Cross-cultural Study of Traditional Georgian Cheese Tenili Among Georgian and French Populations

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Abstract

Traditional cheeses made in small-scale farms has an important place in the cheese production all over the world. One of them is Tenili cheese originated from Southern Georgia, which has Geographical indication and an intangible cultural heritage status in Georgia. The present study evaluated cross-cultural differences among Georgian and French populations in the evaluation of Tenili cheese made with different technologies. A comparison of the sensory characteristics of cheese samples made by different technologies, ripening vessels and duration of ripening was carried out according to the RATA (Rate All That Apply) and hedonic tests. Familiarity and sensory characteristics of products have a huge impact on preferences. Liking of Tenili cheese is higher for Georgian population, where this type of cheese is not widely known, but its taste is similar to other Georgian cheeses, than for French population, where this type of cheese is not known at all. Both Georgian and French assessors prefer cheese made following to a non-traditional technology; a clear difference in liking among ripening materials between populations was not revealed; The five-month ripened cheese is a favorable by both the French and the Georgian populations.

Keywords: Consumer liking; Traditional cheese; Sensory evaluation.

1. Introduction

Developments in food science and technology allowed improvement of industrialization and mass production of cheese in the whole world. However, a lot of cheese is made with traditional technologies in small-scale farms and are named as an art due to the cheesemaker's knowledge and experience, which are crucial to obtain cheese with specific flavor and taste [1]. There are many varieties of cheese in the world, which differ by the used milk type, technological process, aging time, conditions, etc. 1000 types of cheese varieties are known from France; out of them 400 are steadily consumed and are an inseparable part of French gastronomy [2]; 45 cheese verities have status of protected designation of origin (PDO) [3].

Georgia is in the list of countries where dairy production has a long history. This is proven by the archeological materials [4]. Nowadays there is a high demand on dairy products in Georgia especially on traditional type of cheeses which are the most consumed dairy product and is characterized by gradual rising. 80% of obtained milk in Georgia is used for cheese production. 12.7 kg per capita was the average usage of cheese in 2016 [5]. 24 traditionally made cheese varieties were described in Georgia in 2018 [6].

Familiarity of food in general, as well as for cheese is a main factor used by the consumer in the process of products' purchasing and is created by the impact of habits, tradition, culture, religion [7]. As in Georgia and France traditionally made cheeses are favorable and frequently consumed it is interesting to compare traditional cheese liking by both countries' populations. For the purpose of this research, one of the traditional Georgian cheeses – Tenili has been selected. The cheese is made by stretching of curd till thin strands and ripened traditionally in a clay pot. Tenili cheese owns Geographical indication and intangible cultural heritage status in Georgia [8, 9]. Nowadays Tenili cheese can be made either following to a traditional or a non-traditional process [10]. In traditional process is used skimmed milk, naturally acidified milk for coagulation and hot whey, while in non-traditional technology -milk without skimming, home-made rennet and after coagulation prepared cheese heads are cut into hot water. The hand processing step is common for both technologies. Despite that Tenili is a traditional cheese, it is not widely known by the Georgians. Tenili cheese is totally unknown by the French population. The goal of the research is to study cross-cultural difference between the Georgian and the French populations for the evaluation of Tenili cheese made with two different technologies, ripened in glass jar and clay pot during 1, 2, 3 and 5 months.

2. Materials and methods

Sixteen samples of Tenili cheese made by the traditional and non-traditional methods, ripened in a clay pot or a glass jar for one, two, three or five months were taken for the research. For all 16 samples, a Rate All That Apply (RATA) test as well as a hedonic evaluation of products were conducted. For each sample presentation (3g) were used plastic cup coded with 3-digit number. The presentation order of samples for each assessor was randomized according to the Latin square design. Only consumers who like cheese and consume it regularly were recruited for the study. In total, 124 participants (66 females and 58 males) from 18 and to 71 years old were recruited in two cities of two different countries (Tbilisi, Georgia and Lille, France), 62 in each city (Table 1). Limitation of the study is small amount of participant in each county.

Table 1: Demographic characteristics of participants.

| Age and Sex of participants		Tbilisi, Georgia		Lille, France	
		Number	%	Number	%
Age	18-28	43	69.355	34	54.839
	29-42	7	11.290	14	22.581
	43-71	12	19.355	14	22.581
Sex	Female	33	53.226	33	53.226
	Male	29	46.774	29	46.774

The experiment consisted in a tasting session during which participants had to answer the questionnaire. Consumers took part in the experiment individually in one session. In Lille (France) and in Tbilisi (Georgia) the sessions took place in a sensory laboratory equipped with individual booths. Testing was conducted at room temperature (20 °C - 21°C) and under white light. The assessors were asked to evaluate all 16 samples (hedonic test) from liking (10) to disliking (0). After hedonic test the participants were asked to determine the ideal profile of Tenili cheese according to the appearance (stringy, shiny, dense, homogenous, yellow color), odour (barn, fermented, buttery, fresh, cow, gout, milky/creamy, odor intensity), taste (salty, sour, taste intensity, bitter, pungent, barn, gout, pepper, cow, buttery, creamy), texture (fatty, creamy, soft, stringy, doughy, humid).

To analyze the hedonic evaluation, an analysis of variance (ANOVA) was carried out considering the countries as a factor and liking scores as the dependent variable. For every ANOVA, when a significant effect of country was found, a Newman-Keuls pair comparison test was performed at a α-level at 5%; To compare the ideal profile of French and Georgian participants, ANOVAs were carried out considering the countries as a factor and the descriptors as the dependent variables. Statistical analyses were performed using XLSTAT® software version 2020-3.1.

3. Results and discussion

In order to investigate the effect of familiarity on the hedonic evaluation of cheeses, an ANOVA was conducted to compare the results obtained in France and in Georgia. Results showed a significant difference of hedonic evaluation between France and Georgia. French participants liked significantly less all 16 cheese samples compared to Georgian participants ($p < 0.001$, see Fig. 1). The average liking score of Georgian population was 6.83 out of 10 compared to the French population - 4.09, which is 2.74 higher. These results are explained by the more familiarities of Pasta-filata type of cheeses by the Georgian people. This group of cheeses originates mostly from the Mediterranean and Eastern Europe region; The main characteristic is stringy structure and plastic consistency. Some of pasta filata types of cheeses are consumed freshly or require short ripening time (Mozzarella, Scamorza) and others require intense ripening period (Provolone, Kashkaval, Caciocavallo, Ragusano) [11]. Georgian Pasta filata type of cheeses belongs: Acharuli chlechili, Meskhetian chechili, Megrelian sulguni, Svanetian sulguni, Sulguni [9]. They have status of Geographical indication in Georgia and are widely known and consumed by Georgian population. Tenili cheese has similar organoleptic characteristic with above listed Georgian cheeses, which are very popular within Georgian consumers and that indicates about high familiarity. From the literature is known that in cross-cultural studies familiarity significantly impacts positively on the preferences and decision-making process and that is obvious explanation of the received results

[12].
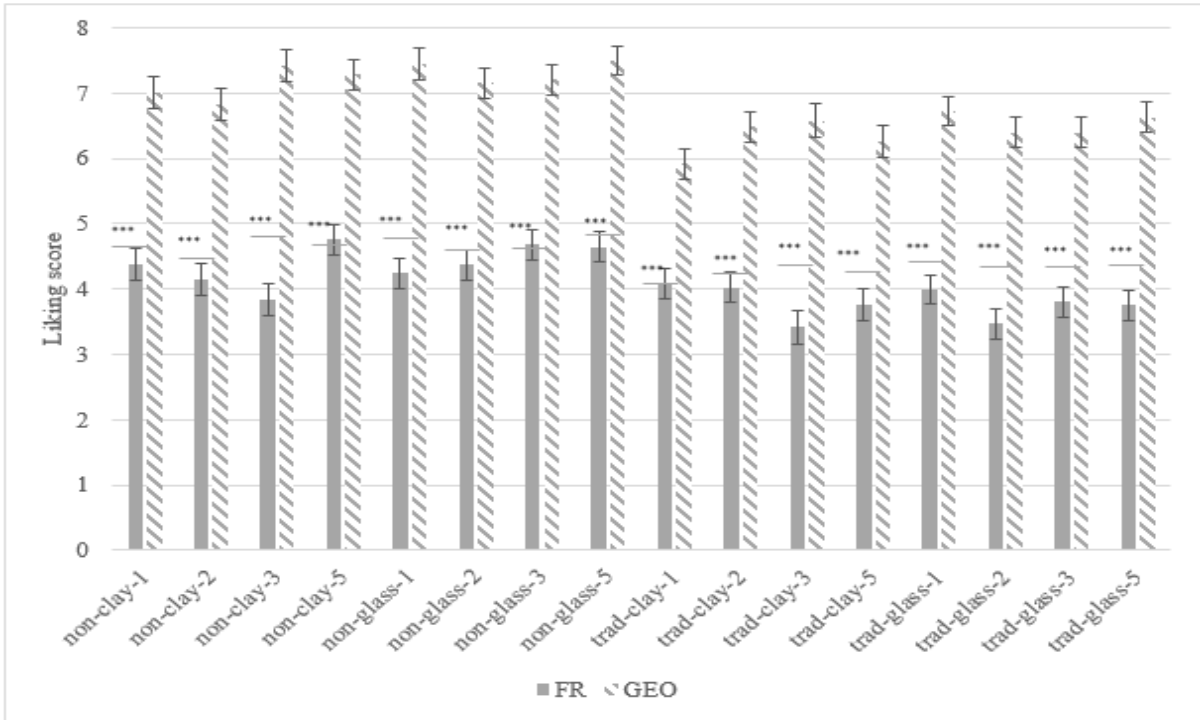
Figure 1: Hedonic evaluation of Tenili cheese for French and Georgian participants. The error bars correspond to the standard error of the mean. Stars correspond to the significance levels (*p<0.05; **p<0.01; ***p<0.001).
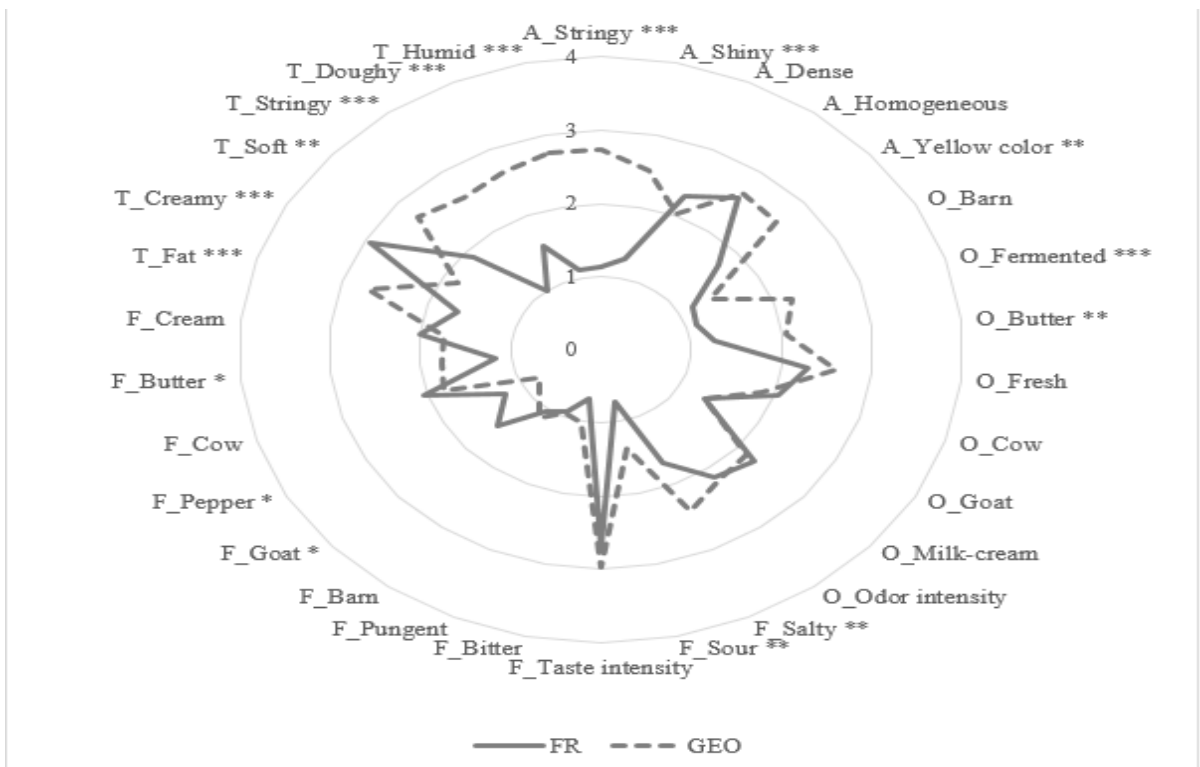
Figure 2: Spider chart based on the ANOVA results of the ideal profile for both Georgian and French

consumers. Stars correspond to the significance levels (*p<.05; **p<.01; ***p<.001). The first letter of the variables corresponds to the related category: A - aspect, O - odor, F - flavor and T - texture.

Results of the study ideal cheese profiles according to the scores of both populations are shown on Fig. 2. The ideal cheese profile for French consumers has a more intense goat and pepper flavor and has a creamier texture, while ideal cheese profile for Georgian consumers is more intense in yellow color, fermented odor, buttery odor, saltiness, sourness, and butter flavor, with a softer, stringier, doughier, and more humid texture. France is the top-producing nation in Europe for milk production, with close to a million goats. This industry's predominant practice of converting milk into value in the form of cheeses, As opposed to other nations, nearly all of the goat milk produced in France is processed into cheese made without sheep or cow milk additives. In addition, because of specific characteristics, French goat milk cheeses are exceptional in terms of flavor, composition, and culinary uses. 81 % of French families are using goat cheese with an average 2 kg consumption per year per family and 14 goat cheeses have status the Protected Designation of Origin. For people in France, goat cheese is more than enjoyment and cultural heritage, it is the notion of authenticity that is why the French population considered goat cheese as the ideal cheese [13]. Georgian cheese varieties differ to each other with technological processes but many of them are salty, with stringy structure and high fat content. The attributes listed by Georgians as ideal cheese are characterized for Georgian cheese varieties [6].

4. Conclusions

Tenili cheese was significantly more liked by Georgian consumers compared to French consumers. People from both countries prefer cheese made by non-traditional technology; In terms of ripening material there is no clear difference in preference among ripening utensils for both populations. The most ripened (five month) cheese is favorable for both French and Georgian populations; The study of the ideal cheese profile confirmed the impact of familiarity to the pasta filata-type cheeses that are widely spread in Georgia and its attributes used for evaluation of the ideal cheese for the Georgian population. As there is high consumption of goat cheese in France, characteristics of goat cheese used for ideal product evaluation by the French population.

Acknowledgements

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