and is the direct responsibility of Subcommittee D31.01 on Vegetable Leather. This test method has been adapted from and is a replacement for Method A5 of the Official Methods of the American Leather Chemists Association.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

2.2 ALCA Methods:

A5 Extraction of Raw and Spent Materials³

3. Terminology

3.1 Definitions:

3.1.1 For definitions of general leather and tanning terms used in this practice refer to Definitions D 1517.

3.1.2 *raw material*—any of the various parts of plants that are used as a source of vegetable tannins.

3.1.3 *spent material*—plant tissue by-products from industrial processes which may contain significant quantities of vegetable tannins.

3.1.4 *tannin*—an astringent substance found in the various parts of plants such as bark, wood, leaves, nuts, fruits, roots, etc.

3.1.5 *vegetable tannins*—mixtures of substances (natural products) obtained from plant tissues by water extraction which have the chemical and physical properties necessary to convert animal hides and skins into leather.

4. Summary of Practice

4.1 The sample of material to be analyzed for tannin content is first brought to moisture equilibrium with the laboratory atmosphere (that is, wet materials such as spent materials are first dried under ambient laboratory conditions) and then ground sufficiently to pass through a sieve. This ground sample is then extracted with water in a steam-jacketed extractor.

5. Significance and Use

5.1 This practice provides a standard procedure for obtaining the water-soluble materials (including tannins) from any material that can be prepared for and charged to the steam-jacketed extractor. The extraction solutions are then analyzed according to Test Methods D 4903, D 6401, and D 6402.

6. Apparatus and Reagents

6.1 *Sieve*, with circular openings 1.27 cm (0.50 in.) in diameter.

6.2 *Sieve*, with circular openings of 2 mm diameter (U.S. Std. Sieve Series No. 10).

³ Official Methods of the American Leather Chemists Association. Available from the American Leather Chemists Association, University of Cincinnati, P.O. Box 210014, Cincinnati, OH 45221-0014.