

DESCRIPTIVE SENSORY CHARACTERIZATION OF REQUEIJAO MORENO APPLYING FLASH PROFILE

ABSTRACT

Brazil is a larger producer of milk and dairy products, being Minas Gerais the biggest producer state in the country. Among these products, Minas Gerais stands out in the production of artisanal cheese. The requeijao Moreno is an example of typical artisanal cheese produced in the north of Minas Gerais that does not have sensory attributes described in literature. The aim of this study was to characterize the sensory profile of requeijao Moreno through the Flash Profile technique. The test results showed that 86,67% of variability of data presented in two dimensions and 19 descriptive terms was established by panelists. In addition, the tasters distinguished the characteristics between the requeijao Moreno and common requeijao branco. Therefore, the Flash Profile technique was effective on the sensorial characterization of requeijao Moreno.

INTRODUCTION

Brazil is the fifth largest producer of milk in world¹. In 2018, the gross production value was R\$ 31,9 billion and for milk industry was R\$ 68,7 billion^{2,3}. Minas Gerais is the largest producer of milk among Brazilian states and its annual production of milk is 8,9 billion liters⁴.

Cheese is a dairy product obtained by coagulation and partial whey removal that can be fresh or matured and added or not with other food substances⁵. Artisanal cheeses are a popular dairy product produced and consumed in Minas Gerais, which contributes to the historical development of cheese production in this state⁶. There are laws that rule the concept of artisanal cheese. One of them, define artisanal cheese as a product prepared by traditional methods which is connected to territory, region and culture, applying good manufacturing practices and following a defined production protocol for each type and variation of cheese⁷. In other law, proper to the state of Minas Gerais, artisanal cheese is a product obtained from integral raw milk which has specific characteristics of identity and quality^{8,9}. The production and commercialization of artisanal cheese of Minas Gerais are regulated by state laws^{8,9}. In Brazil, it is estimated that 80% of cheese producers are family farmers and 170,000 of this produce artisanal cheese^{10,11}.

The requeijao Moreno is a type of artisanal cheese produced and commercialized in the north of Minas Gerais¹². This cheese is produced from raw cow milk in Vales do Jequitinhonha e Mucuri¹² and presents regional economic and cultural relevance. The requeijao Moreno does not have a description of sensory characteristics in literature which prompted the realization of this work.

The descriptive analysis in sensory evaluation of food consists of the description and intensity of the sensory characteristics. Flash profile is a method used to fast description and quantitatively evaluates the sensory attributes¹³. This method is related to the conventional profile and results in reliable sensory profile¹³. Sensory evaluation using Flash Profile have two phases. First, evaluators describe terms for sensory

characteristics and then they classify the samples according to the intensity of the attributes¹⁴.

OBJECTIVE

This study aims to characterize the sensory profile of requeijao Moreno through the Flash Profile technique.

METHODOLOGY

This research was performed out in the Sensory Analysis Laboratory of Federal Institute of the North of Minas Gerais (IFNMG) – *campus* Salinas in July of 2022. The data were collected after proof of the microbiological safety (IN 60/2019)¹⁵ of the samples and approval of the Research Ethics Committee of the State University of Montes Claros (CAAE: 56053622.0.0000.5146). Three requeijao Moreno samples (Commercial 1, 2 and 3) were purchased from three different producers in Salinas - MG and one sample of requeijao branco was obtained in retail market from the same city.

The flash profile panel was comprised by 13 subjects who are habitual consumers of requeijao Moreno. Two tasting sessions were conducted over the course of 2 days. During the first session, panelists were presented to the samples of requeijao Moreno, with two sample combinations for comparison, to individually generate descriptive terms. Following this session all the terms generated were gathered into a common list. In the second session, the compiled list was provided to the panelists, sorted by category, that is, appearance, odor, texture, aroma, and flavor. Panelists were given papers indicating scales which they used to rank all the samples for each attribute from the general compiled list and ranked the attribute from the weakest to the strongest sensation, with ties allowed. The panelists were given water and salty cracker to rinse their mouths and were free to compare and retake the samples as many times as necessary. All the evaluations took in individual sensory booths. Statistical analysis was performed through Generalized Procrustes Analysis (GPA) using XLSTAT (Addinsoft, New York, NY, USA).

RESULTS AND DISCUSSION

Figure 1 presents the location of four cheeses, three types of requeijao Moreno and one of requeijao branco, at the consensus. Results obtained of Flash Profile can be represented in two dimensions ($F1 = 69.74$ and $F2 = 16.93$) which explained 86.67% of the data variability. According $F1$, the samples were divided in two groups, the first one was composed by requeijao Moreno commercial 1, 2 and 3, and the other was composed by requeijao branco.

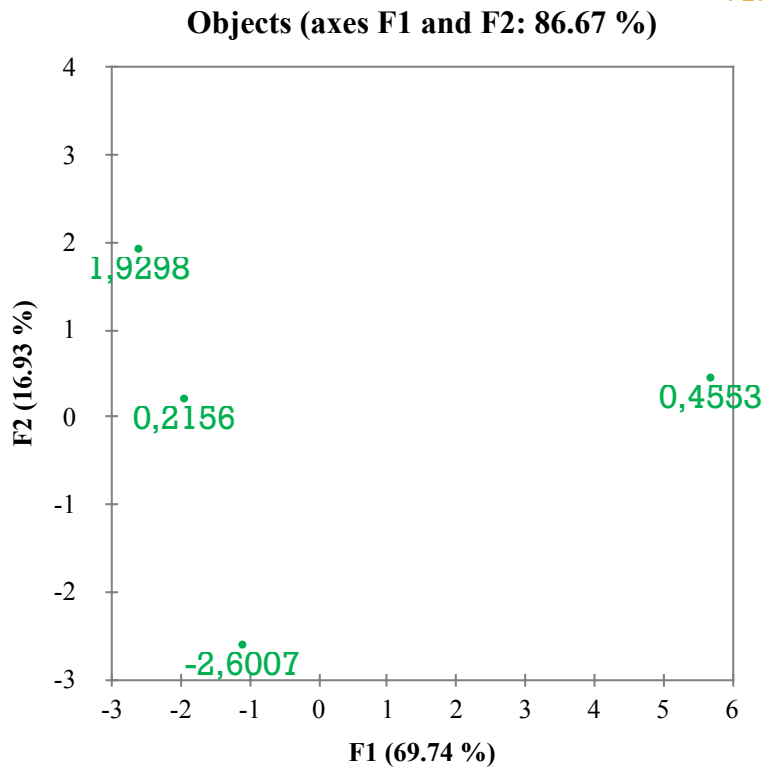
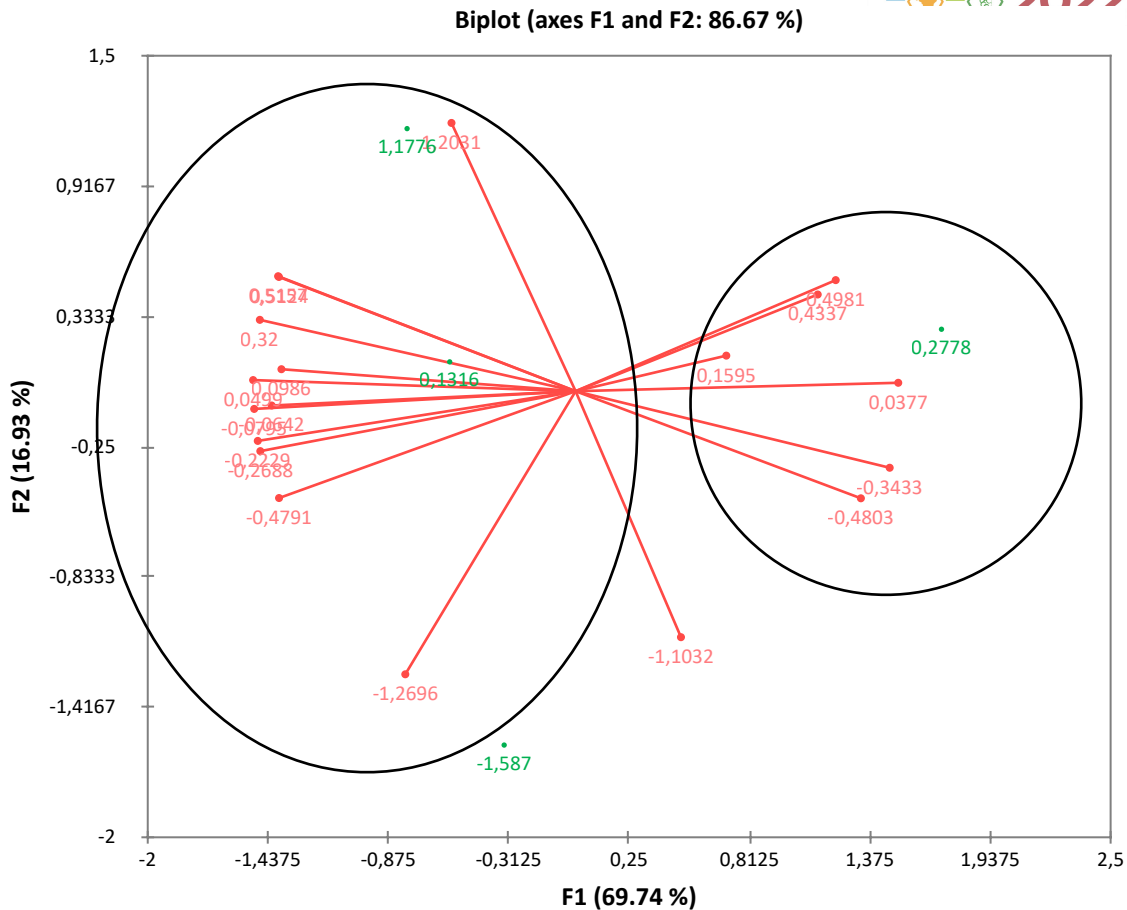


Figure 1. Sensorial space and consensus for four types of cheese evaluated with an 86.67% of variability of data from GPA.

The consensual configuration of the four cheese samples and the attributes obtained by panelists after GPA are presented in Figure 2. The panelists characterized the requeijao Moreno commercial 1 with sweet taste, dry look, fermented aroma, cooked flavor, brittle and ruberry. Requeijao Moreno commercial 2 and 3 described with characteristic aroma, presence of dark spots, firmness to chew, brown color and firmness to touch. While requeijao branco was interpreted with acid taste, milky aroma, salty taste and cheese flavor. According Rodrigues-Noriega et al.¹³, the ingredients and type of production (handcrafted, semi-mechanized and industrialized process) are factors that influence the perceived difference between the panelists.



Label: Ferm aro = fermented aroma; Cooked flav = Cooked flavor; Charac aro = Characteristic aroma; Pres dark spots = Presence of dark spots; Firm to chew = Firmness to chew; Firm to touch = Firmness to touch.

requijao branco) and the lexicon used to describe them at the first and second dimensions of the GPA from Flash Profile test.

CONCLUSION

The Flash Profile technique demonstrated to be a quick way to survey of sensory attributes and makes the difference between the requijao branco e requijão Moreno. The results from the present study show that Flash Profile is a reliable alternative of sensory characterization of requijao Moreno, when there is not a trained sensory group available. Furthermore, results of Flash Profile test presented nineteen descriptive attributes that it was used to classify samples of requijao Moreno and requijao branco. The requijao Moreno was characterized as cheese with characteristic aroma, presence of dark spots, firmness to chew, brown color and firmness to touch.

REFERENCES

1. Food and Agriculture Organization of the United Nations – FAO. **Dairy market review: Overview of global dairy market developments in 2020**, 2021. Disponível em: <https://www.fao.org/3/cb4230en/cb4230en.pdf>. Acesso em: 26 ago. 2022.
2. ABIA – ASSOCIAÇÃO BRASILEIRA DAS INDÚSTRIAS DA ALIMENTAÇÃO, 2019. Disponível em: <https://www.abia.org.br/vsn/anexos/faturamento2018.pdf>. Acesso em: 21 ago. 2022.
3. BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. **Valor Bruto da Produção Agropecuária**. Ministério da Agricultura, Pecuária e Abastecimento, Brasília, DF, 2019. Disponível em: <https://www.gov.br/agricultura/pt-br/assuntos/politica-agricola/outras-publicacoes/201902-agropecuaria-brasileira-em-numeros>. Acesso em: 21 ago. 2022.
4. FIÚZA, A. L. de C.; LOURENÇO, L. R. Compartilhamento intergeracional e perfil de produtores rurais na atividade leiteira em Minas Gerais. **Redes (St. Cruz Sul, Online)**. v. 25, Ed. Especial 2, p.2128 - 2150, 2020.
5. BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. Portaria nº 146 de 07 de março de 1996. **Regulamento Técnico de Identidade e Qualidade de Queijos**. Diário Oficial, Brasília, 11 março, 1996, p.3977-3978.
6. ANTONIO, M. B. de; BORELLI, B. M. A importância das bactérias lácticas na segurança e qualidade dos queijos minas artesanais. **Rev. Inst. Laticínios Cândido Tostes**, Juiz de Fora. v. 75, n. 3, p. 204-221, 2020.
7. BRASIL. Lei nº 13.860, de 18 de julho de 2019. **Dispõe sobre a elaboração e a comercialização de queijos artesanais e dá outras providências**. Diário Oficial da União, 19 jul. 2019. Seção 1, n. 138, p. 1. Atos do Poder Legislativo.
8. MINAS GERAIS. Lei nº 23.157, de 18 de dezembro de 2018. **Dispõe sobre a produção e a comercialização dos queijos artesanais de Minas Gerais**. Minas Gerais Diário do Executivo, 19 dez. 2018. Caderno 1, ano 126, n. 234, p. 1. Disponível em: <https://www.legisweb.com.br/legislacao/?id=372516>. Acesso em: 26 ago. 2022.
9. MINAS GERAIS. Lei nº 23.157, de 18 de dezembro de 2018. **Dispõe sobre a produção e a comercialização dos queijos artesanais de Minas Gerais**. Minas Gerais Diário do Executivo, 19 dez. 2018. Caderno 1, ano 126, n. 234, p. 1. Disponível em: <https://www.legisweb.com.br/legislacao/?id=372516>. Acesso em: 26 ago. 2022.
10. SEBRAE. **Pecuária. Agronegócio. Relatório de Inteligência**. Santa Catarina: Sebrae, 2021.
11. BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. **Selo agrega valor e permite acessar grandes mercados, destacou Tereza Cristina**. 2019. Disponível em: <https://www.gov.br/agricultura/pt-br/assuntos/noticias/selo-agrega-valor-e-permite-acessar-grandes-mercados-destacou-tereza-cristina>. Acesso em: 26 ago. 2022.
12. PINEDA, A. P. A. et al. Brazilian Artisanal Cheeses: diversity, microbiological safety, and challenges for the sector. **Frontiers in Microbiology**, São Paulo, v. 12, p. 1-16, 2021.
13. RODRIGUEZ-NORIEGA, S.; BUENROSTRO-FIGUEROA, J. J.; REBOLLOSO-PADILLA, O. N.; CORONA-FLORES, J.; CAMPOSECO-MONTEJO, N.; FLORES-NAVEDA, A.; RUELAS-CHACON, X. Developing a Descriptive Sensory Characterization of Flour Tortilla Applying Flash Profile. **Foods** **2021**, 10, 1473, 2021. <https://doi.org/10.3390/foods10071473>.
14. ALCANTARA, M. de; FREITAS-SÁ, D. de G. C. Metodologias sensoriais descritivas mais rápidas e versáteis – uma atualidade na ciência sensorial. **Braz. J. Food Technol.**, Campinas, v. 21, 2018.
15. BRASIL. Instrução Normativa nº 60, 23 de dezembro de 2019. **Estabelece as listas de padrões microbiológicos para alimentos**. Diário Oficial, Brasília, 26 dezembro, 2019.