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**Sensory analysis - Assessment (determination and
verification) of the shelf life of foodstuffs**

感官分析 食品货架期评估（测评和确定）

(ISO 16779:2015, IDT)

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Sensory analysis - Assessment (determination and verification) of the shelf life of foodstuffs

1 Scope

This standard specifies the method for evaluating and determining the shelf life of foodstuff, by sensory inspection. During the set shelf life, the sensory properties of foodstuff in appearance, smell, taste, texture, trigeminal sensation and flavor are evaluated by sensory inspection.

This standard provides guidance for the development of procedures for determining the shelf life of specific products.

The intent of this standard does not address all safety issues, even if related to the use of this standard. It is the responsibility of the user of this standard, to establish appropriate safety and health safeguards AND to clarify the limitations specified prior to use.

Note: When estimating the shelf life, in addition to the results of microbial testing and physical and chemical testing, it is also necessary to consider the results of sensory inspection.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

ISO 5492 Sensory analysis - Vocabulary

3 Terms and definitions

The terms and definitions, which are defined in ISO 5492, as well as the following terms and definitions, apply to this document.

3.1

Best before date

The expiry date, by which the sold product retains its declared quality, under the

representative of all aspects of the product being tested, including formulation, processing, packaging.

Test samples should be packaged for easy distribution. In order to ensure the smooth progress of the test, the test sample can be produced in the laboratory or factory, OR it can be sampled from the commercially available products.

If necessary, the test sample can be handled, under conditions similar to typical storage and circulation situations (such as: light, temperature and humidity changes, shaking or vibration, etc.).

4.2.2 Reference sample

Test samples should be compared with their corresponding reference samples.

Reference samples can be any of the following:

- a) Product standard samples used so far, data from descriptive analysis of previous sensory inspections, data obtained from sensory inspections at the test starting point (such as descriptive inspection results);
- b) Representative samples, which are newly produced during each test interval;
- c) During the test period, samples stored under conditions (such as refrigeration or modified atmosphere) that ensure minimal changes in product characteristics.

The determination of reference samples can be refined, based on the results of consumer testing.

4.2.3 Number and quantity of test samples and reference samples

The number and quantity of test samples and reference samples, which are required throughout the test period, depends on the test interval in the sampling plan, sensory inspection methods, experimental design, food properties, storage conditions.

4.3 Storage conditions

4.3.1 Specified storage conditions

Storage conditions shall be detailed, in order to reproduce the storage conditions of the product distribution channel. It includes temperature, humidity, light, air pressure, weather simulation caused by seasonal changes (temperature changes), packaging-related properties (packaging material component migration, oxygen permeability, water vapor barrier, perforation, etc.), etc.

It shall record the detailed storage conditions.

4.3.2 Non-specified storage conditions

Non-specified conditions are storage conditions, that result from ambient conditions under appropriate storage requirements. The storage conditions shall meet the relevant requirements of the product AND be consistent with the storage conditions encountered in practice.

The non-specified storage conditions and their changes shall be recorded separately.

4.3.3 Storage condition intended to accelerate product changes

For products, which have longer shelf life and use by date, it may use the storage condition intended to accelerate product changes, to promote rapid changes in product characteristics.

For products, which have longer shelf-life (e.g., frozen and dried foods), it should also shorten the test period, by accelerating product changes.

The storage condition intended to accelerate product changes used shall conform to the characteristic decay law of the product being tested.

The storage condition intended to accelerate product changes can be specified storage conditions or non-specified storage conditions, both of which shall be recorded accordingly.

If there is no information to indicate what method to use to shorten the test period, when the shelf life of the product is known to be related to the water activity, Arrhenius's law can be used to estimate.

Elevated storage temperatures can save time in evaluating or determining the shelf life of certain products. However, the resulting estimates are only a rough indication of how the product might change, under normal storage conditions.

For some products, higher storage temperatures may lead to negative changes, such as changes in product appearance caused by high temperature storage, which do not occur under normal conditions AND which are not necessarily directly related to product shelf life.

4.3.4 Application example when reaction rate/temperature (RRT) is equal to 2

- a) When the storage temperature is 20 °C:

The predicted or expected shelf life is 20 months, equivalent to a full cycle.

- b) When the storage temperature is 30 °C:

The predicted or expected shelf life is 10 months, equivalent to half a full cycle.

than 60 days, the test period can be 25% longer than the estimated shelf life. The test period should be designed, after the estimated shelf life, to ensure that the shelf life can be covered and changes in the organoleptic properties of spoiled products can be observed.

4.4.3 Determination of test interval

Determine appropriate intervals for evaluation. For samples tested under storage condition intended to accelerate product changes, the test interval is shortened accordingly.

Example 1: If the shelf life of a product is unknown OR reference data for similar products are not available, it should be evaluated at the following time intervals: 0%, 25%, 50%, 75%, 100%, 125% and/or 150% expected shelf life.

Example 2: If a product is mostly spoiled in the later stages of shelf life, it should be evaluated at the following intervals: 0%, 50%, 65%, 80%, 90%, 100%, 110%, 125% or 150% % of expected shelf life.

Example 3: If a product is mostly spoiled during the initial stages of shelf life, it should be evaluated at the following intervals: 0%, 10%, 25%, 50%, 75%, 100%, 125% of the expected shelf life.

5 Test methods

5.1 General

Test methods are selected, based on specified or agreed-upon criteria. Analytical sensory evaluation methods or preference testing methods are suitable for shelf life assessment.

5.2 Difference inspection method

A difference inspection shall be used, to determine at which time interval there is a statistical difference between the test sample and the reference sample.

The difference inspection method is as follows:

- Triangle test (see GB/T 12311);
- Paired comparison test (see GB/T 12310);
- Duo-trio test (see GB/T 17321).

The difference inspection does not apply to products, that are visually very different.

5.3 Descriptive inspection methods

Descriptive inspection methods (see ISO 13299) shall be used, when determining shelf life and/or evaluating differences between products, based on changes in one or more organoleptic properties of the product.

Statistical significance itself is not directly used to determine the shelf life, BUT to determine the shelf life by statistically verifying whether the sensory properties have changed significantly.

5.4 Preference testing method

Preference testing needs to involve a sufficient number of consumer groups (see ISO 11136). The preference testing shall continue at least until an acceptable level is reached.

5.5 Combinations of test methods

The above test methods can also be used in combination. For example, if a difference inspection finds a statistically significant difference, between a test sample and a reference sample, THEN, descriptive analysis and consumer acceptability testing can be used, to further determine what sensory properties are responsible for the difference.

6 Results evaluation

The method of analysis of the test data should be suitable for the experimental design employed and the test method chosen.

It shall be considered that the resulting difference may be a deviation, which is caused by the design of the test interval, OR it may be a difference between products over a period of time.

Other determinants, such as storage conditions intended to accelerate product changes, shall also be considered when assessing shelf life.

Ultimately, the shelf life shall be determined, based on the comparison of sensory inspection results with microbiological, physical, chemical test results.

7 Test report

The test report shall contain the following:

- a) The label refers to this standard;

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