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## Standard Guide for Evaluating Nonconventional Microbiological Tests Used for Enumerating Bacteria<sup>1</sup>

This standard is issued under the fixed designation E 1326; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope

1.1 The purpose of this guide is to assist users and producers of nonconventional tests in determining the applicability of the test for processing different types of samples and evaluating the accuracy of the results. Conventional procedures such as the Heterotrophic (Standard) Plate Count, the Most Probable Number (MPN) method and the Spread Plate are widely cited and accepted for the enumeration of microorganisms. However, these methods have their limitations, such as performance time and degree of accuracy. It is these limitations that have recently led to the marketing of a variety of non-conventional procedures, test kits and instruments.

1.2 A conventional test is one that is widely accepted and published as a standard microbiological method or related procedure. A new, nonconventional test method will attempt to provide the same information through the measurement of a different parameter. This guide is designed for comparing levels of bacteria recovered from samples by the Heterotrophic Plate Count Procedure to the equivalent units determined with a nonconventional test.

1.3 It is recognized that the Heterotrophic Plate Count does not recover all microorganisms present in a product or a system<sup>2</sup> (1). When this problem occurs during the characterization of a microbiological population, alternate standard enumeration procedures may be necessary, as in the case of sulfate-reducing bacteria. At other times, chemical methods that measure the rates of appearance of metabolic derivatives or the utilization of contaminated product components might be indicated. In evaluating nonconventional tests, the use of these alternate standard procedures may be the only means available for establishing correlation. In such cases, this guide can serve as a reference for those considerations.

1.4 Since there are so many types of tests that could be considered nonconventional, it is impossible to recommend a specific test protocol with statistical analyses for evaluating the tests. Instead, this guide should assist in determining what

types of tests should be considered to verify the utility and identify the limitations of the nonconventional test.

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>3</sup>

**D 3870** Practice for Establishing Performance Characteristics for Colony Counting Methods in Bacteriology

**D 5245** Practice for Cleaning Laboratory Glassware, Plasticware and Equipment used in Microbiological Analysis

**D 5465** Practice for Determining Microbial Counts From Waters Analyzed by Plating Methods

**E 691** Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

### 3. Summary of Guide

3.1 ASTM standard practices are referenced for use by producers and users to determine the potential utility of the nonconventional test. Users of tests who are unequipped for performing standard microbiological tests are given recommendations for seeking out microbiological laboratories that could perform collaborative studies to evaluate and verify the information generated with the nonconventional tests.

### 4. Significance and Use

4.1 This guide should be used by producers and potential producers of nonconventional tests to determine the accuracy, selectivity, specificity, and reproducibility of the tests, as defined in Practices **E 691** and **D 3870**. Results of such studies should identify the limitations and indicate the utility or applicability of the nonconventional test, or both, for use on different types of samples.

4.2 Nonconventional test users and potential users should employ this guide to evaluate results of the nonconventional test as compared to their present methods. Practices **D 5245-92** and **D 5465-93** should be reviewed in regards to the conventional microbiological methods employed. If conventional methods have not been used for monitoring the systems, then guidelines are included for obtaining microbiological expertise.

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee E35 on Pesticides and is the direct responsibility of Subcommittee E35.15 on Antimicrobial Agents.

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<sup>2</sup> The boldface numbers in parentheses refer to the list of references at the end of this guide.

<sup>3</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.