Designation: D8282 – 19

Standard Practice for Laboratory Test Method Validation and Method Development[1]

This standard is issued under the fixed designation D8282; 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 The quality, efficacy, and safety of cannabis and products containing cannabis extracts shall be evaluated by validated testing methodologies used by trained staffed utilizing qualified instruments and/or materials.

1.2 This practice provides the cannabis industry with guidance for the development and validation of testing methods that adequately evaluate cannabis and products containing cannabis extracts for quality, efficacy, and consumer health safety in the absence of validated methods from agencies. This includes, but is not limited to, the potency of active substances and adulteration, including impurities stemming from potential adulteration during agricultural or manufacturing processes or both (for example, pesticides, residual solvents, and the presence of fungus and microorganisms) before product approval and release for use. Depending on the methodology and precision and accuracy required, these methods may be both qualitative or quantitative.

1.3 This practice shall define the procedures for test method characterization (TMC), test method validation (TMV), and test method transfer/transfer of analytical procedures (TMT/TAP) of biological, chemical spectroscopic, and physical-based laboratory test methods.

1.4 Depending on the nature of the test in question (chemical, microbiological, etc.) different variables will need to be considered for validation. The particular variables subject to consideration are beyond the scope of this document. Refer to Guide E2857 for more guidance.

1.5 This standard does not consider the specifics of acceptable test method limits and users should consult relevant standard literature to determine the appropriate test parameters.

1.6 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E2857 Guide for Validating Analytical Methods

2.2 *Other Documents:*

United States 40 CFR Appendix B to Part 136 Definition and Procedure for the Determination of the Method Detection Limit[3]

USP 1224 Transfer of Analytical Procedures

USP 1225 Validation of Compendial Procedures

ICH Q2(R1) – Validation of Analytical Procedures: Text and Methodology

3. Terminology

3.1 *Definitions:*

3.1.1 *acceptance criteria, AC, n*—specification(s) that shall be met by a test sample or matrix specific method to be considered suitable or validated for use, respectively.

3.1.1.1 *Discussion*—State-specific criteria shall be met as applicable.

3.1.2 *accuracy, n*—the closeness of agreement between a test result and an accepted reference value.

3.1.2.1 *Discussion*—The term accuracy, when applied to a set of test results, involves a combination of a random component and of a common systematic error or bias component.

3.1.3 *addendum, n*—document written to make minor updates to an existing completed protocol or report.

[1] This practice is under the jurisdiction of ASTM Committee D37 on Cannabis and is the direct responsibility of Subcommittee D37.03 on Laboratory.

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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.

[3] Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, http://www.access.gpo.gov.

3.1.3.1 *Discussion*—They may be used when a change in scope of a validation does not occur.

3.1.4 *analytical method type, n*—categorical classification of a test method that provides general guidance on the analytical performance characteristics to be characterized for that test method type.

3.1.5 *analytical performance characteristics, APC, n*—test method characteristics that make the test method suitable for its intended use.

3.1.6 *application, n*—application is the scope to which a test method is applied.

3.1.6.1 *Discussion*—A test method may have multiple applications.

3.1.7 *common test method, CTM, n*—group of test method applications that share common risk factors, analytical performance characteristics, and elements that could impact the suitability of the test method for the intended uses of the group of applications.

3.1.8 *concentration, n*—quantity of a substance contained in a total unit quantity of sample.

3.1.9 *end-user laboratory, EUL, n*—third-party laboratory in which the test method is performed for the intended use and applications for which it has been validated.

3.1.10 *extension, n*—new application of the intended use of a validated test method.

3.1.10.1 *Discussion*—An extension shall be evaluated per change control and, if deemed appropriate, re-characterized and revalidated before official use.

3.1.11 *limit of quantitation, LOQ, n*—concentration of analyte in a specific matrix for which the probability of producing analytical values above the method detection limit is 99 % or greater.

3.1.12 *linearity, n*—the ability (within a given range) of an assay to provide results that are directly proportional to the concentration (amount) of the analyte in the test sample.

3.1.13 *matrix, n*—specific type of medium (for example, flower, oil, and hard candy) in which the analyte(s) of interest may be contained

3.1.14 *method detection limit, n*—minimum concentration of an analyte that, in a given matrix and with a specific method, has a 99 % probability of being identified, qualitatively or quantitatively measured, and reported to be greater than zero.

3.1.14.1 *Discussion*—Also referred to as the limit of detection (LOD).

3.1.15 *method development team, n*—team that consists of subject matter experts (SMEs) from one or more functional areas working on a project based on their expertise.

3.1.15.1 *Discussion*—A project team may also be called a cross-functional team.

3.1.16 *precision, n*—closeness of agreement between test results obtained under prescribed conditions.

3.1.17 *protocol, n*—formally agreed upon and controlled document that states in detail how a validation will be conducted, including test parameters, product characteristics, equipment, materials, personnel, location, and what constitutes acceptable validation results.

3.1.18 *repeatability, n*—precision under repeatability conditions.

3.1.19 *reporting limit, RL, n*—depending on the regulatory body, this limit applies to impurity tests and shall be at or higher than the limit of quantification (LOQ).

3.1.20 *reproducibility, n*—a quantitative expression of the random variability associated with successive measurements of the same measurand carried out by operators working in different laboratories, each obtaining single results on identical test material when applying the same method.

3.1.20.1 *Discussion*—Repeatability deals with results in a single laboratory while reproducibility deals with results obtained in different laboratories.

3.1.21 *robustness, n*—a measure of the change of the required parameter with deliberate and systematic variations in any or all of the key parameters that influence it.

3.1.21.1 *Discussion*—A useful discussion of robustness experiment considerations is found in the ICH Validation of Analytical Procedures Q2(R1) Guideline (1).

3.1.22 *selectivity, n*—the ability of a measurement procedure to determine accurately and specifically the analyte of interest in the presence of other components in the sample matrix under the stated conditions of the test.

3.1.23 *specificity, n*—the ability to assess unequivocally the analyte in the presence of components which may be expected to be present. Typically these might include impurities, degradants, matrix, etc.

3.1.24 *standard operating procedure, SOP, n*—defined set of instructions for performing an activity that ensures a specific outcome within established acceptance criteria such as a test method or protocol.

3.1.25 *subject matter expert, SME, n*—person highly knowledgeable on the subject through education or experience or both.

3.1.26 *supplements, n*—documents written to update, correct, or augment the scope of an existing completed protocol or report.

3.1.26.1 *Discussion*—Also referred to as an addendum.

3.1.27 *system suitability, n*—checking of a system before or during analysis of unknowns to ensure system performance.

3.1.28 *test method, TM, n*—approved method that describes how to perform an analysis.

3.1.29 *test method characterization, TMC, n*—comprises the studies performed that consider the intended use(s) of the test method, the test method type, and the analytical performance characteristics to be characterized to establish an understanding of conditions that can affect the suitability of the test method for its intended use(s).

3.1.30 *test method transfer, TMT, n*—transfer of a validated test method from one functional area (originating) to another functional area (receiving).