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Protocol for Sensory Assessment of Traditional Dish Cottage Cheese Struklji

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Summary

Traditional food products and dishes are a part of the national legacy, and today they have important roles in the recognition of a country or a region. Although such traditional recipes are generally well known and preserved, the majority of traditional dishes do not have clearly defined sensory characteristics and chemical compositions that can be used for quality control.

The subject of the research were Cottage cheese Struklji (boiled rolls), a well-known dish that is traditionally prepared in different Slovenian regions, although the recipes can differ slightly. Ten samples of cottage cheese Struklji were collected from tourist farms or from restaurants known for their domestic cuisine, or were bought in supermarkets. The preliminary sensory assessment defined the sensory attributes and their importance, along with the flavour attributes. Then quantitative descriptive analysis was performed by a 7-member panel using a 5-point scale for description of the intensity/adequacy of selected parameters. The samples of cottage cheese Struklji differed most over a spectrum of perceived aroma attributes and their intensities, as a result of regional modifications to the recipe. Industrially produced cottage cheese Struklji have a more uniform appearance, and differ slightly in the intensities of the evaluated sensory attributes from samples of artisanal production. A protocol and criteria for sensory assessment of cottage cheese Struklji was developed, which can serve for eventual application for protected indication, as well as being important for the preservation of the authenticity of the dish and the promotion of the region.

Keywords: cottage cheese Struklji, traditional food, sensory analysis, Flavour profile method, Quantitative descriptive analysis

Introduction

Traditional food products and dishes are a part of the national legacy. Nowadays, with the prevalence of a global market, such traditions also have an important role in the recognition of a country or a region. They can be related to specific events or festivities, or simply to the artisanal production of a specific territory (Cayot, 2007; Bogataj et al., 2008). A traditional product will thus be limited to a defined territory and linked to the culture of that territory, which implies cooperation of the individuals from the area. Interestingly, the variety of production is wider and the significance of such products is greater in southern European countries, which arises, among other reasons, from the specific climatic conditions (Jordana, 2000).

According to Guerrero et al. (2009), European consumers perceive a traditional food or dish as a product that is produced strictly following the heritage. There should be little processing involved, and the product should be recognizable due to its sensory properties and its consumption either frequently or during specific holidays. As indicated more recently, in southern Europe, the term 'traditional' is more often associated with concepts of heritage, culture and history, while central and Nordic Europeans connect this term more frequently with practical issues, such as health and convenience (Guerrero et al., 2010). However, all consumers demand that any traditional food product is safe and has distinctive sensory properties that reflect its origin (Cayot, 2007).

The recipes for the preparation of traditional products and dishes are generally well known and preserved; however, they can also be influenced by the characteristics of microregions or by modifications arising from the more recent semi-automation of some of the processing steps. The sensory characteristics of several products with quality distinctiveness labels, such as those indicated as PDO (Protected Designation of Origin), are well defined, along with the necessary sensory methods for the evaluation of their sensory quality (International Olive Oil Council, 2005; DOSI, 2002). However, as well as for such quality-distinctive labels, the characterization of the

sensory properties of traditional food products also assures better quality control in their production processes and clearer presentation of the product to consumers (Cayot, 2007). Due to the particularities of traditional food products, the sensory methods for their quality evaluation must not be simplified and uniform, but must be developed with consideration of the typicality of the product (Etaio et al., 2010).

The cottage cheese Struklji is a characteristic dish that has been reported to have arisen from the Slovenian cuisine of the middle-classes in the 17th century. Struklji can be found on traditional holiday menus throughout the Slovenian regions. However, while Struklji are prepared mostly with filo (or phyllo) pastry, and served as a savoury side dish with meat or sweetened as a dessert, in the Primorska region, leavened dough is used instead of filo pastry. Furthermore, walnuts and raisins are often added to the cottage cheese filling and Struklji are served exclusively as a sweet course (Bogataj et al., 2008). Although the most typical version of Struklji is prepared with tarragon filling, the cottage cheese Struklji are the most frequent nowadays in restaurants and public canteens, and on tourist farms.

Despite being particularly characteristic of Slovenia, this dish does not have a clearly defined chemical composition (nutritional value) or sensory properties that can allow clearer distinguishing of its quality. The purpose of the present study was to define the major sensory parameters and their attributes in cottage cheese Struklji from different Slovenian regions, from both, artisanal and industrial productions. Furthermore, the study was designed to develop a protocol with an evaluation system for the sensory assessment of Struklji that can be applied to routine quality control or to sensory contests.

Materials and Methods

Samples

In total, ten different samples of cottage cheese Struklji were sampled three times over a period of two months, from tourist farms (2 samples), from restaurants known for their

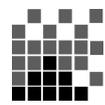


Table 1. Principal sensory parameters defining the quality of cottage cheese Struklji and their attributes.

Parameter	Attribute
Overall appearance	surface colour, roughness, evenness, gloss, secretion of starch
Appearance of cross section	colour of cross section, amount of filling, linkage of filling with dough
Odour	intensity and balance of odour attributes, absence of off-odours
Taste	intensity and balance of perceived salt, sweet, sour, bitter taste
Texture	adhesivity, smoothness, coarseness
Flavour	intensity, persistence and type of aroma attributes, balance of aroma attributes, mouth feeling, absence of off-flavours

domestic cuisine (6 samples), or bought from the supermarkets (2 samples). One of the samples obtained from a tourist farm was prepared from leavened dough, while the rest of the samples were prepared from filo pastry. The samples from the supermarkets were prepacked and frozen, while all of the other samples were freshly prepared and stored in a refrigerator overnight.

The samples were thermally treated on the day following the sampling, according to the producer instructions. Then the Struklji were cut into two-centimetre-wide slices, as they are usually served, photo-documented, and immediately assessed by the sensory panel.

Sensory assessment

A panel of seven trained sensory assessors evaluated all 10 of the Struklji samples during three individual sessions, which were performed the day after each sampling. In this way, each sample was assessed three times over a period of two months.

The principal sensory parameters defining sensory quality of Struklji were discussed and determined during initial sessions, in a similar way to that described in the case of red wines by Etaio et al. (2010). Descriptors for the flavour were then determined using the Flavour profile method, and finally, the principal sensory parameters of the Struklji samples were assessed using Quantitative descriptive analysis.

The *Flavour profile method* is a descriptive sensory method used to describe a flavour as one of a complex sensory characteristics of food. Namely, the flavour consists of three sensations: taste, aroma and odour, as well as a complex of sensory impressions that are not identifiable separately. With this method, the main components of the flavour are identified and described, as the flavour attributes, the intensities of these attributes, the order of appearance of these attributes, and the aftertaste. The intensities of the flavour attributes were evaluated according to a 5-point scale with anchor words: not present, threshold, slight, moderate, strong (Keane, 1992).

Quantitative descriptive analysis is a descriptive sensory method that is developed to provide data on the descriptions of the sensory parameters of a food that are more suitable for statistical processing than those from the Flavour profile and other similar descriptive methods (Stone and Sidel, 2004; Meilgaard et al., 2007). A 5-point scale with intensity anchor words was applied during the training of the sensory assessors, as well as for the assessment of the intensity and adequacy of the defined sensory parameters in these cottage cheese Struklji. The mean values of each sensory parameter for the Struklji samples were calculated and are presented in a spider-web format.

Results and Discussion

The principal sensory parameters defining the quality of cottage cheese Struklji were discussed and elaborated in the initial sessions of the sensory panel assessing randomly selected samples. For each parameter attributes were collected, where close terms were grouped and hedonic ones removed. Six principal parameters were determined by consensus: overall appearance, appearance of cross section, odour, taste, texture and flavour (Table 1).

Although two types of cottage cheese Struklji, i.e. made from filo pastry and leavened dough, respectively, were assessed, the principal sensory parameters defined did not differ. The colour of the surface varied from

pale white to straw-like yellow, presumably due to ingredients in pastry/dough. However the surface of Struklji was found evenly coloured, glossy, smooth, and without or with barely perceived secreted starch. The uniformity of the shape was excluded from the list of attributes. Industrially produced cottage cheese Struklji had significantly more uniform shape than those from artisanal production, however uneven shape is reminiscent of homemade, old fashioned, rural; the terms which were found strongly connected to the perception of traditional foods (Guerrero et al., 2010). The colour of the cross section is determined by the colour of the pastry and the filling. Both of the components were found even coloured with the exception of Struklji from leavened dough, in which grind walnuts and raisins are traditionally added to the cottage cheese filling. The dough was well linked up with filling ensuring a firm rolled structure of Struklji. The adequate amount of filling provided more attractive appearance of the cross section, while

Table 2. Flavour attributes of cottage cheese Struklji regarding the type of dough

	Struklji	
	from filo pastry	from leavened dough
Positive attribute	cooked curd cooked dough butter bread crumbs milky lemon	cooked curd cooked dough butter bread crumbs milky lemon walnut raisin spicy (sweet) lemon zest rum
Negative attribute	flour rancid fish fusty sour fried egg plastic cardboard soapy bitter oily mouthcoat	rancid sour fried egg plastic yeasty soapy honey condensed milk oily mouthcoat

the excessive filling was found undesired. Namely, it destabilized the structure of Struklji and it was found not to be related to perception of the term ‘traditional appearance’. The odour of warm Struklji samples was of cooked cottage cheese, eggs, boiled flour, butter, where attributes were well balanced. More complex odours were perceived in samples from leavened dough. The intensity of the odour was stronger in samples from artisanal production. In some of industrially produced samples off-odours of fish and cardboard were determined as well. The plain cottage cheese Struklji were characterized by moderately sour taste, on behalf of cottage cheese filling, balanced with slight saltiness. On the contrary, in leavened dough Struklji the sweet taste prevailed, while the sourness was weak, but saltiness barely perceived. The texture of Struklji samples was smooth and slightly adhesive. The coarseness was perceived in some of the samples. The mouthcoat, the mouth feeling impression of a coating film that adheres to mouth surfaces, was not found typical for both types of cottage cheese Struklji, although it

Assessed samples differed in a spectrum and intensities of flavour attributes, which is mostly attributed to the regional modifications to the recipe (ingredients in dough and filling). Average intensity of an attribute in each sample, presented in Figure 1 and 2, is a result of three assessments performed by a panel. Among positive flavour attributes (Figure 1) aroma of cooked curd of slight to moderate intensity was perceived in all samples, while spicy sweet aroma was detected only in Struklji from leavened dough. For these also moderate to strong walnut aroma was distinctive.

The most intense negative aroma attributes were of flour and fish, and were perceived in two industrial samples of cottage cheese Struklji. The later is presumably resulting from the temperature regime or from handling with the sample during freezing (Fuller, 1998). Another negative attribute of remarkable intensity was aroma of plastic, identified in samples from a tourist farm, which was most likely linked to materials used in preparation and storage of the Struklji in the kitchen.

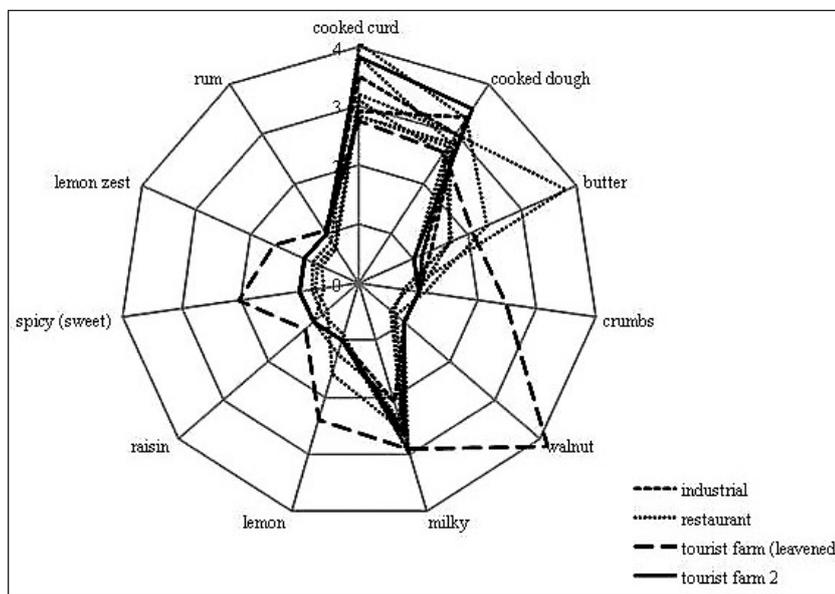


Figure 1. Intensities of positive flavour attributes in cottage cheese Struklji (0: not present, 1: threshold, 2: slight, 3: moderate, 4: strong)

was perceived in two samples. A spectrum of aroma was of medium intensity and short persistence in Struklji from filo pastry, while for Struklji from leavened dough medium to long persistent aroma was distinctive.

Flavour profile method

With the flavour profile method 25 most common flavour attributes in 10 samples of cottage cheese Struklji were determined. The intensity of perceived aroma attributes was reported with 5-point intensity scale (0: not present, 1: threshold, 2: slight, 3: moderate, 4: strong). Some of the attributes were common for both, Struklji from filo pastry and from leavened dough, while the other were characteristic for one type of the Struklji only (Table 2). Collected attributes were grouped to positive and negative. The later are unwanted in this type of food products, however they may be perceived at times and affecting the overall sensory quality of Struklji.

Quantitative descriptive analysis

The principal sensory parameters defining the quality of cottage cheese Struklji were analysed by means of Quantitative descriptive analysis. The flavour was omitted in this analysis since it was thoroughly investigated by the Flavour profile method. Basing on descriptions of parameters and their attributes defining typical cottage cheese Struklji, which were determined during initial sessions, the selected sensory parameters were scored on 5-point verbal scale regarding their distinctiveness (1: untypically; 5: very typically expressed).

Industrially produced cottage cheese Struklji had more uniform appearance and shape, which were considered less typical, and slightly differed in intensities of evaluated sensory attributes from samples of artisanal production. As shown in Figure 3, the least differences among samples were in the appearance of cross section, while the highest variability was determined in typicality of the taste. Con-

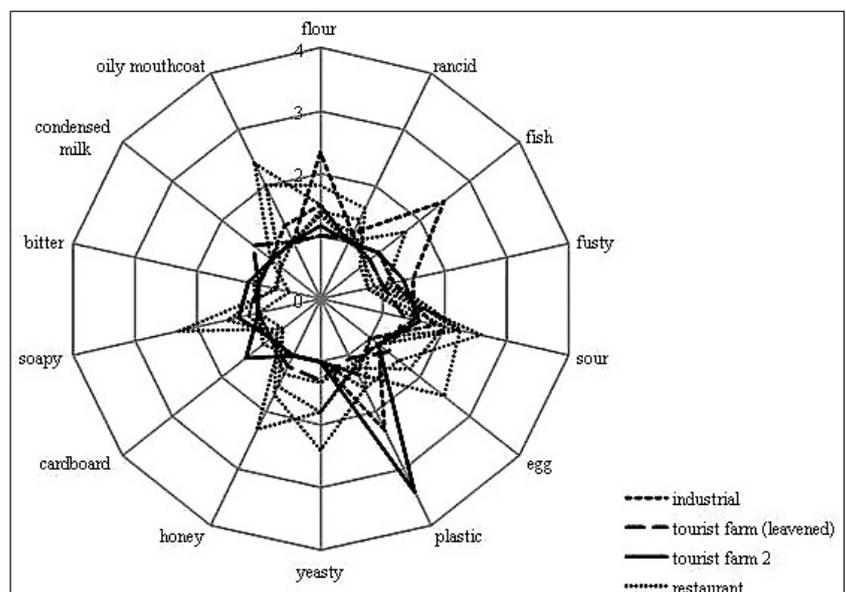


Figure 2. Intensities of negative flavour attributes in cottage cheese Struklji (0: not present, 1: threshold, 2: slight, 3: moderate, 4: strong).

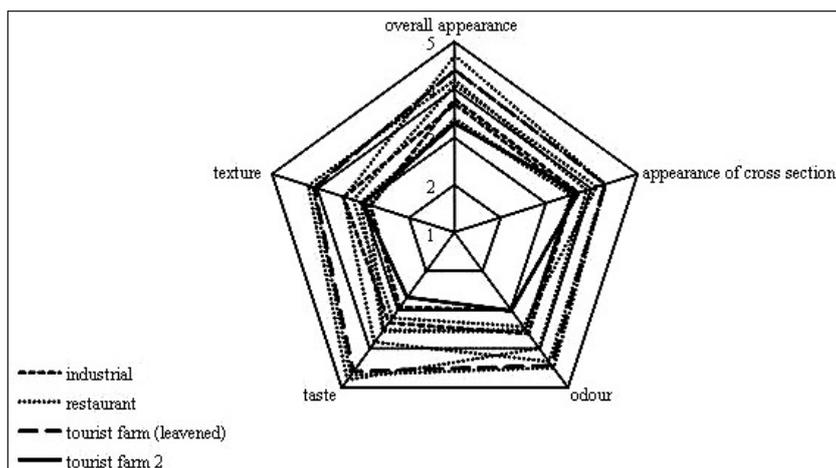


Figure 3. Mean values of sensory parameters assessed with Quantitative descriptive analysis (1: untypical, 2: slightly typical, 3: moderately typical, 4: typical, 5: very typical).

trary to our primary assumptions that the most typical Struklji would origin from the rural area, the samples of cottage cheese Struklji from a tourist farm were assessed as the least typical in nearly all parameters. The preparation procedure of Struklji showed to be better defined and introduced in kitchens with higher frequency of production, such as inns and restaurants, where less variability was observed among samples from different samplings. However, the selection of ingredients and their quality noticeably affected sensory quality and typicality of the final product, as it was already established for other food products (Fuad and Prabhasankar, 2010).

Proposed 7-point evaluation system

Defined principal sensory parameters and their attributes, by which sensory quality as well as typicality of cottage cheese Struklji is described, were collected in an evaluation form intended for comparative evaluation, such as a routine quality control or sensory contests. For better discrimination among assessed samples, a 7-point structured scale with anchor words at lower (not present) and high end (the highest) was proposed. Parameters and attributes comprised in the proposed evaluation form are the following: the surface appearance (evenness and roughness), the surface colour, absence of starch secretion, the surface glossiness, appearance of the cross section (the colour and the amount of filling), linkage of filling and dough, odour distinctiveness, absence of off-odours, taste, texture, non-adhesivity, the mouth feeling, aroma distinctiveness and absence of off-flavour.

Conclusions

Well defined sensory properties are important for the preservation of authenticity of traditional food product, and might together with the data on chemical composition support an eventual application for protected indication. Cottage cheese Struklji are Slovenian traditional dish, served savoury or sweetened no longer only at festivities. Although sensory attributes are affected by regional modifications to the recipe, some samples in the study were found to have only little analogy with sensory properties defined for traditional cottage cheese Struklji. Samples from different Slovenian regions were

assessed and sensory properties of typical cottage cheese Struklji were defined. Guidelines for training of sensory assessors of this dish were elaborated employing the results of the two descriptive sensory methods. On the basis of defined principal sensory parameters, their attributes and descriptions, criteria for sensory assessment of Struklji were developed, and an evaluation form for sensory quality assessment in a routine quality control or at special events, such as sensory contests or fair competitions, was proposed.

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