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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 19275-2025

Replacing GB/T 19275-2003

**Evaluation of the potential biodegradation and disintegration
capability of plastic materials by the action of the specific
microorganisms**

材料在特定微生物作用下潜在生物分解和崩解能力的评价

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document supersedes GB/T 19275-2003 "Evaluation of the potential biodegradation and disintegration capacity of materials under the action of specific microorganisms", and is consistent with...

Compared with GB/T 19275-2003, apart from structural adjustments and editorial changes, the main technical changes are as follows.

- a) The types of "experimental bacteria" have been increased (see Table 2);
- b) The "Instruments and Equipment" section (see Chapter 6, 2003 edition) has been amended. the "Relative Humidity Controllable at" setting for "Bio-Incubators" has been changed.

"90% or higher" should be changed to "Relative humidity can be controlled at $\geq 95\%$ " (see 6.1, 2003 edition); the label for "drying oven" should be changed to "[missing information]".

The phrase "The standard temperature and humidity conditions can be controlled at 23°C and 50%RH" should be changed to "The sample drying temperature can be controlled at 45°C±1°C".

The soil drying temperature can be controlled between 103°C and 105°C (see 6.2, 2003 edition); pressure control of the autoclave.

The Pa was changed from 2x10⁵ Pa to 1x10⁵ Pa (see 6.3, 2003 edition 6.3), and the "Buchner funnel" and "grid" were added (see 6.9).

6.10);

c) The specimen "shape and size" have been changed (see 7.1, 2003 edition of 7.1);

d) The temperature requirements for "conditioning" have been changed (see 7.3.1, 2003 version 7.3.1);

e) The culture conditions in the "Experimental Methods" section have been changed (see Table 3, Table 3 in the 2003 edition);

f) The spore culture temperature was changed (see 8.2.4, 2003 edition);

g) The section on "Inoculation and Sterilization of Samples" has been amended (see 8.2.5, 2003 version 8.2.5);

h) The incubation temperature has been changed (see 8.2.6, 2003 version 8.2.6);

i) The section on "Soil biological activity" has been amended (see 8.4.1, 2003 edition of 8.4.1);

j) A "staining assessment method" has been added (see 9.1);

k) The evaluation of fungal growth behavior has been revised (see Table 4, Table 4 in the 2003 edition);

l) Added "Grid assessment of fungal surface growth" (see Appendix B).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed and is under the jurisdiction of the National Technical Committee on Standardization of Bio-based Materials and Degradable Products (SAC/TC380).

Introduction

Under certain climatic and environmental conditions, microorganisms can grow and reproduce on the surface of materials, and they and/or their metabolic products may cause damage.

Damaged materials themselves, and affect the durability of additives (such as plasticizers), thus causing the material to decompose and disintegrate.

The role of microorganisms in materials includes the following two aspects.

---Direct action. Microorganisms destroy materials by using them as a nutrient source for growth;

---Indirect effects. The effects of microbial metabolites on materials (such as discoloration) or cause further damage.

These two effects directly manifest as microbial growth on the material surface, loss of the material's own mass, and a decline in physical properties, thereby further causing material degradation.

Decomposition and/or disintegration.

This document was developed to evaluate the potential biodegradation and disintegration capabilities of materials under the action of microorganisms.

Materials have the potential for biodegradation under the action of specific microorganisms.

Evaluation of disintegration ability Warning. Handling and processing microorganisms involves potential hazards, requires reliable technical skills, and should comply with national legislation and regulations.

This procedure should only be performed by specially trained personnel. Disinfection, culturing, and personal hygiene must strictly adhere to relevant operating procedures.

1 Scope

This document describes experimental methods for qualitatively evaluating the potential biodegradation and disintegration capabilities of materials under the action of specific microorganisms.

This document is only applicable to the qualitative evaluation of the biodegradability and disintegration ability of test materials, and cannot be used as a basis for judging the biodegradability and disintegration of materials.

For quantitative assessment of disintegration, if further quantitative determination of its biodegradability and disintegration capacity is required, refer to other relevant standards.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this

document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 2918 Standard Environment for Conditioning and Testing of Plastic Specimens

3 Terms and Definitions

The following terms and definitions apply to this document.

biodegradation

Material degradation occurs due to biological activities, especially the action of enzymes, causing it to be gradually broken down by microorganisms or certain organisms as a nutrient source.

This leads to a decrease in its relative molecular mass and mass loss, a decline in physical properties, and ultimately it is decomposed into simpler compounds and the elements it contains.

Mineralized inorganic salts of elements, a property of dead organisms.

[Source. GB/T 41010-2021, 3.1] 3.2 Disintegration During composting, experimental materials and products are decomposed by microorganisms along with fresh biomass waste, due to physical or chemical processes.

It transforms from a larger shape into extremely small fragments.

[Source. GB/T 41010-2021, 3.5]

4.1 Principle

Under specified temperature and humidity conditions, the sample is placed in an environment containing specific test fungi and bacteria for a certain period of time, and the sample will...

Using microorganisms as a nutrient source, they are gradually eroded or even decomposed under the action of microorganisms, resulting in quality loss and performance decline.

Under the same experimental conditions, the microbially inoculated sample group (Group I) was compared with the untreated sample group (Group O) or the sterilized sample group (Group S).