DETERMINING A SENSORY PROFILE OF CHEESE PASTE WITH SPICES, USING QUANTITATIVE DESCRIPTIVE ANALYSIS

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Abstract: *Food should nourish the body, should display sensory properties that make them be easily accepted, asked for in consumption, and at the same time it should also have a positive effect on consumer's health. This last aspect defines best functional foods.*
Cheese paste, using a classic recipe (by replacing paprika with oregano, thyme or basil, all dried) has been obtained and served as sandwiches. Sensory analysis was performed, using quantitative descriptive analysis (QDA) for the the new products obtained. The analysis was conducted by nine evaluators, who, by means of specific documents (such as questionnaire for collection of descriptors, tasting sheets) and by analyzing tasting samples, identified 85 descriptors in the first phase, then after successive filtrations 41 descriptors were kept and in the end 12 descriptors were considered to define the product characteristics. Therefore, the sensory analysis focused on the size of spice particles, paste uniformity (granulometry), white uniform color, and smell of fresh cow cheese, salty or bitter taste of fresh cow cheese and butter, cheese flavors, specific spices, adhesion, persistent flavor. Definitions and an order of tasting were initially established for all these descriptors. After having performed the analysis, based on averages values, a stellar diagram was obtained. It was observed that the obtained profiles for the paste with dried spices (oregano, thyme or basil) were quite similar. Larger differences occurred at bitter taste and aftertaste. The new pastes differed from the original paste (with paprika) in the uniformity of color and size of the particles, which are due to the physical characteristics of the spices used.

Keywords: *foods with functional potential, descriptors, stellar diagram*

1. Introduction

The interest for the relationship between diet and health is a tradition for many populations. Functional foods lie at the intersection of the two [1].

An item of food is considered functional if this one influences positively one or more target functions of the body, in addition to adequate nutritional effects in a way that it is relevant either by improving health and well-being/or by reducing the disease risk. Functional foods must remain classic foods and must demonstrate their effects in normally consumed intakes in the diet [2]. Fogliano and Vitaglione [3] present three strategies that can be applied in the development of new functional foods: influencing the modification of raw materials, modifying the recipe or changing the technology. All these directions can be adopted to improve antioxidant capacity, an important aspect of the character of functional foods or catering preparations.

Modification of the recipe resides, most often, in the potential addition of functional foods.

The aim of this study was to replace a spice - paprika (Total-ORAC 21932 μmol TE /100 g; polyphenol content -TP- 1643 mg GAE / 100 g) – from a recipe for a paste used to get sandwiches with superior antioxidant potential spices: basil (Total-

ORAC - 61063 µmol TE / 100g; TP - 4489 mg GAE / 100 g), oregano (Total-ORAC - 175 295 µmol TE / 100 g, TP - 3789 mg GAE / 100 g) and thyme (Total-ORAC - 157380 µmol TE / 100 g; TP - 4470 mg GAE / 100 g) according to the USDA database [4].

But food and dishes are chosen by consumers, most of the time, on the basis of sensory attributes. Therefore, a sensory analysis for the new preparations was performed.

The application of sensory analysis for functional catering preparations started from two interdependent goals: their development and characterization. Characterization involves defining and framing the setting of product attributes in a predefined type or standard. It also allows the detection of faults that can occur [5].

The sensory analysis was based on quantitative descriptive analysis, which provides a complete description of all the sensory properties of a product and is one of the most complete methods to characterize important sensory attributes [6, 7]. It is a tool used at sensory analysis and requires the use of a qualified group of subjects (usually 8 to 12 assessors, or more).

2. Materials and methods

To perform the sensory analysis, the quantitative descriptive analysis (QDA) was used. This method is based on the ability of a team of trained tasters to measure the specific attributes of a product in a reproducible manner in order to obtain a quantitative description of the product, carried out by statistical analysis. The QDA approach involves the recruitment of a panel of tasters, whose task is to identify the key attributes of a certain product on an appropriate intensity scale. This panel is trained to identify correctly the values of

the descriptors (attributes) of the products analyzed [5].

Materials

Four samples of cheese paste for sandwiches were obtained and analyzed: cheese paste with paprika (PBA); cheese paste with basil (PB); cheese paste with thyme (PC) and cheese paste with oregano (PO).

They were made (for a kg of paste) from 600 g fresh cow cheese, 150 g feta sheep cheese, 150 g butter, 100 g cream and 5 g spices [8].

The samples were prepared as described in the plug technology, ranging the spice. They were served in white plastic plates in the form of sandwich (prepared correspondingly to a portion), encoded with 3-digit numbers and served immediately after preparation to further reduce: loss of flavor, discoloration and textural changes.

The tasting sheets used, contain general information on the taster, tasting descriptors set by the panel, scales for assessing the intensity of descriptors and a comment box.

Methods

Sensory profile was established by QDA, a method used in many studies covering dairy products [9, 10], honey [4], chocolate [11, 12] etc.

Nine assessors (7 female, 2 male, aged between 42 and 58 years) were selected to participate in the study, based on interest, availability, smoker status and non-allergic to food. They have not participated in organized sensory determinations so far, still they have experience in the field of food processing.

The initial training of the selected group was performed in a 40-minute meeting, when the method was presented and the tasting conditions were specified. Attention was drawn to the fact that there are factors that can affect temporarily sensitivity to aromas, taste and smell

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(smoking, chewing gum, mint candies and spices). Therefore, the participants were advised not to eat or drink (except water) or smoke for at least one hour before the tasting session. A rinsing protocol (mineral water and unsalted bread croutons) was established as well.

QDA deployment was achieved in three distinct phases:

a) looking for a minimum number of descriptors that provide the maximum amount of information about a particular product, and, in parallel, preparation and discussion about the tasting sheet;

b) measuring the intensity of perceived sensory properties for each of the chosen descriptors;

c) building, based on the quantized set of descriptors, the sensory profile of the product [13, 14].

3. Results and discussion

The identification of descriptors was performed in 4 sessions of 40 minutes. The aim was for the assessors not to overlap and give a full description of the samples analyzed. In selection, a questionnaire to collect descriptors was used. Out of the four sessions, in the first two, conducted individually, the assessors have tasted food prepared according to recipes,

similar dishes selected in an earlier stage and working samples, and have selected a number of descriptors. The next two sessions were conducted jointly pursuing the same goal.

a) In this way, 85 descriptors were selected. They were subjected to filtering. In the first stage 44 terms were removed, in order to avoid overlapping: hedonic terms (harmonious flavor, tasty, optimal, appetizing etc.), quantitative terms (strong, weak, according to.... etc.); terms that are not relevant (typical, normal). The remaining descriptors (41) were summarized in Table 1, depending on the feature in question and the time they were detected.

In the second phase, after a discussion, the terms to be retained for the products' analysis were chosen. So, 12 terms agreed with by all members of the group were selected.

Finally the descriptive terminology of the samples included two attributes for aspect (*particle size spice, paste consistency*), an attribute for color (*white uniform color*), an attribute for odor (*fresh cow cheese*), four taste attributes (*salty, fresh cow cheese, butter, bitter*), two attributes for flavor (*cheese, spice specific*), a texture attribute (*adhesion*) and a residual taste attribute (*persistent, specific for the spice used*).

Table 1

Selected Attributes after first filtration

Moment	Feature
Before testing	aspect: homogeneity; granulation; finesse; particle spice size; pasty; cream;
	color: white; uneven; white for the cream, green with various shades for the spices; specific cow cheese;
	aroma: butter; fresh cow cheese; fermented; pungent; other odors; specific of the spice; herb;
During testing	taste: salty; acid; spicy; harmonic; astringent; spicy; bitter; metal; sour; foreign tastes; fad;
	flavor: butter; fresh cow cheese; cream; other flavors; mixed; specific spice;
	texture: adhesion; lubricity; uniform;
After testing	taste: bitter; metal; salty;
	flavor: specific spice.

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In the last issue of training the order in which attributes were perceived (in the order they are shown in Table 2) was established. To be sure that the attributes have the same meaning for all members of the group, a lexicon of the terms selected was drawn up (Table 2).

Before preparing the tasting sheet it was agreed to use a scoring unstructured scale of 10 cm, with extreme anchors "missing" and "extremely strong", which means no descriptor and its intensity to measure each sensory attribute.

In the last training session, preparations and attempts to obtain consistency between evaluations and tasters were reviewed. The duration of training sessions varied between 18 and 40 minutes.

Table 2

Definitions of descriptors selected

Attributes	Definitions
Aspect	
- spice particle size	- particle size, ranging from those that cannot be visually detected (dust) to pieces over 3 mm;
- paste uniformity (granulometry)	- paste property, given the size of the pieces of cheese and spice;
Color	
- white, uniform	- white color intensity or strength with different tones;
Odor	
- fresh cow cheese	- fresh cow cheese odor;
Taste	
- salted	- the fundamental taste factor associated with a sodium chloride solution;
- fresh cow cheese	- specific taste of fresh cow cheese;
- butter	- specific taste of fresh butter;
- bitter	- taste fundamental factor associated with a caffeine solution;
Flavor	
- cheese	- fresh cow cheese specific flavors;
- spice specific	- spice flavors used;
Texture	
- adhesion	- textural property asseses the degree to which the food adheres to the surface of palate when it is compressed by tongue;
Taste remaining	
- persistent, specific to the spice used	- the persistence duration of spice taste, after swallowing the sample bits.

b) The proper evaluation of the evidences was done in two sessions. The two sessions were held before noon, according to the indication suggested by Mason [15].

In each session four samples were presented and submitted to panelists in order to eliminate the effects of order of service as much as possible.

Panel members scored each attribute and stressed the intensities on the unstructured scale of 10 cm. Evaluators rinsed the mouths with mineral water and unsalted croutons between assessments. Breaks between tests were taken. The results were converted into numerical values. Then the average of values for each evaluator was performed.

In conducting the tests there were encountered some difficulties. Thus, there were evaluators who used different portions of the scale to express their feeling of the same sample, and some difficulties in the interpretation of attributes were identified as well. These difficulties were mainly due to evaluators' lack of experience in using this test

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method, and to a small number of training sessions.

c) Assessment of results was performed using the graphical representation, using a stellar diagram. This one was drawn on the basis of average values obtained in evaluating sensory attributes of preparations by descriptive analysis (Fig. 1). The intensity of attributes is plotted by the distance from center.

One can notice that the profiles for new preparations are quite similar. Visible differences occur aftertaste, where oregano has the highest value and bitter taste (but these differences occur at low levels).

The new preparations differ more from the initial preparation in uniformity of the color and in particles size, differences due to the physical characteristics of spices (purchased in the commercially available state).
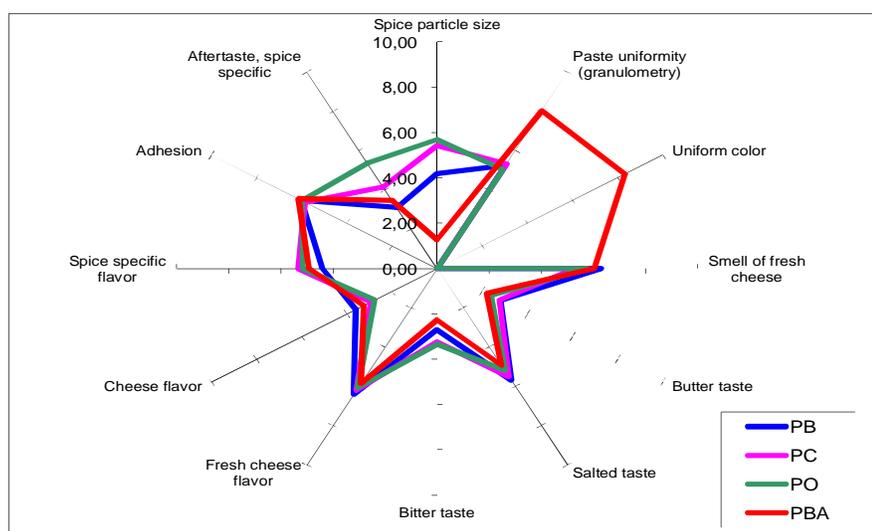

Fig. 1. Sensory profile using the stellar diagram, based on QDA, for pastes analyzed

The lowest intensity of fresh cheese flavor is registered by the thyme sample (which means that some substances in this spice are able to annihilate the flavor of substances that contribute to forming cheese flavor) and decreased in the following order: PB> PO > PBA> PC. Specific spice flavor intensity decreases in the order: PC> PO> PB> PBA, hence the flavor of other ingredients in the recipe, which had been initially neglected (butter, salty cheese, cream), influenced the overall flavor of the product.

The taste of fresh cow cheese had similar intensities in all samples, in contrast with the salty taste, whose intensity was generally higher in samples with thyme and basil and bitter taste, more prominent in samples with thyme and oregano. The results seem to suggest that the type of spice may be responsible for the perception of aromas and the tastes of other foods used in the preparation.

4. Conclusions

Some outstanding conclusions can be drawn from this study:
- there is a variety of methods to obtain catering preparations with health benefits,

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but the simplest one is the introduction of foods with high functional potential;

- the QDA application allows the identification and quantification of defining descriptors for a specific category of food, wherein the products are different or similar. For the new pasta analyzed, the descriptors according to which the products differ one from the other are: the aftertaste and the bitter taste;

- spices, even when used in small amounts, influence significantly some characteristics of preparations when annihilating or highlighting tastes, flavors, colors are introduced .

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