Sensory evaluation in food industry

Dr. Szabó P. Balázs

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Európai Szociális Alap
BEFEKTETÉS A JÖVŐBE

Sensory Evaluation

1. The aim of the sensory evaluation

The aim is to determine the food quality characteristics and the degree of compliance with the legal requirements and consumer habits.
The first and most important parameter of food is the sensory characteristics.
It is complex property, and it is an opinion about the product itself, which can not be replaced by any other method.

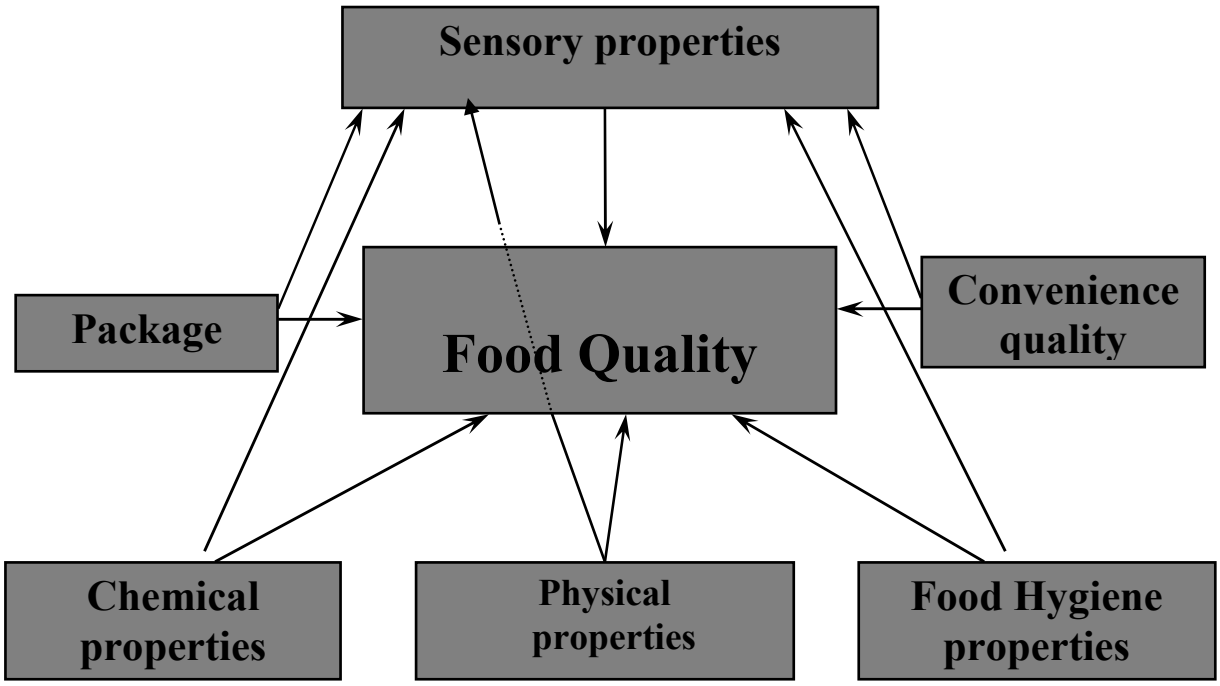

Figure 1. Food quality

The aim of the sensory testing is to describe the product. Distinguishing two or more products: are there any differences between the quality, its magnitude and direction. Performing: the expert or the consumer. So the enjoyment is the sum of the organoleptic characteristics.
Application:

- Industry or official quality control
- The impact of technological and receipe change
- Determine shelf life
- Product Development
- Consumer like
- Competitive product

Sensory analysis of food: it is examined with the human sense. Determine the organoleptic properties of the product, and the enjoyment of the products. Sensory science is the study of the reactions of the five senses, these are sight, hearing, smell, taste and touch. It helps to know the characteristics of physical matter.
The „machines" are the human senses (See the Table 1.):

- tongue and oral cavity
- nose
- skin touch
- eye
- ears

Table 1. The human senses

Behaviour	Eye	Nose	Tongue	Finger	Ear
Color	X				
Surface	X		X	X	
Shape	X			X	
Taste		X	X		
Odor		X			
Aroma		X			
Elasticity			X	X	
Hardness			X	X	
Roughness			X	X	
Crispness			X	X	X

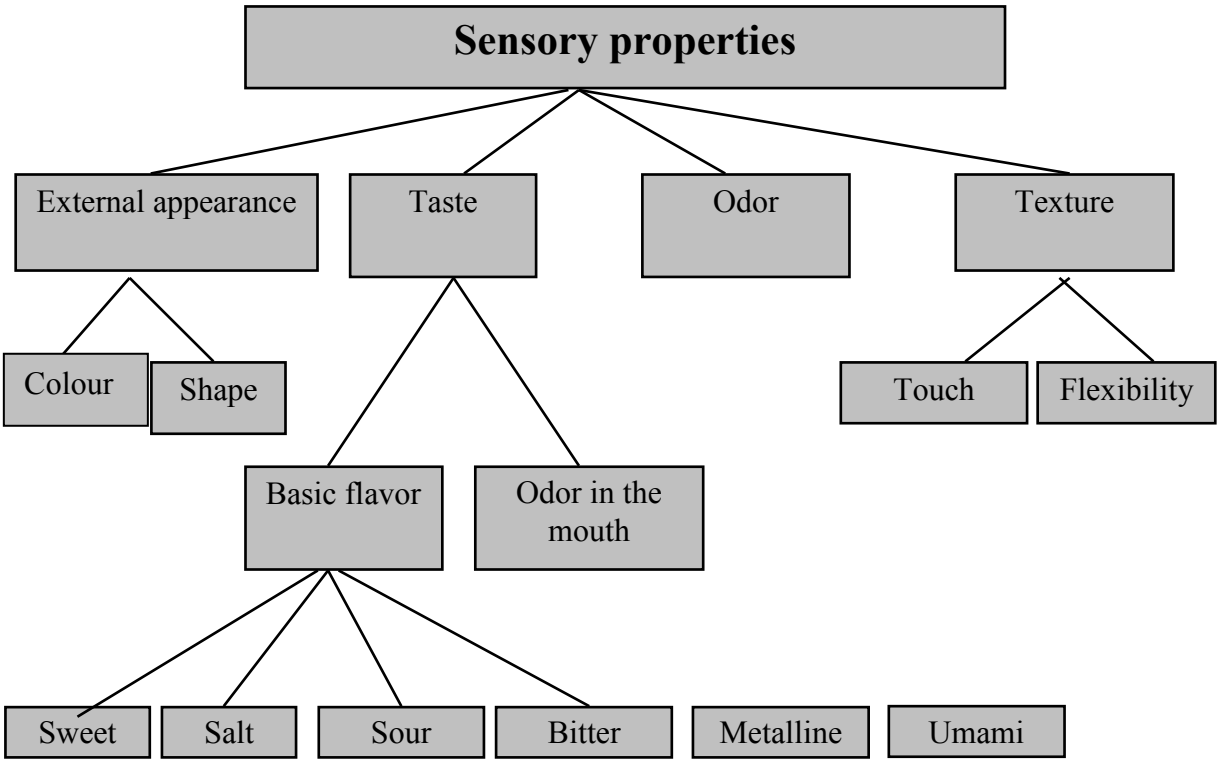

Figure 2. The sensory properties

2. Objective measurement of sensory properties

During the organoleptic testing, we can not eliminate the subjectivity of consumers. But this isn't a problem, becuse the judgement is based on the overall properties of the product. With instruments we can measure only one behaviour.
It is very important to know the preferences of the consumers and perceptions of the sensory characteristics of food products for food manufacturers.

Measurement of Taste and Odor:

- Determination the sweet taste: measure the sugar content
- Determination of salty taste: measure the sodium chloride content
- Acidity: pH measurement
- Rancid taste: TBA number, peroxide number determination
- Aromas: gas chromatograph, liquid chromatograph, electronic nose

2.1. Texture analysis

These methods measure the mechanical properties of products; especially deformation modulus, breaking force and work, measuring by compressional procedure, etc.
Penetrometer: A penetrometer is a device to test the strength of a material. They are usually round or cone shaped. The penetrometer is dropped on the test subject or pressed against it.
Texture analizer: The instrument measures the pressure power on the products, due to the way that the pressure head has taken. The machine records data during the measurement, and draws the load – extension curve (with mm on the X axis and Newton on the Y axis).

2.2. Colour measurement

The human eye is very sensitive, so it is very difficult task to imitate it.
Spectrophotometry: A spectrophotometer is employed to measure the amount of light that a sample absorbs. The instrument operates by passing a beam of light through a sample and measuring the intensity of light reaching a detector.
Surface color measurement: the surface is measured by uniformly light, then measure the reflected light. It is measured after calibration (Color Standards).

3. Sensory properties

Appearance - Sight

Sight gives information about the size, the colour, the shape, the texture, etc. of the products. The human visual system detects the light of the wavelenghts from about 400 nanometers (violet) to about 700 nanometers (red).

Colour and form
Visually observed.
Visible wavelength
Range 360-780 nm

Light= It is a reflected electromagnetic radiation by the object

Retina - the light-sensitive
receptors
Pin (daylight, color)
stick (in the evening, gray)

The colour mixing is created in the eye, it depents on stimulates of the incoming light (the receptors are stimulates).

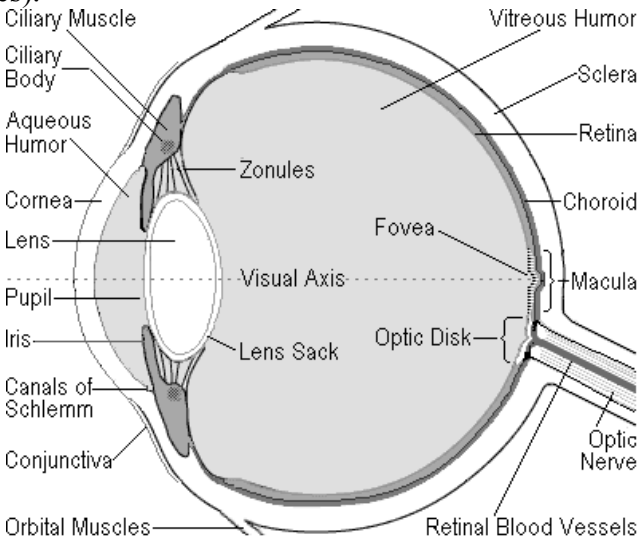

Figure 3. Parts of the human eye (http://www.aboutcancer.com/radiation_to_the_eye.htm)

17000 hue, intensity grade 300 = 5 million hue colours. The colour blindness is the lack of the receptors (0.8% of men (inherited); 0.4% of women; the eye gets tired).

Taste

This sensory depends on our taste buds. Taste buds, located on small bumps on the tongue called fungiform papillae (these are made up of about 50 to 150 taste receptor cells). On the surface of these cells are receptors that bind to small molecules related to flavor.
Children: 4000-6000 taste buds
Adults: 2000-3000
Elderly: 500-1000

Figure 4. Taste buds of the human tongue
(http://printablecolouringpages.co.uk/?s=taste+buds)

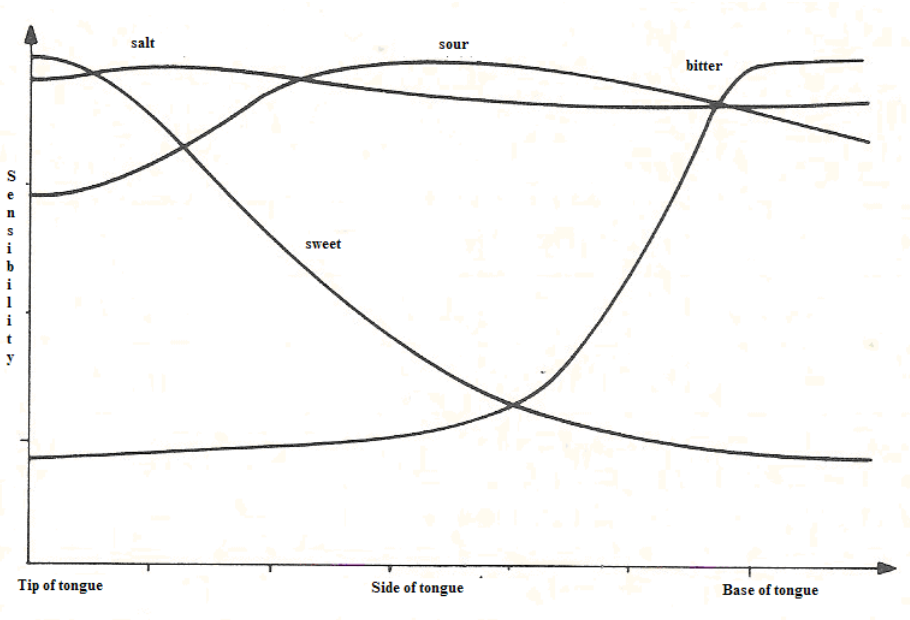

Figure 5. The sensitivity of the tongue surface

The basic flavors:

- Sweet (sucrose)
- Salty (NaCl) - the receptors taste the sodium ions.
- Sour (citric acid) - Sour receptors detect the protons liberated by sour substances (acids).
- Bitter (quinine sulfate)

And the „new" flavors:

- Metal (ferrous sulfate)
- Umami (monosodium glutamate)

The „new" flavour is the umami. It means „Gorgeous taste" in Japanese. Far Eastern cuisine is based on it (broth flavor). Additives, flavor enhancer (E 621), glutamate sensitivity (American population 2%). This is the syndrome of Chinese restaurants: sweating, feeling hot, tinnitus.

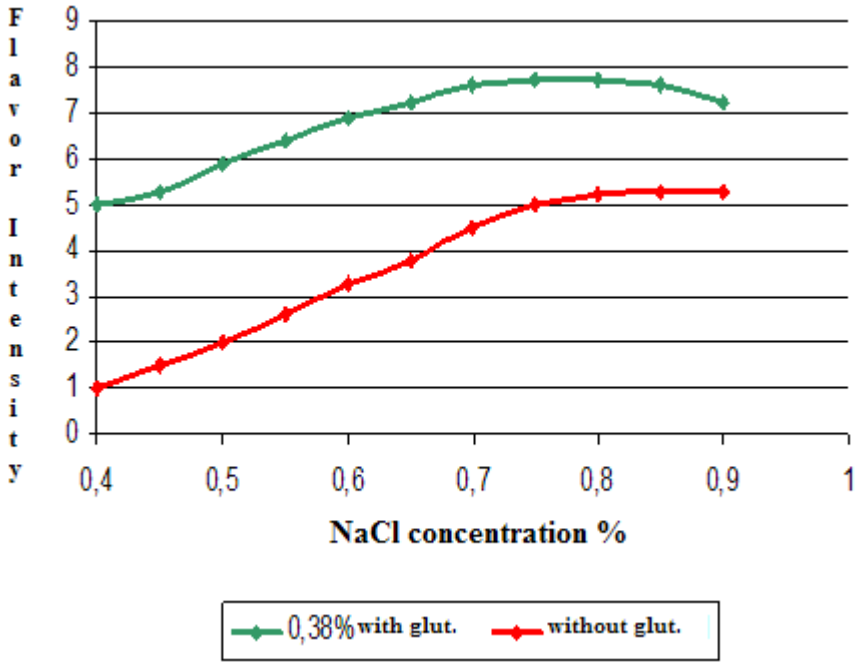

Figure 6. Connection between the NaCl and glutamate

Table 2. The glutamate content

	Glutamate, mg/100 g
chicken	44
beef	33
pork	23
parmesan cheese	1200
Camembert	390
tomatoes	292
potato	180
broccoli	115
Breast Milk	22
cow Milk	2

Odor - Smell

Mammals have the most advanced sense of smell: the dogs' is the best, people's is moderate (4000 odor), and whales have none.
Smelling: the nasal cavity in the rear of the olfactory receptors (1-2 million) covered with olfactory neuroepithelium, an area of 500 mm^2. The olfactory epithelium - a fat - thin mucus covered. Each has its own smell receptors.
Smell Test determines the property group of the quality ratings. The indicator, which indicates the possible deterioration. The taste buds and olfactory function are interrelated:

Taste - saliva-soluble solids or aqueous solutions detection
Smell - water or fat soluble gaseous detection

Odors - volatile organic compounds in general. The temperature determines the volatility of odors.

6 main olfactory (Henning's smell prism, 1916):

- flower-like
- spicy
- fruit-like
- resinous
- rotten
- burnt

Smell is influenced by the temperature, the moisture content, the age.

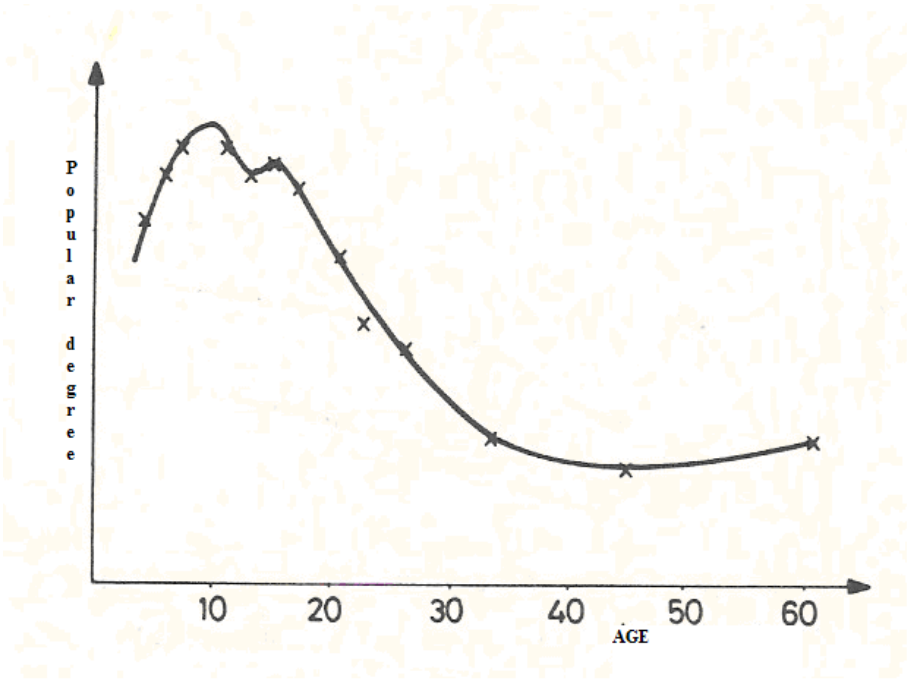

Figure 7. Strawberry flavor popularity

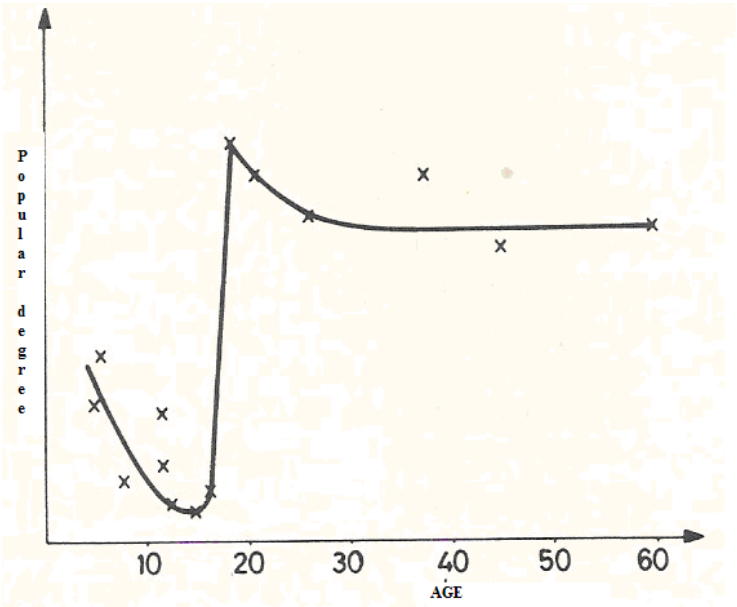

Figure 8. Lavender oil popularity

Texture - Touch

The first input is visual the second is touch. The texture is very complex.
The texture is related property between physical condition (texture, consistency) and structure (texture), which is detected visually, auditory and touch. Consistency is the connection among food components (More or less). Texture, we perceive it in the mouth. This the most complex property group.
There are three groups:
1. Mechanical properties: hardness, cohesion, viscosity, adhesion, flexibility, fragility.

2. Geometric texture characteristics: Grain size, granular shape.
3. Special texture features: moisture and fat content-related (eg. involving the mouth).

Our senses are changing: aging with the age, if one sense fails, the other senses are amplified (blindness - hearing). After the death they disappear (vision - taste - smell - touch – hearing).

4. The panelists

The panelists are people who test the food and judge it. A panelist can be one person or several hundred. It depends on the type of the sensory method.

Table 3. The panelist behaviour

	Training	**Specific**	**Investigation**	
Consumer	**-**	numerous	popularity	opinion
Panelist	+	sensitive, product knowledge	difference, product development	attribution
Expert	+	product knowledge, property, failure, concept, term	research	value judgment

The panelist must be free from the following problems: taste and odor perception disorders, colour blindness, denture defects. The panelists must be trained.

Selection and training of panelists (ISO 8568-1):

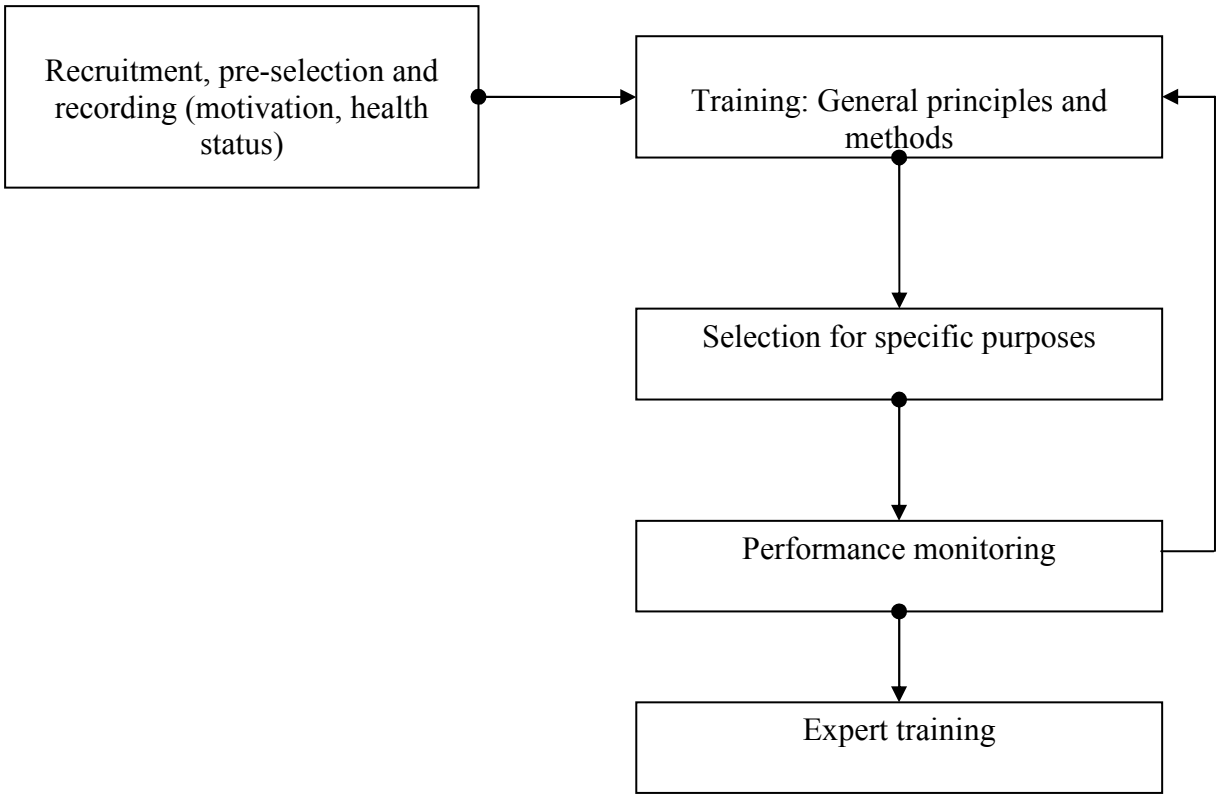

Figure 9. Selection and training of panelists (ISO 8568-1)

The panelists can be classified in three groups (trained panelists, semi trained panelists, untrained panelists). In case of trained panelists 4-5 people is enough for the test. In case of semi trained panelist 10-20 people is preferable. In case of untrained people, the largest number is the best.
Panelist should be of good health and should stop smoking, eating and drinking before 30 minutes of the test. Factors affecting judge sensitivity:

- Health
- Smoking
- Memory
- Motivation

The panelist mental fitness:

positive attitude
lack of prejudice
emotional factors suppression
incorruptibility
good sensory memory
reliability
thoroughness
analyzing and synthesizing ability
sense of responsibility
accuracy
prudence
solid character
quietude
discipline
conscientiousness
perseverance
concentration
critical and self-critical approach
balance

The criteria of panelist:

- Physiological factors - sound system senses.
- Individual endowments; age-related changes in abilities.
- You shall have no aversion to the food product to be tested.
- Do not be allergic.
- Mental condition is appropriate.
- Physical avoid congestion.

Information about the panelist:

- Expected loading rate.
- Interest and willingness, motivation.
- Availability (nature of work, the boss's contribution).
- Known limitations exploration (medicine, smoking, allergies, psychological load, etc.).

Analysis of Physiological fitness:

- Real skills exploration and development, basic testing and product testing.

Analysis of Psychological fitness:

- Concentration Skill.
- Taste, color and odor memory (the weakest color, taste and odor memory = talent, but improved).
- Duration of Criticism.
- Suffer the decision situation.
- Associative and selection skills.
- Attitude.

Training of panelist and experts

Colour

- Colour Detection.
- Colour Laying ability - color intensity ranking.

Odor

- Olfactory Ability, odor recognition.

Taste

- Taste recognition.
- Taste threshold.
- Concentration difference.

Colour

- Colour vision testing.
- Ishihara test (eye color vision test, color blindness).

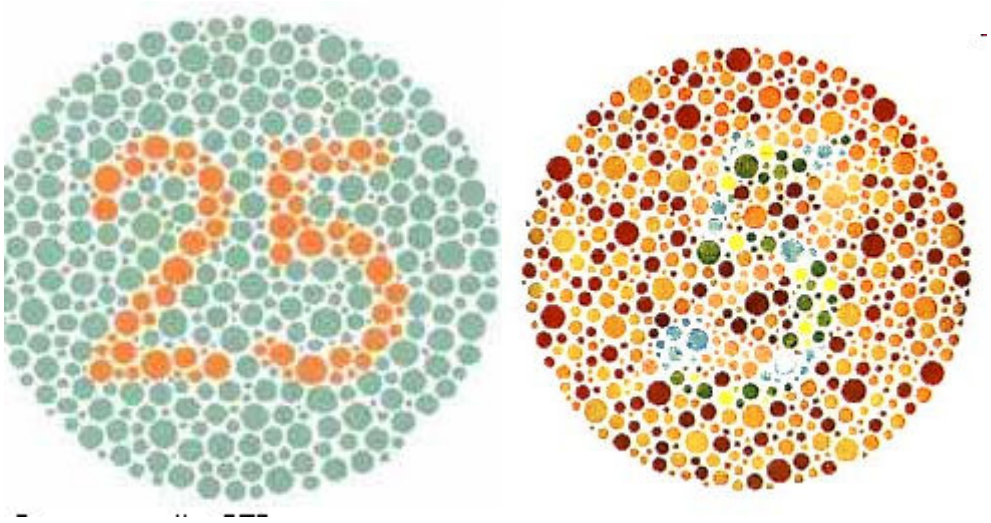

Figure 10. Ishihara test

Colour Detection and Ranking

Hungarian standard: MSZ 7304/12: 1982

- 30 colours in random order solution.
- 3 colours (green - lichtgrün, yellow - chrysoin red - azorubine).
- 10 members dilution series.
- Separation by colour.
- Creation of colour intensity.
- The sample code numbers are written on the evaluation board.
- Error is not allowed (the so-called. zero defective test).

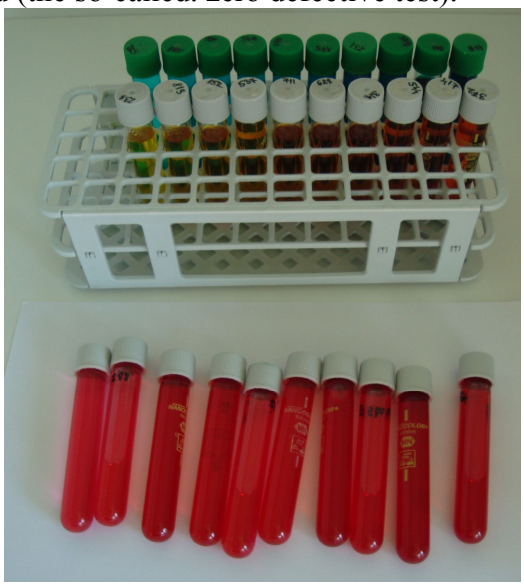

Figure 11. Colour test test tube

Table 4. Colour test sheet

Sequence	Code number		
	red	**yellow**	**green**
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Name:
Date:
Wellbeing:

Odor

Hungarian standard MSZ 7304/10:1982
Table 5. Odor sample (example)

Reagent	Typical odor	Concentration	Solvemt
Ammonia	stall	1%	water
Benzaldehyde	bitter almonds	1%	60%-os ethanol
Butyric acid	sweat	10%	water
Acetic acid	vinegar	8%	water
Amyl acetate	nail polish	10%	60%-os ethanol
Camphor	camphor	3 g/100 cm^3	60%-os ethanol
Phenol	hospital	10 g/100 cm^3	30%-os ethanol
Vanillin	vanilla	10 g/100 cm^3	30%-os ethanol
Acetophenone	orange	1 g/100 cm^3	60%-os ethanol
Anethole	cumin	1 g/100 cm^3	60%-os ethanol

- Different odors, dropping wadding.
- Open - one by one, smell a few times and then close them before opening the next sample.

- After several snorting, describes its name, or writes about the odor impact.

Figure 12. Bottles with different odor sample

Table 6. Odor test sheet

Code number	Odor name	Odor periphrasis
1.		
2.		
3.		
4.		
5.		

Name:
Date:
Wellbeing:

Taste

Hungarian standard MSZ ISO 3972:2003

Table 7. Taste sample (example)

Taste	Reference material	Concentration, g/dm^3
Sour	citric acid	0.43
Bitter	caffeine	0.195
Salty	sodium chloride	1.19
Sweet	saccharose	5.76
Glutamate	natrium-glutamate	0.595
Metallic	iron (II) sulfate heptahydrate	0.00475

Table 8. Taste test sheet

Code number	Neutral	Sour	Bitter	Salty	Sweet	Umami	Metallic
		x					
			x				
		x					
				x			
	x						
			x				
					x		
				x			
					x		

Name:
Date:
Wellbeing:

Taste value

Hungarian standard MSZ ISO 3972:2003

Table 9. Taste value examples

Dilution	Sour g/dm^3	Bitter g/dm^3	Salty g/dm^3	Sweet g/dm^3	Glutamate g/dm^3	Metallic g/dm^3
0	1.20	0.54	4.00	24.00	2.00	0.0160
1	0.60	0.27	2.00	12.00	1.00	0.0080
2	0.48	0.22	1.40	7.20	0.70	0.0056
3	0.38	0.17	0.98	4.32	0.49	0.0039
4	0.31	0.14	0.69	2.59	0.34	0.0027
5	0.25	0.11	0.48	1.56	0.24	0.0019
6	0.20	0.09	0.34	0.94	0.17	0.0013
7	0.16	0.07	0.24	0.55	0.12	0.0009
8	0.13	0.06	0.16	0.34	0.08	0.0007

- Increasing concentrations, one taste, 8 sample.
- Mark the sample which clearly identify the basic taste.

Table 10. Taste value sheet

	1.	2.	3.	4.	5.	6.	7.	8.
Code								
Taste	-	-	sweet					

Name:
Date:
Wellbeing:

Concentration Difference

MSZ ISO 3972: 2003

- Same flavour samples.
- Concentration is different.
- Taste the sample and assign the higher concentration, and select the basic taste.
- Repeated tasting is allowed.

Table 11. Concetration difference sheet (example)

	Code number	
	Weaker	**Stronger**
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Name:
Date:
Wellbeing:

Mistakes

- Sensory, first detection: eg .: appealing packaging.
- Expectations: positive - negative bias.
- Habituation: a large number of samples, small differences.
- Contrast: too much difference.
- Use the middle values.

The issues are for example

Consumer

- Which product do you like better?
- What is the ideal property to the intensity of a product?

Panelists / expert

- Analytical issues.
- Is there a difference between the samples?

What is the difference?
What qualities associated to the sample?
NOT: How do you like the sample?
Consumer criticism (popularity)

- Market Research.
- No product tasting.
- Filling paper.
- It happens in the shop.
- Target Groups.

Children has easy tasks:
Europe

Figure 13. Figures in Europe

USA

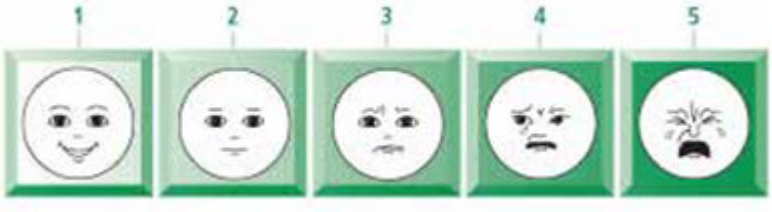

Figure 14. Figures is USA

Blind Test
The example was: taste pudding

- Red products pudding: The taste was: raspberry / strawberry / cherry flavor
- Blind test: The pudding was lemon / apple taste

Panelist review

- Simple Difference - “which sample is different?”
- Triangle test
- Duo-trio test
- Directional Difference - “which sample is sweeter?”
- Paired comparison test
- Ranking test
- Scoring or Scaling - “how hard is the sample?”

5. The group of the Sensory Test Method

- Discrimination/Difference Test
- Ranking
- Scaling
- Consumer preference tests (Difference tests; Ranking; Scaling)

5.1. Discrimination/Difference tests

Difference tests are the simplest test of the food product testing. They are used to determine: whether there is or not a difference between two samples or one sample is preffered to another. This method is a routine quality control and the effects of change is monitoring in production. This test is a good step to determine the complex sensory evaluation of the products. Commonly Used Difference Tests:

- Paired comparison
  - two samples compared, one to be selected (1-tailed)
  - where preference is asked either sample can be correct (2-tailed)
- Triangle test
  - only one response can be correct
- Difference to refference/control
  - duo-trio
  - multiple comparison

5.2. Ranking Procedures

In this test there are three or more samples (max 6 samples), which are presented at the same time. They are coded, and there is no information about the samples.

5.3. Scaling procedures

Scale is"the instrument used by panelists to make explicit their perception". Scaling – Types of Scale: Verbal, Numerical, Line.

6. Descriptive method/test

This is the basic type of sensory test. Examine for example:

- How the sample meet the requirements.
- Recorded the sample positive and negative features.
- The test page, select the characteristic property.
- Use: quality control, competitive products, product development, research.
- Simple questionnaire method, products discription.

This test examines the followings: Appearance characteristics (colour, size, geometry, etc.); Aroma Characteristics; Flavour characteristics (salty, sweet, etc, or olfectory sensations); Oral texture characteristics (hardness, viscosity, etc.); Geometrical parameters (size, shape); Fat/moisture parameters; Skinfeel characteristics (mechanical, geometrical).

Example
Chocolate investigation questionnaire
Table 12. Chocolate investigation

	External properties	Fragrance	Flavor	Texture
+	dark brown uniform color bright shell fracture	intensive cocoa fruity aromatic harmonic	characteristic harmonic sweet bitter sour spicy	 soft creamy homogeneous easy to melt velvety
-	gray sallow spotted unclear porous	unpleasant foreign rancid too aromatic burnt foreign	unpleasant foreign rancid burnt soapy too aromatic tasteless	granular friable lumpy gooey tallowy melt too quickly not melt

7. Difference test

This test is easy, it examines the difference between the two samples (slight, just noticeable differences). Behaviours are the following:

- Some sensory tested.
- Use: food ratings, product development.
- Changing the production technology, product competition.

Based on the type of questioning:
1. General: Is there a difference between the two samples? yes, no
2. Directional: Which sample is saltier? greater than
3. Popular: Which sample is better? better, worse

Simple difference

- Training method, used memory capacity building.
- ’A’ sample is the base sample.
- Memorize the properties of the samples.
- ’A' or 'B' sample is the same as the base sample.
- Included hitting probabilities ½.

Example: Same like the base sample?

Table 13. Results of different test (example)

Sample	1. Panelist	2. Panelist	3. Panelist
1.	different	different	different
2.	same	same	same
3.	same	different	same
4.	different	same	same
5.	different	different	different
6.	same	same	different
summary	5 correct 1 incorrect	5 correct 1 incorrect	5 correct 1 incorrect
summary	6 exercises x 3 panelists = 18 results 15 correct 3 incorrect		

Evaluation:

1. Expect: there is a difference

Table 14. Evaluation, if the expect is there is a difference

Number of the examination	Number of correct results		
	95%	99%	99.9%
5	5	-	-
10	9	10	10
15	12	13	14
18	13	15	16
20	15	16	18
50	32	34	37

2. Expect: there isn't a difference

Table 15. Evaluation, if the expect is there isn't a difference

Number of the examination	Number of correct results		
	95%	99%	99.9%
5	5	-	-
10	9	10	-
15	12	13	14
18	14	15	17
20	15	17	18
50	32	35	37

There is a difference between the two samples (99% probability).

Paired comparison method/test

This is the easiest method, because the judges give samples in pair. The question is: Which pair is the same? Included hitting probabilities ½

Example: Practical tasks (cream of wheat with sweetener)

Is there any difference between the sample pairs?

Table 16. Results of paired comparison test (example)

Sample		**1. Panelist**	**2. Panelist**	**3. Panelist**
A	**B**	yes	yes	no
B	**B**	no	no	no
A	**A**	no	nincs	no
B	**A**	yes	yes	yes
B	**A**	no	yes	no
A	**A**	no	no	yes
summary		5 correct 1 incorrect	6 correct 0 incorrect	3 correct 3 incorrect
summary		6 exercises x 3 panelist = 18 results 14 correct 4 incorrect		

Evaluation:
1. Expect: there is a difference

Table 17. Evaluation, if the expect is there is a difference

Number of the examination	Number of correct results		
	95%	99%	99.9%
5	5	-	-
10	9	10	10
15	12	13	14
18	13	15	16
20	15	16	18
50	32	34	37

2. Expect: there isn't a difference

Table 18. Evaluation, if the expect is there isn't a difference

Number of the examination	Number of correct results		
	95%	99%	99.9%
5	5	-	-
10	9	10	-
15	12	13	14
18	14	15	17
20	15	17	18
50	32	35	37

There is a difference between the two samples (99% probability).

Duo Trio method

- One sample is the base sample.
- Judges give sample in pairs.
- Which pair is the same with the base sample.
- We don't use the same sample.
- Included hitting probabilities ½.

Example:

Which sample is identical to the base model (B)?

Table 19. Results of Duo Trio method (example)

Sample		**1. Panelist**	**2. Panelist**	**3. Panelist**
A	**B**	2	1 (wrong)	2
A	**B**	2	2	1 (wrong)
B	**A**	1	1	1
A	**B**	2	2	2
B	**A**	1	1	1
B	**A**	1	1	2 (wrong)
summary		6 correct 0 incorrect	5 correct 1 incorrect	4 correct 2 incorrect
summary		6 exercises x 3 panelist = 18 results 15 correct 3 incorrect		

Evaluation:

1. Expect: there is a difference

Table 20. Evaluation, if the expect is there is a difference

Number of the examination	Number of correct results		
	95%	99%	99.9%
5	5	-	-
10	9	10	10
15	12	13	14
18	13	15	16
20	15	16	18
50	32	34	37

2. Expect: there isn't a difference

Table 21. Evaluation, if the expect is there isn't a difference

Number of the examination	Number of correct results		
	95%	99%	99.9%
5	5	-	-
10	9	10	-
15	12	13	14
18	14	15	17
20	15	17	18
50	32	35	37

There is a difference between the two samples (99% probability).

Triangle method

- Judges give three samples.
- The question is: which samples are the same.
- Included hitting probabilities 1/3.

Example:
Which sample is different?

Table 22. Results of Triangle method (example)

Sample			**1. Panelist**	**2. Panelist**	**3. Panelist**
A	**B**	**B**	2 (wrong)	2 (wrong)	2 (wrong)
B	**A**	**B**	2	3 (wrong)	2
A	**B**	**B**	1	1	1
summary			2 correct 1 incorrect	1 correct 2 incorrect	2 correct 1 incorrect
summary			3 exercises x 3 panelist = 9 results 5 correct 4 incorrect		

Evaluation:

Table 23. Evaluation of Triangle method (example)

Number of the examination	Number of correct results		
	95%	99%	99.9%
5	4	5	-
9	6	7	8
10	7	8	9
15	9	10	12
20	11	13	14
50	24	26	28

There is no difference between the two samples.

8. Ranking method

- A lot of samples can be compared.
- Use:
  - competitions, setting up quality rankings
  - product develop, comparing different receip
  - consumer Testing
- Ranking the samples, the basis is the specified characteristics.

Example:

Table 24. Results of Ranking (example)

	A sample	**B sample**	**C sample**	**D sample**
1. panelist	1	2	4	3
2. panelist	2	1	3	4
3. panelist	1	3	4	2
4. panelist	1	3	2	4
5. panelist	3	2	4	1
Rank total	8	11	17	14
Rank index = Rank total / Number of the panelist	1.6	2.2	3.4	2.8

9. Scoring method

- This is the most widespread method.
- The panelist investigates all the organoleptic properties of food (for example: taste, smell, texture).
- The panelists give number to the properties.

Conditions

- Qualified panelist.
- Knowledge of the product.
- Aware of requirements.

Find characteristics (eg. rotten odor, discoloration)

- Appearance (packaging, shape, size, surface area).
- Color (intensity, uniformity, homogeneity).
- Odor
- Taste
- Texture (hardness, juiciness, fatness).

100-point method

- Negative scoring method.
- Shortcomings of the property group, flaws are downgraded.
- Error-driven method.
- Meat industry, refrigeration industry, canning industry uses.

Evaluation

- Determination the property of the group.
- Determination the maximum possible score.
- Determination the depreciates property.
- Averaged the scores.

Table 25. Score sheet of 100-point method

Name of the product	Color (max 20)	Odor (max 20)	Taste (max 40)	Texture (max 20)	Total score (max 100)

Classification

The averaged scores of each organoleptic properties must be greater than 0.

Table 26. Quality class of 100-points method

Quality	Whole points	Taste points
Excellent	95	36
I.class	80	28
II. class	65	25

20-point method

- Positive scoring method.
- Defining the attribute of the group.
- Maximum 5 points of attribute group.

5 points = excellent point
4 points = good
3 points = satisfactory
2 points = less satisfactory
1 point = unsatisfactory

- The highest possible score is 20.
- The factor means the weight of the property group.
- Use in all industries.

Factors are determined by experts.

Table 27. Factors of the 20-point methods

Attribute	Importance	Factor
Appearance	10	0.4
Color	10	0.4
Odor	20	0.8
Taste	50	2
Texture	10	0.4
Totel score	100	4

Table 28. Score sheet of the 20-point methods

Product		Appearance (max 5)	Color (max 5)	Odor (max 5)	Taste (max 5)	Texture (max 5)	Total score (max 20)
	Point						
	Motivation						
	Score X factor						

Qualification

Table 29. Quality class of 20-point methods

Categories	Total score
excellent	17.6 – 20.0
good	15.2 – 17.5
satisfactory	13.2 – 15.1
less satisfactory	11.2 – 13.1
unsatisfactory	<11.2

10. Profile analysis

This is the most comprehensive and demanding sensory method, which is used in analysis, product development. In this method all behaviour of the products is examined (described and evaluated numerically) and the product changes. This method needs preparation and it is time-consuming, so it is not a routine testing.

- The sensory profile quality depends on the appropriateness of the panelists.
- Selection, Training, Testing.
- Adequate training of the panelist is very important.
- The training is directed, the type of product and its components.
- Regular training.
- The panelist will determine the profile when they are well trained.
- The product features can be used to display a graphical representation (bar graph, line graph, web graph, histogram).

11. Food certification

It determines the quality characteristics of the product and examines the compliance in connection with the legal requirements and consumer habits.

Sensory quality

- The sensory quality is very important in the food industry.
- It is a decisive factor in the decision of customers (same as the price).
- The training of the consumer groups is very important.

Conditions of the organoleptic method

1. Selection of the panelist (personal condition).
2. Award spaces (material conditions).
3. Judgement execution.

10.1. Preparation and evaluation isolation room

In the room the environmental controls are very important. The temperature should be between 22-24 ^{o}C, the humidity 45-55 %. The lighting is between 300-800 lux. The wall of the rooom is white.

Hungarian standard MSZ 7304/2:1977

Preparation room:

- Near to the panelist room (transfer window).
- Well-lit, well ventilated, easy to clean surface.
- Refrigerator, stove, slicing, shredding equipment.
- Dishwasher.
- Trays, dishes of the same color and size, high surface area, seamless tabletop.
- Shelves, cabinets.

Award spaces/panelist room:

- Noise and odor free.
- Draft-free, ventilated.
- Well-lit (changeable colour).
- 20-22 °C, 50-70% relative humidity.
- Bright pastel-colored furniture and wall coverings.
- Separation of reviewers.

Figure 15. Panelist room

10.2. The management of criticism

Sampling

- Random.
- Unopened packaging.
- Note the features.
- Model designation (coded).
- Preparation packed photo.

Sample Storage

- Typical product temperature.

Sample Preparation

- Depending on the product (cold and hot).
- Sliced, thickness observed.
- Code (three-digit number that can not be inferred signal).
- Setting up the order, smell, taste intensity according to the increase.
- Served in the same way.
- Preparation photo.

Investigation

- Before, during prohibited tobacco, alcohol, coffee, spicy food consumption.
- No communication, (oral or facial).
- Neutralization, water, biscuits, apples, cheese.
- Evaluation order: Appearance shape, surface, cut sheet, colour, odor, taste, texture.
- Filling score sheet.

Evaluation

- Write report.

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