
Sensory analysis — Methodology — Texture profile

Analyse sensorielle — Méthodologie — Profil de la texture

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 12, *Sensory analysis*.

This second edition cancels and replaces the first edition (ISO 11036:1994), which has been technically revised. The main changes compared with the previous edition are as follows:

- definitions have been added for consistency with ISO 5492;
- changes have been made to avoid repetition.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Sensory profiling methods are formal procedures used for assessing in a reproducible manner the separate attributes of a sample and then rating their intensities on a suitable scale. The methods can be used for evaluating odour, flavour, appearance and texture, separately or in combination.

As a consequence of the unique nature of texture, methods have been developed specifically for texture profiling.

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Sensory analysis — Methodology — Texture profile

1 Scope

This document specifies a method for developing a texture profile of food products (solids, semi-solids, liquids) or non-food products (e.g. cosmetics).

This method is one approach to sensory texture profile analysis and other methods exist. This method describes various steps in the process of establishing a complete description of the textural attributes of a product.

This method is applicable to:

- screening and training assessors;
- orientating assessors through the development of definitions and evaluation techniques for textural characteristics;
- characterizing the textural attributes of a product in order to establish its standard profile and to discern any later changes;
- improving old products and developing new products;
- studying various factors that can affect the textural attributes of a product, e.g. changes in process, time, temperature, ingredients, packaging or shelf-life, and storage conditions;
- comparing a product with another similar product to determine the nature and intensity of textural differences;
- correlating sensory and instrumental and/or physical measurements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5492, *Sensory analysis — Vocabulary*

ISO 8586, *Sensory analysis — General guidelines for the selection, training and monitoring of selected assessors and expert sensory assessors*

ISO 8589, *Sensory analysis — General guidance for the design of test rooms*

3 Terms and definitions

For the purposes of this document, the definitions given in ISO 5492 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

texture, noun

all the mechanical, geometrical and surface attributes of a product perceptible by means of mechanical, tactile and, where appropriate, visual and auditory receptors

Note 1 to entry: The “mechanical attributes” are those related to the reaction of the product to stress. They are divided in five primary characteristics, i.e. hardness, cohesiveness, viscosity, springiness and adhesiveness. The “geometrical attributes” are those related to the size, shape and arrangement of particles within a product. The “surface attributes” are those related to the sensations produced by moisture and/or fat content. In the mouth, they are also related to lubrication and the way in which these constituents are released.

4 Principle

The development of a texture profile by means of a systematic classification that describes all of the textural attributes (mechanical, geometrical and surface).

5 General test requirements

5.1 General conditions of test

Evaluations shall be carried out in a test room that is in accordance with ISO 8589.

5.2 Equipment and premises

Utensils, containers and other needed materials shall be selected by the sensory analyst or panel leader, according to the nature of the product, the number of samples, etc. These shall in no way affect the test results.

If standardized apparatus corresponds to the needs of the test, it shall be used.

Sampling should be done following best practices. A standardized sample preparation that represents the texture of the whole batch should be selected.

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6 Methodology

6.1 Components of a texture profile

The concept of texture profiling is based on the same elements as in flavour profiling. Therefore, a texture profile may include the following elements, depending on the type of product (food or non-food):

- a) perceptible textural attributes, i.e. mechanical, geometrical and other;
- b) intensity, i.e. the degree to which the attribute is perceptible;
- c) the order of appearance of the attributes, which can be outlined as follows:
 - 1) prior to touch (visual);
 - 2) first touch (which may be with hands or another part of the body);
 - 3) first application (for food, this may be to the lips or tongue; for other products, it may be to skin surfaces on other parts of the body);
 - 4) manipulation (e.g. chewing for food, rubbing for creams/lotions/textiles);
 - 5) residual (changes occurring during mastication and/or absorption, such as the rate and type of breakdown);
 - 6) follow up, if any (e.g. swallowing, absorption, wipe off, rinsing).

6.2 Classification of textural attributes

6.2.1 General

Texture is composed of different properties since the sensory evaluation of texture is a dynamic process.

Textural attributes can be grouped into three main classes (see 6.2.1 to 6.2.3) according to the degree to which each is present, and the order in which they appear.

Textural attributes are manifested by the reaction of a food or non-food product to a constraint or product manipulation. They are measured either:

- a) by kinaesthesia, which includes the sensations of position, movement and tension of parts of the body, perceived through nerves and muscles, tendons and joints;
- b) by somesthesia, which includes the sensations of pressure (touch) and pain perceived by receptors located in the skin and lips, including the oral mucosa, tongue and periodontal membrane.

6.2.2 Mechanical attributes

To obtain the maximum benefit from the use of scales in a sensory programme, each attribute shall be defined. A sensory technique should always accompany the definition of a textural attribute. Examples of mechanical attributes, definitions, techniques and common alternatives for liquid, semi-solid and solid food and non-food products are listed in Table 1.

Table 1 — Examples of definitions and methods of evaluation for mechanical textural attributes

Characteristic	Sensory definition	Technique	Common synonyms	Common antonyms
Hardness	Mechanical textural attribute relating to the force required to achieve a given deformation or penetration of a product. In the mouth, it is perceived by compressing the product between the teeth (solids) or between the tongue and palate (semi-solids). With hands, it is perceived by compressing the product between the hand (solids) and a plain surface or between two fingers (semi-solids).	Place the sample between the molar teeth or between the tongue and palate and chew evenly, evaluating the force required to compress the food. Evaluate sample hardness by pressing down on the sample on a plain surface or evaluate it between two fingers.	Firm, hard	Soft
Viscosity	Mechanical textural attribute relating to resistance to flow. It corresponds to the force required to draw a liquid from a spoon over the tongue, or to spread it over a substrate.	Place a spoon containing the sample directly in front of the mouth and draw the liquid from the spoon over the tongue by slurping, evaluating the force required to draw the liquid over the tongue at a steady rate. The degree of resistance of a liquid flow when administered on a surface or substrate may be evaluated visually or via kinaesthesia.	Viscous	Fluid, thin, runny

^a Applies to non-food products. See also Annex B.

Table 1 (continued)

Characteristic	Sensory definition	Technique	Common synonyms	Common antonyms
Springiness	Mechanical textural attribute relating to the rapidity of recovery from a deforming force and the degree to which a deformed material returns to its undeformed condition after the deforming force is removed.	Place the sample either between the tongue and palate (semi-solids) or molar teeth (solids) and compress it partially. Remove the force and evaluate the degree and rapidity of recovery. Place the sample either between a hand and a plain surface or another part of the body, or between two fingers and compress it partially. Remove the force and evaluate the degree and rapidity of recovery.	Plastic, malleable, elastic, springy	
Adhesiveness	Mechanical textural surface attribute relating to the force required to remove material that adheres to the mouth or to a substrate (such as the skin surface).	Place the sample on the tongue, press it against the palate, and evaluate the force required to remove it with the tongue. Evaluate the degree to which fingers stick to each other or to the sample after coming in contact with the sample.	Sticky, tacky, gooey, gluey	
Fracturable	Mechanical textural attribute related to cohesiveness and to the force necessary to break a product into crumbs or pieces.	Place the sample between the molar teeth and bite down evenly until the sample crumbles, cracks or shatters, evaluating the force with which the food moves away from the teeth. Place the sample between both hands, scrub one hand to the other pressing evenly until the sample crumbles, cracks or shatters, evaluating the force with which the sample moves away from the hands.	Brittle	
Cohesiveness of mass	Mechanical texture attribute related to the degree to which the mass holds together while chewing or during manual manipulation.	Chew sample with molar teeth until phase change. Knead or squeeze the sample manually until there is a phase change.	Springy and gummy	
Drag ^a	The amount of pressure required for the application of the product on a substrate, such as the skin or nails.	Place the sample on the substrate and evaluate while moving the sample on the substrate at a pre-determined rate and form.		
Spreadable ^a	The ease to which the product can be manipulated on the surface of a substrate, such as the forearm or nails.	Place the sample on the substrate and evaluate the force needed to reposition the sample.		

^a Applies to non-food products. See also [Annex B](#).