



Consumer Acceptance of a New Brand of Telemea Cheese. A Descriptive Sensory Analysis

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RESEARCH ARTICLE

Abstract

Descriptive sensory analysis may reveal information necessary to improve or maintain product quality and to understand consumers buying intentions. This study aimed to understand, by means of using descriptive sensory analysis, the consumer acceptance of a new brand of white sheep cheese 'Telemea' and to reveal its position in respect to competitive products. The evaluation was performed by a group of panelists who assessed four brands. The appearance-exterior, appearance-interior, odour, taste, and consistency were evaluated according to the DLG 5-point scheme as a descriptive sensory analysis method. Data were analyzed using descriptive statistics and statistical tests. Further, the principal component analysis was used to better understand the differences and similarities between the four brands belonging to the same type of cheese. Results indicate that consumers highly appreciate the new brand and show high degree of acceptance compared to the other brands. The results of the descriptive sensory analysis represent the starting point in developing marketing strategies for producers of cheese, in close connection with consumers' perceptions. Developing marketing strategies that take into account consumer preferences is vital for a product to succeed on the market in the long term.

Keywords: consumers' expectations, food quality, sensory analysis

INTRODUCTION

Food consumption patterns are continuously shaped by consumers' preferences with an increasing trend toward healthier and more sustainable foods (Nunes et al., 2020). This trend was also noticed in Romania in the last years (Muresan et al., 2021, Radulescu et al., 2021, Brata et al., 2022) regarding both fresh and processed food products. It is understandable that consumers play an incontestable role as they influence the demand of products through their buying behavior (Dibb et al., 2012), while producers face challenges when offering "the right product in the right place, at the right price, at the right time" (Neck et al., 2018, p.1190). Improving or maintaining the quality of a product is not always an easy task for producers, although there are methods that may provide the needed information to properly act. Understanding consumers' behavior is a complex process that requires investigations of all activities that occur before, during and after the purchase (Ngugi et al., 2020). In the case of New product, it is crucial to reveal consumers behavior as a premise to develop proper marketing strategies to reach targeted consumer. Sensory evaluation is often used for this purpose as it reveals information about the acceptance of food products (Byrne, 2020). Descriptive sensory analysis is one of the main methods used to understand what food product characteristics value consumers most (Sirangelo, 2019). In practice


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it is used to assess the quality of products by analyzing sensory attributes such as appearance, taste, flavour, odour, texture (Carpenter et al., 2000). This can be done in compliance with product specifications in order to understand the eventual deviations, process that helps maintaining the consistency of the quality (Kemp et al., 2018). It is widely emphasized by scholars that sensory analysis reveals key information necessary to improve or maintain the product quality and that the success of food producer on the market relies on adopting efficient marketing strategies (Carpenter et al., 2000, Ristic et al., 2017). When introducing a new product on the market, but not only, the assessment of the quality of the product in the eyes of consumers can reveal information to be further used for developing efficient marketing strategies. When analyzing competitor products, a preference map can be constructed to find out the sensory attributes that drive consumer preference toward a product or another (Nollet et al., 2011, Kemp et al., 2018). One of the main advantages of using preference maps is to learn about similarities and differences between products belonging to the same type (Lawless et al., 2010).

Recognized as a powerful tool, descriptive sensory analysis was extensively used in the last decade on several types of cheese such as Petit Suisse and Minas cheeses (Mendes et al., 2019), Mozzarella and Cheddar (Gulzar et al., 2020), smoked Cheddar (Del Toro-Gipson et al., 2020), buffalo Stracchino (Di Cairano et al., 2021), Paipa cheese (Benavides-Sánchez et al., 2022). Scholars emphasized the importance of using sensory analysis to assess the characteristics that might trigger consumers to purchase the products and to help producers look for a strategic position in the market. Using descriptive sensory analysis may also provide a guarantee of the product quality, in some cases being even certified by authorized organizations.

In this context, this study aimed to understand, by means of using descriptive sensory analysis, the consumer acceptance of a new brand of white sheep cheese 'Telemea' launched in Romania and to reveal its position in respect to competitive products.

MATERIALS AND METHODS

A descriptive sensory analysis was conducted based on the DLG 5-point scheme (DLG, 2022) which included visual, olfactory and taste criteria. The DLG sensory analysis method is a descriptive sensory test with integrated assessment (DLG, 2022), developed in agreement with the latest scientific findings and the development trends of the food market. The sensory evaluation was performed by a group of 19 panelists who evaluated four brands of white sheep cheese (Sample 2-4) of which one product was a new brand (Sample 1). The white sheep cheese, named 'Telemea', is brine-ripened with natural fat content minimum 43% fat in dry matter. The session took part in May 2022 at the University of Agricultural Sciences and Veterinary Medicine from Cluj-Napoca, Romania following the instructions received from DLG regarding the set-up (preparation of samples, setting up the tasting room etc.). Panelists were trained prior to the tasting sessions and provided written informed consent. They were asked to taste each sample independently and rate five sensory descriptors: appearance-exterior, appearance-interior, odour, taste, consistency based on the evaluation fiche for semi-hard cheese and cheese in liquids (except blue cheese) (DLG, 2022). The following scale was used: 0 = inadequate (not evaluable); 1=not satisfactory (strong deviation); 2=less satisfactory (clear deviations); 3=satisfactory (perceptible deviations); 4=good (slight deviations); 5=very good (quality expectations reached in full) (DLG, 2022).

Data were analyzed using descriptive statistics and statistical tests for comparisons. The normality of data was assessed using the Shapiro-Wilk test. One-way ANOVA was used to test differences in the scores between samples, followed by Tukey's multiple comparison test. P-value less than 5 % was considered significant. Principal component analysis (PCA) with Kaiser's criterion and Varimax rotation was performed to better understand the differences and similarities related to the white sheep cheese samples (Hair et al., 2006, Lawless et al., 2010). Statistical analysis was carried out using Intercooled Stata (v 15.0, StataCorp, Texas, USA) and R software (v.4.2.2).

RESULTS AND DISCUSSIONS

The tasting session started with providing step-by-step instructions on the method. Each participant evaluated the four samples of white sheep cheese provided in a casserole, in which each sample was tagged with a number (Figure 1).

Participants consumed bread and water between tasting to neutralize and clean their mouths. Participants assessed each of the five sensory descriptors (appearance-exterior, appearance-interior, odour, taste, consistency) concerning the potential deviations listed in the evaluation fiche of the cheese category: "semi-hard cheese and cheese in liquids (except blue cheese)" according to DLG (DLG TestService, 2022).

First, each sample was analyzed in terms of the scores provided to understand the ranking of the five sensory descriptors for each individual sample. The interior appearance received the highest score for Sample 1 (4.42 ± 0.77) and Sample 2 (3.89 ± 0.81), while the exterior appearance received the highest score in case of Sample 4 (4.63 ± 0.68) and the taste in case of Sample 3 (4.42 ± 0.84).

Next, statistical tests were used to identify any significant differences in the scores between samples. The exterior appearance ($p < 0.01$) and consistency ($p < 0.05$) were found to be statistically significantly different in some samples.

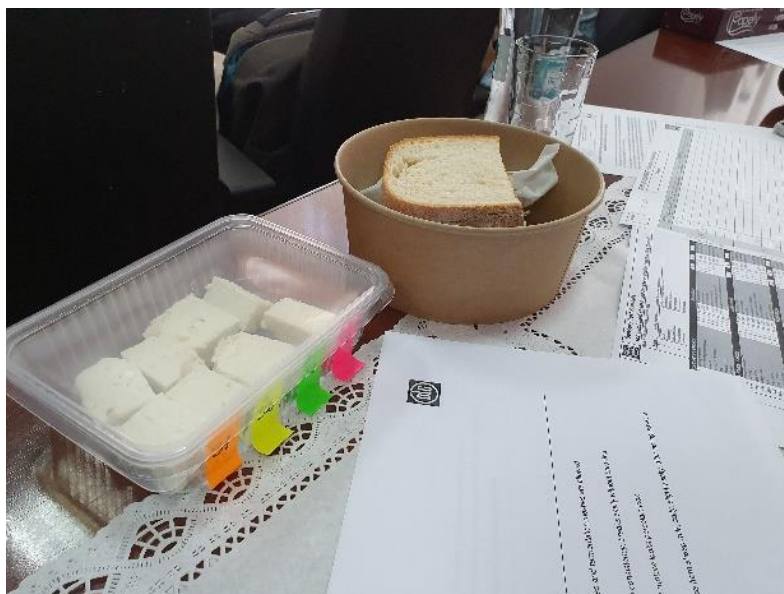


Figure 1. Testing session set-up for the white sheep cheese 'Telemea'

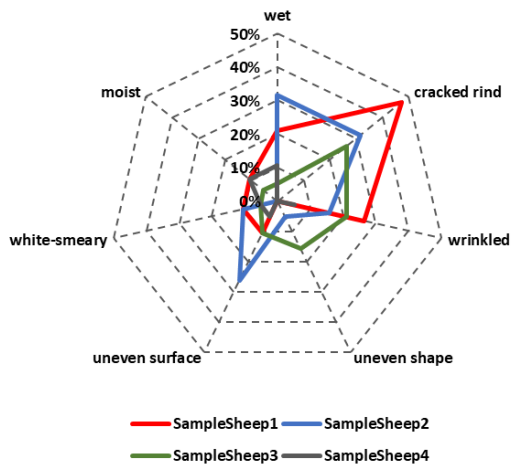
The exterior appearance was better appreciated in case of Sample 4 as compared to Sample 3 (4.63 vs. 3.89, $p < 0.05$) and Sample 2 (4.63 vs 3.58, $p < 0.05$). The consistency was evaluated with a significantly higher score in case of Sample 4 compared to Sample 2 (4.37 vs. 3.68, $p < 0.05$). No statistically significant differences were found between samples in terms of the interior appearance, odour and taste ($p > 0.05$).

Table 1. Evaluation scores for each sensory descriptor (Mean \pm Standard Deviation)

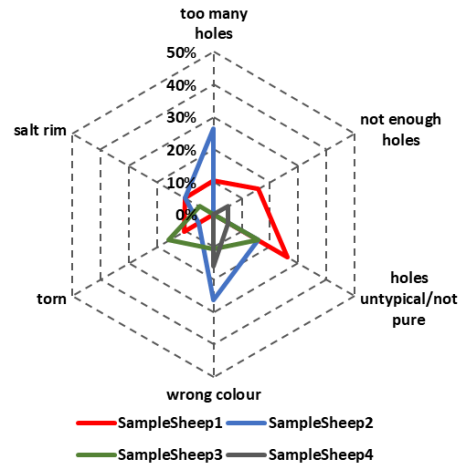
| | Appearance- exterior | Appearance- interior | Odour | Taste | Consistency |
|----------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|
| Sample1 | 4.05 \pm 0.85 ^{ab} | 4.42 \pm 0.77 ^a | 3.95 \pm 0.97 ^a | 4.21 \pm 1.03 ^a | 4.26 \pm 0.81 ^{ab} |
| Sample2 | 3.58 \pm 0.90 ^a | 3.89 \pm 0.81 ^a | 3.84 \pm 1.07 ^a | 3.74 \pm 0.93 ^a | 3.68 \pm 0.86 ^a |
| Sample3 | 3.89 \pm 0.87 ^a | 4.11 \pm 0.99 ^a | 4.37 \pm 0.89 ^a | 4.42 \pm 0.84 ^a | 4.32 \pm 0.58 ^{ab} |
| Sample4 | 4.63 \pm 0.68 ^b | 4.53 \pm 0.69 ^a | 4.26 \pm 0.99 ^a | 4.16 \pm 0.96 ^a | 4.37 \pm 0.89 ^b |
| p-value | <0.01 | 0.079 | 0.303 | 0.163 | <0.05 |

Note: Means with the same letter are not significantly different from each other at the 5% level.

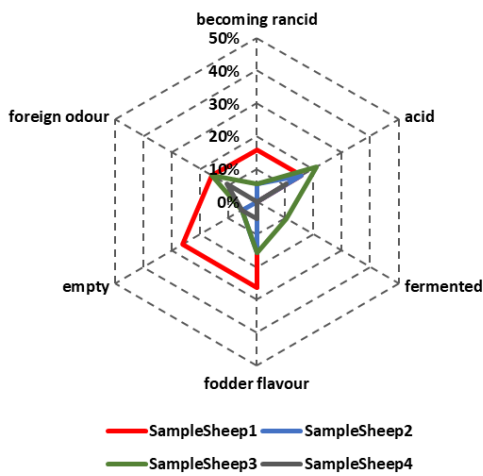
The characteristics identified as deviations for each sensory descriptor are depicted in Figure 2. The deviations were pointed out as features that may require more attention in the production process, features that may influence consumers in their buying decision. Regarding the exterior appearance, Sample 1 (the new brand) has more cracked rind and is more wrinkled, but less wet (Figure 2a). It has untypical or not enough holes in the interior, but with better colour (Figure 2b). When analyzing the odour and taste, the fodder flavor and acidity stands out (Figure 2c, Figure 2d). The consistency is perceived as crumbly and soft (Figure 2e). Following, a Principal component analysis was performed to provide an overview of the differences and similarities of the New brand as compared to the other three types of white sheep cheeses, products that are already on the market and well-known by consumers. Two principal components accounting for 62% of the variation were identified (Table 2). The first component explained 41.5% of the variation and differentiates the cheese samples in terms of exterior appearance, interior appearance and consistency, while PC2 accounted for 20.3% of the variation and differentiates the samples based on the odour and taste characteristics (Table 2). The PCA biplot depicted in Figure 3 indicates that the attribute vectors are of the same relative importance, except for 'consistency' which is perceived as less important. The positive values of the attribute vectors suggest that the samples were positively perceived during the tasting session, and participants appreciated the sensory descriptors as important. Sample 2 slightly differentiates from the other samples, most probably due to the wet and uneven exterior appearance (Figure 2) and crumbly consistency (Figure 2).



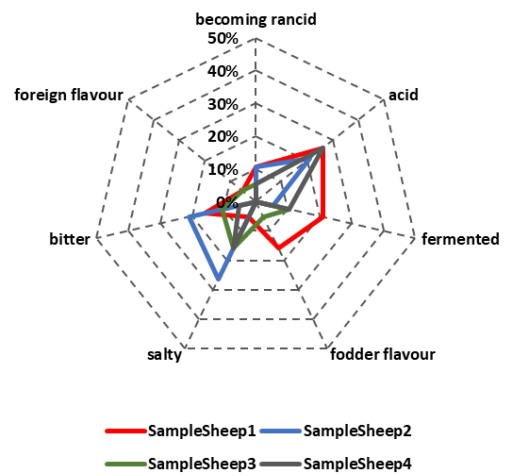
(a)



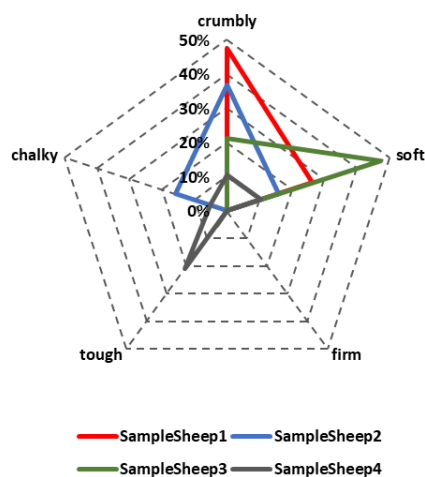
(b)



(c)



(d)



(e)

Figure 2. Characteristics identified as deviations for each sensory descriptor; (a) Appearance-exterior; (b) Appearance-interior; (c) Odour; (d) Taste; (e) Consistency

Sample 1 (the new brand) is perceived of similar quality to the already marketed products, important information for the producer in establishing his position on the market and evaluating the best marketing strategies to adopt.

Table 2. PCA results

| Component | Eigenvalue | % of variance | Sensory descriptor | Factor loading |
|------------------------|------------|---------------|---------------------|----------------|
| PC1 | 2.074 | 41.48 | Exterior appearance | 0.791 |
| | | | Interior appearance | 0.729 |
| | | | Consistency | 0.619 |
| PC2 | 1.014 | 20.28 | Odour | 0.858 |
| | | | Taste | 0.842 |
| Total variation | | 61.76 | | |

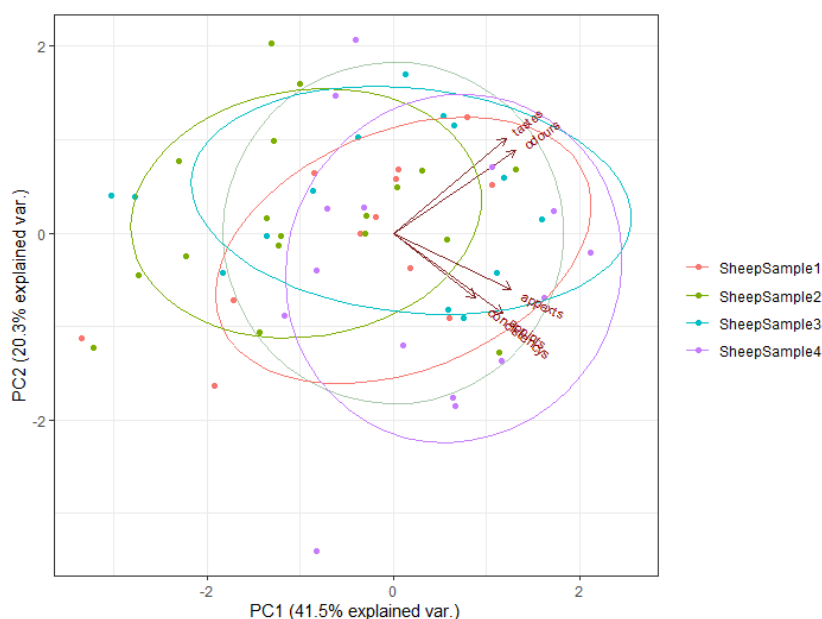


Figure 3. PCA biplot with scores and loadings for the white-sheep samples

CONCLUSIONS

The results of the study, which aimed to understand consumers' acceptance of a New brand of white sheep cheese 'Telemea' launched in Romania, indicate that the New brand was highly appreciated by the panelists and showed a high degree of acceptance compared to the other already-marketed white sheep cheeses. Acceptance of the New brand white sheep cheese depends on factors such as exterior and interior appearance, odour, taste and consistency, key sensory attributes with great impact on consumer behaviour as highlighted in the PCA plot. The use of a perceptual map as a tool to understand competing products has been proved one more time as being full of information needed to develop efficient marketing strategies within a competitive environment. The descriptive sensory analysis represents the starting point in developing marketing strategies in particular for producers of cheese in close connection with consumers' perception. Developing marketing strategies that take into account consumer preferences is vital for a product to succeed on the market in the long term. The current research provides a comprehensive understanding on how consumers perceive a New brand in comparison with brands already known on the market, and can be replicated on cheese products from same category. Although the results suggest practical implications for producers, further work will focus on revealing consumers' attitude and buying intention.

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Conflicts of Interest

The authors declare that they do not have any conflict of interest.

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