



Designation: D6405 – 99 (Reapproved 2009)

## Standard Practice for Extraction of Tannins from Raw and Spent Materials<sup>1</sup>

This standard is issued under the fixed designation D6405; 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 ( $\epsilon$ ) 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*:<sup>2</sup>
- D1517 Terminology Relating to Leather
  - D4903 Test Method for Total Solids and Water in Vegetable Tanning Material Extracts
  - D4904 Practice for Cooling of Analytical Solutions
  - D6401 Test Method for Determining Non-Tannins and Tannin in Extracts of Vegetable Tanning Materials
  - D6402 Test Method for Determining Soluble Solids and Insolubles in Extracts of Vegetable Tanning Materials
  - D6403 Test Method for Determining Moisture in Raw and Spent Materials

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D31 on 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D6404 Practice for Sampling Vegetable Materials Containing Tannin

2.2 *ALCA Methods*:

A5 Extraction of Raw and Spent Materials<sup>3</sup>

### 3. Terminology

3.1 *Definitions*:

3.1.1 For definitions of general leather and tanning terms used in this practice refer to Terminology D1517.

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 D4903, D6401, and D6402.

### 6. Apparatus and Reagents

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

<sup>3</sup> 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.