

BLENDING TRADITION AND INNOVATION: TRANSFORMING THE TURKISH ICE CREAM SECTOR

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Abstract

This study examines the transformation of the Turkish ice cream sector through a case study of an artisanal ice cream producer. Grounded in Schumpeter's theory of "creative destruction," Rogers' "diffusion of innovations," Chesbrough's "open innovation," and Christensen's "disruptive innovation," the research analyzes the interaction between tradition and innovation within the sector. Data were collected through in-depth interviews with an artisanal producer and thematically analyzed using NVIVO 2024 software. The analysis revealed five main themes. Findings demonstrate that local ingredients such as tahini, vegetables, and seasonal herbs, combined with experimental techniques like infusion and molecular gastronomy applications, play a significant role in innovative product development, attracting consumer interest and challenging traditional norms. Despite challenges such as food waste and limited patent protection, opportunities for sustainable growth and global competitiveness have been identified. The study recommends increasing R&D investments, securing intellectual property rights, adopting environmentally friendly practices, and strengthening collaborations within the sector. In conclusion, the research highlights the dual role of the Turkish ice cream sector as both a preserver of cultural heritage and a pioneer of innovation, offering valuable insights for both academia and industry stakeholders.

Keywords: Turkish ice cream sector, innovation management, creative destruction, artisanal ice cream, sustainability

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Gelenek ve Yeniliği Harmanlama: Türk Dondurma Sektörünün Dönüşümü

Özet

Bu çalışma, Türk dondurma sektöründeki dönüşümü, artizan bir dondurma üreticisinin vaka analizi üzerinden incelemiştir. Schumpeter'in "yaratıcı yıkım", Rogers'ın "yeniliklerin yayılımı", Chesbrough'un "açık yenilik" ve Christensen'in "yıkıcı yenilik" teorileri temelinde yürütülen araştırmada, sektördeki gelenek ve yenilik arasındaki etkileşim analiz edilmiştir. Veriler, artizan bir üreticiyle yapılan derinlemesine görüşmeler yoluyla toplanmış ve NVIVO 2024 yazılımı kullanılarak tematik analiz yöntemiyle değerlendirilmiştir. Analiz sonucunda beş ana tema ortaya çıkmıştır. Bulgular, tahin, sebzeler ve mevsimsel otlar gibi yerel malzemelerle infüzyon ve moleküler mutfak uygulamaları gibi deneysel tekniklerin, yenilikçi ürün geliştirme sürecinde önemli rol oynadığını ve tüketici ilgisini artırarak geleneksel normları sorguladığını ortaya koymuştur. Gıda israfı ve sınırlı patent koruması gibi zorluklara rağmen, sürdürülebilir büyüme ve küresel rekabet için fırsatlar olduğu görülmüştür. Çalışma, Ar-Ge yatırımlarının artırılmasını, fikri mülkiyet haklarının korunmasını, çevre dostu uygulamaların benimsenmesini ve sektör içi iş birliklerinin güçlendirilmesini önermektedir. Sonuç olarak, Türk dondurma sektörünün hem kültürel mirası koruyan hem de yenilikçi çözümler geliştiren ikili bir rol üstlendiği vurgulanmaktadır.

Anahtar Kelimeler: Türk dondurma sektörü, yenilik yönetimi, yaratıcı yıkım, artizan dondurma, sürdürülebilirlik

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INTRODUCTION

Ice cream is distinctive in Turkish gastronomy, embodying a rich cultural heritage and a platform for innovative transformation. Traditional products like Marař ice cream, celebrated for their unique texture and flavor derived from local ingredients such as salep and goat milk, stand as symbols of this heritage. However, the Turkish ice cream sector is undergoing a dynamic shift driven by the rise of innovative approaches such as artisanal production and unconventional flavor pairings. These developments reflect a global trend in which ice cream transcends mere consumption to become an aesthetic and experience-driven gastronomic product fueled by techniques such as molecular gastronomy and focus on sustainability (Batu, 2019).

This transformation presents both opportunities and challenges for the Turkish ice cream sector. While traditional flavors remain culturally significant, the increasing demand for novel products and intensified competition in local and international markets necessitate innovation. With their ability to blend local ingredients with modern techniques, artisanal producers are uniquely positioned to navigate this dual identity, preserving tradition while embracing change. However, despite extensive global research on ice cream innovations (e.g., molecular gastronomy in Spain and cultural fusions in Japan), the specific dynamics of this transformation within the Turkish context, mainly through the lens of artisanal producers, remain underexplored. This gap is compounded by a practical challenge: balancing cultural heritage with the evolving preferences of modern consumers in a competitive landscape (Del Moral, 2020).

This study addresses how innovative ice cream practices can transform the Turkish ice cream sector while preserving its traditional identity in an increasingly competitive and globalized market. It focuses on the role of artisanal producers, exemplified by the case study of Paseo in Istanbul, in navigating this tension and influencing consumer perceptions. To this end, this study explores how innovative ice cream varieties interact with and potentially reshape traditional Turkish ice cream culture; examines the perceptions and adoption patterns of Turkish consumers, particularly early adopters, toward these products; investigates how artisanal producers like Paseo leverage local collaborations and innovative techniques to create new opportunities within the sector; and considers how innovative practices can contribute to the sustainable coexistence of traditional and modern ice cream offerings in Türkiye.

This study aims to explore the concept of innovative ice cream in Türkiye and examine the creative approaches of artisanal producers within the sector. The primary goal is to analyze the Turkish ice cream sector's traditional and innovative identity and evaluate its impacts on industry practices and consumer perceptions. The theoretical foundation draws on Schumpeter's "creative destruction" to understand sectoral transformation, Rogers' "diffusion of innovations" to assess consumer adoption, and Chesbrough's "open innovation" to explore collaborative practices, providing a robust lens for this investigation. Through this focus, the research seeks to offer an original contribution to the literature on Turkish gastronomy and innovation management.

1. Theoretical Framework

Ice cream has been a significant gastronomic experience throughout history, forming a unique connection between traditional and innovative products across various cultures (Kitchen Stories, 2017; Barksdale, 2023; Marchetti, 2020; Mills, 2023). In Türkiye, Marař ice cream—distinguished by its unique texture and flavor from local ingredients like salep and goat milk—exemplifies this cultural heritage. Currently, the ice cream industry faces a transformative process that requires both the preservation of traditional flavors and the adoption of innovative practices to meet evolving consumer demands and competitive pressures (Batu, 2019).

In this context, innovation management offers a robust theoretical lens for understanding changes within the Turkish ice cream sector. Schumpeter's "creative destruction" concept explains how new production methods and flavors can reshape established traditions and drive sectoral evolution. Rogers' "diffusion of innovations" model sheds light on how consumers adopt these novel products, influencing their market success. Meanwhile, Chesbrough's "open innovation" principles underscore the importance of collaborations with local suppliers in fostering sustainable and creative advancements. Together, these frameworks guide this study in analyzing the interplay between tradition and innovation in Turkish ice cream production, providing insights into its future development and contributing to industry practices and academic literature.

1.1. The Role of Innovation in the Food Industry

The food industry is evolving rapidly, driven by shifting consumer preferences, technological advancements, and sustainability imperatives (Demirdöğen, Tatlı, and Korucuk, 2016). Within this broader context, innovation has become a key driver in the ice cream sector, enabling the creation of new products and refinement of production processes. This shift is propelled by growing consumer awareness and expectations, encouraging producers to adopt creative and sustainable practices (İlter, 2022).

Innovation serves as a bridge between tradition and modernity in the Turkish ice cream sector. Artisanal producers, for instance, blend local ingredients—such as salep or regional fruits—with modern techniques to craft distinctive flavors, strengthening competitiveness in local and international markets. Sustainability enhances this impact, with practices like energy-efficient production and eco-friendly packaging reducing environmental footprints while supporting economic viability (Tař and Olum, 2020). By merging local resources with innovative approaches, these efforts preserve cultural flavors while appealing to contemporary consumers, reflecting global trends and offering uniquely Turkish contributions to food innovation.

1.2. Innovative Practices in the Ice Cream Sector

The ice cream sector increasingly embraces innovative approaches, with global examples setting diverse benchmarks. In the United States, artisanal producers utilize high-quality ingredients for gourmet flavor combinations (Festa, 2017), while Spain's Ferran Adria pioneered molecular gastronomy to redefine ice cream textures (Gill, 2014). Japan integrates cultural flavors with modern techniques,

further advancing the field (Imada, 2024). In Türkiye, innovation follows a distinct trajectory, blending local ingredients with unique approaches to create a regionally rooted yet progressive identity (Gastronomy Journal, 2023).

Studies illustrate how these innovations enhance ice cream's quality and appeal. Pumpkin-based ice creams, for example, boost nutritional value and sensory profiles, preserving local tastes while meeting modern demands (Uysal İter, 2019). Similarly, barberry (*Berberis vulgaris*) from Erzincan improves nutritional and sensory properties, with research confirming its positive effects on quality metrics like viscosity and melting rate (Arslaner, Çakıroğlu, and Çakır, 2016). Molecular gastronomy techniques, such as spherification and emulsification, create novel textures and flavors, offering extraordinary taste experiences (Batu, 2019). Globally, sustainability drives innovation, as seen in Thailand's use of insect-based proteins, where consumer awareness enhances acceptance (Seeharat, Conforto, and Wannamakok, 2024). In Türkiye, artisanal efforts to integrate local ingredients and cultural values into modern processes complement these trends, contributing to the local economy while balancing tradition with innovation. This study builds on such examples, offering a unique perspective on the Turkish ice cream sector's evolving identity.

1.3. Key Concepts in Innovation Management

Innovation management is a discipline that enables organizations to effectively implement new ideas and bring innovations to market (Adams, Bessant, and Phelps, 2006). In the context of the ice cream sector, several key concepts are critical for understanding innovation processes:

- **Schumpeter's Concept of Creative Destruction:** Schumpeter viewed innovation as a driver of economic development through "creative destruction," where new ideas and methods replace outdated structures (Kitapcı, 2019). In the Turkish ice cream sector, this is evident in the coexistence of cultural icons like Maraş ice cream with innovative offerings that introduce novel flavors, such as fruit and spice combinations. These innovations broaden consumer options and intensify market competition, reshaping traditional practices (Taneo, Hadiwidjojo, Sunaryo, and Sudjatno, 2020). For example, the introduction of tahini-flavored ice cream by artisanal producers can be seen as an instance of 'creative destruction,' where a traditional ingredient is innovatively repurposed to challenge and evolve the sector's product offerings.
- **Christensen's Theory of Disruptive Innovation:** Christensen's theory highlights how innovations, starting in niche markets, can displace established players by offering simpler or more accessible alternatives (Efe, 2024). In Türkiye, boutique ice cream producers craft unique flavors with local ingredients, such as vegetable-infused varieties, challenging large-scale producers. These efforts target niche consumer groups while holding the potential to transform broader sectoral dynamics.
- **Rogers' Diffusion of Innovations Model:** Rogers outlined five stages of innovation adoption—innovators, early adopters, early majority, late majority, and laggards—providing a framework for analyzing product diffusion (Rogers, 2003). Young consumers and gastronomy

enthusiasts drawn to innovative flavors represent early Turkish ice cream sector adopters. Social media and tasting events accelerate this adoption process, enhancing the spread of new products.

- **Chesbrough's Open Innovation Concept:** Chesbrough defines open innovation as a process where businesses leverage internal and external resources to develop innovations, fostering collaboration and reducing costs (Kaynak and Maden, 2012). Turkish ice cream producers exemplify this by partnering with local farmers and suppliers to incorporate natural ingredients, such as regional herbs or fruits. These collaborations enhance product quality, support sustainable production, and contribute to the local economy.

1.4. Applicability of Innovation Management in the Turkish Ice Cream Sector

The Turkish ice cream sector offers substantial potential for preserving traditional flavors while fostering innovative products. Innovation management provides a framework to balance these dual aspects effectively. Local ingredients and unique flavors are key to differentiating Turkish ice cream. Beyond traditional elements like salep and goat milk in Marař ice cream, producers can explore natural additions such as regional fruits or herbs, creating novel offerings that stand out globally. These efforts bolster research and development, enabling the industry to reach diverse consumer groups with evolving preferences (řen, 2016).

Innovation enhances the sector's competitiveness in international markets by blending Marař ice cream's substantial brand value with creative flavors and modern presentation techniques. The rise of gastronomic tourism further positions these innovations as a draw for visitors, strengthening Türkiye's reputation as a culinary destination. Engaging consumers in product development—through social media, digital platforms, and local tasting events—boosts brand loyalty and speeds up the adoption of new offerings (Çavuş, Türkmendağ, and Göldoğan, 2018).

Sustainability is a vital pillar of this approach. Partnerships with local farmers and producers conserve natural resources and strengthen the supply chain, while eco-friendly packaging and energy-efficient processes reduce environmental impact and enhance brand reputation. These practices align Turkish ice cream with global gastronomic trends, appealing to international consumers without sacrificing cultural identity. By integrating innovation, the sector not only gains recognition but also supports local economies, ensuring long-term growth (Adanacıoğlu, Saner, and Ağır, 2018).

Building upon this theoretical groundwork, the methodology developed in this research is crafted to empirically explore these concepts within the Turkish ice cream sector. Using a case study approach, the methodology provides tangible insights into how these theories manifest in real-world practices. The upcoming section provides the details of the methodology.

METHODOLOGY

This study was designed as a qualitative research employing a case study approach to examine the concept of innovative ice cream in Türkiye and the role of artisanal ice cream producers in the sector. The case study method was selected as an appropriate approach to collect in-depth data within a specific context. The research sample was determined using a purposive sampling method. The primary criteria

for sample selection included the business's location in Istanbul, where the researchers reside, its regular development of innovative ice creams, and the uniqueness of these products within the sector. The interviews were conducted with the co-founder and chef of the business.

A semi-structured interview form was used during the data collection process. The interview form was designed in light of theoretical frameworks such as Schumpeter's concept of "creative destruction," Rogers' "diffusion of innovations" model, and Chesbrough's principles of "open innovation." The questions focused on the company's vision, product development processes, innovative approaches, material selection, and consumer strategies. The interview was conducted face-to-face in August 2024 and lasted approximately 60 minutes. Written consent was obtained from participants, and the process was conducted in line with the principle of voluntary participation.

Expert opinions were sought to ensure the validity of the data collection and analysis processes. During data analysis, a double-coding method was applied. Two researchers independently coded the interview transcripts, and the codes were compared. Any discrepancies were discussed and resolved, enhancing the reliability of the analysis process. The collected data were analyzed using thematic analysis with the NVIVO 2024 software. The analysis process included identifying codes, creating themes, and interpreting these themes in alignment with the study's objectives. Thematic analysis was selected as an appropriate method to gain a deeper understanding of the applications of the innovative ice cream concept in the sector.

FINDINGS

This study conducted an in-depth interview with the co-founder and chef of an artisanal ice cream business to explore its innovative approaches, vision, and role within the Turkish ice cream sector. The data were analyzed using thematic analysis with NVIVO 2024 software, yielding five key themes: (1) The Founder and the Company's Vision, (2) Innovative Products and Techniques, (3) Material Usage and Selection Process, (4) Consumer Responses and Strategies, and (5) Sectoral Evaluation and Future Projections. These themes were interpreted through Schumpeter's "creative destruction," Rogers' "diffusion of innovations," and Chesbrough's "open innovation" frameworks, addressing how innovation transforms Turkish ice cream culture and consumer perceptions.

- **The Founder and the Company's Vision:** The company aims to "transform traditional ice cream into a modern experience, creating a new consumption culture." This vision aligns with Schumpeter's "creative destruction," challenging conventional norms to establish innovative habits among Turkish consumers. With a decade of professional kitchen experience and academic training, the chef seeks to realize this ambition locally and globally. Initial hurdles—adapting to Turkish palates, communicating the concept, and overcoming resistance to novelty—were mitigated by the brand's modern identity, which attracted Rogers' "early adopters" via social media, driving initial acceptance.
- **Innovative Products and Techniques:** The company distinguishes itself through diverse, scientifically crafted products. Unlike traditional ice creams with a single flavored base, each

recipe accounts for ingredient properties—sugar’s effect on freezing, milk’s fat content, air incorporation, and serving temperature. Unusual ingredients like cheese, peppers, mushrooms, olive oil, and seasonal vegetables introduce umami, spicy, and salty notes, redefining ice cream beyond sweet conventions. Techniques like infusion are often applied to milk with herbs (e.g., lavender, fennel) or spices (e.g., cardamom) to enhance flavor complexity, with vanilla and salt amplifying depth and contrast. These innovations, echoing Gill’s (2014) molecular gastronomy insights, transcend traditional boundaries, aligning with Schumpeter’s framework and offering gastronomic experiences rather than mere desserts.

- **Material Usage and Selection Process:** Quality, freshness, and sustainability guide ingredient selection with organic milk, fresh fruits, and natural sweeteners from local farms. Reflecting Chesbrough’s "open innovation," these collaborations improve product quality, ensure consistency, and bolster the local economy. Rigorous quality checks reject substandard ingredients, and flawed batches are discarded, reinforcing customer trust and loyalty. Local flavors like tahini, rose petals, and chestnuts are reinterpreted with modern methods, preserving tradition while meeting contemporary demands.
- **Consumer Responses and Strategies:** Initially, the company produced a unique experimental flavor weekly, totaling 52 in the first year, but shifted to a monthly schedule to ease R&D demands. Winter planning now streamlines summer production, securing ingredients early despite occasional harvest shortfalls that require recipe adjustments. Consumers, especially young gastronomy enthusiasts, embrace these innovations, while hesitant traditionalists warm to them through tasting events. Strategies like pre-purchase sampling, social media announcements, and word-of-mouth marketing—particularly effective for experimental flavors—boost visibility and demand, aligning with Rogers’ model where early adopters pave the way, though broader acceptance remains gradual.
- **Sectoral Evaluation and Future Projections:** The interview revealed that while traditional flavors anchor Türkiye’s ice cream sector, innovative artisanal production is gaining traction. Over the past decade, professional chefs have diversified the market, improving access to high-quality, non-industrial options. Rising consumer demand for healthier, flavorful products signals further growth, supporting Schumpeter’s vision of a dynamic industry. The company aims to expand globally, promoting sustainable options like vegan and low-calorie varieties and enhancing presentations to elevate ice cream into a memorable experience.

These findings illustrate how innovation transforms the Turkish ice cream sector, aligning with the study’s theoretical frameworks of Schumpeter’s "creative destruction," Christensen’s "disruptive innovation," Rogers’ "diffusion of innovations," and Chesbrough’s "open innovation." Table 1 below summarizes the key themes, their primary findings, and their theoretical connections.

Table 1: *Summary of Findings from the Artisanal Ice Cream Case Study*

Theme	Key Findings	Theoretical Connection
1. The Founder and the Company's Vision	-Vision: Transform traditional ice cream into a modern experience, creating a new consumption culture.	-Schumpeter: Creative destruction
	-Chef's 10 years of experience and training support local and global goals.	-Rogers: Role of early adopters
	-Challenges: Adapting to Turkish palates, communication, resistance; modern identity overcame these.	
2. Innovative Products and Techniques	-Scientific production: Recipes tailored to ingredient properties (sugar, milk, air, temperature).	-Schumpeter: Pushing traditional boundaries
	-Unconventional ingredients (cheese, peppers, mushrooms, olive oil) offer umami and spicy flavors.	-Christensen: Disruptive innovation (niche markets)
	-Infusion techniques (e. g. herbs, spices in milk); vanilla and salt enhance taste	
3. Material Usage and Selection Process	-Priority on quality, freshness, sustainability; organic milk and fruits sourced locally.	-Chesbrough: Open innovation
	-Strict quality controls ensure standard; subpar ingredients rejected.	
	-Local flavors (tahini, rose, chestnuts) reinterpreted with modern techniques.	
4. Consumer Responses and Strategies	-Shift from weekly to monthly experimental flavors; R&D planned in winter	-Rogers: Early adopters and diffusion
	-Young enthusiasts positive, traditionalists convinced via tastings.	
	-Social media and word-of-mouth boost visibility.	
5. Sectoral Evaluation and Future Projections	-Tradition strong, innovation growing; professional chefs increased over 10 years.	-Schumpeter: Dynamic industry structure
	-Demand for healthy, flavorful options; plans for vegan, low-calorie varieties.	-Christensen: Disruptive innovation (market shift)
	-Goal: Global expansion and experience-focused presentations.	

Note: Findings are derived from an in-depth interview analyzed via thematic analysis with NVIVO 2024.

DISCUSSION

This study explores how innovative approaches influence the Turkish ice cream sector, balancing tradition with modernity. The findings reveal that unconventional ingredients and consumer engagement drive this transformation, addressing how traditional flavors coexist with novel products (Putra, Wangsaputri, Putri, and Sutisna, 2024). These insights, interpreted through Schumpeter's "creative destruction," Christensen's "disruptive innovation," Rogers' "diffusion of innovations," and

Chesbrough's "open innovation," illuminate the sector's evolving dynamics and its potential for sustainable growth.

Schumpeter's "creative destruction" frames the sector's shift as traditional norms give way to innovation. While Marař ice cream remains a cultural staple, ingredients like peppers, mushrooms, and olive oil challenge conventions, fostering new consumption habits. This dynamism diversifies the market and encourages consumers to embrace novel flavors, aligning with Gordillo's (2017) view of innovation as a catalyst for behavioral change.

Christensen's "disruptive innovation" explains how boutique producers disrupt established players. By targeting niche markets with experimental flavors, these small-scale operations—often leveraging local ingredients—redefine consumer expectations. Over time, their growing acceptance intensifies competition, compelling both large and small producers to adapt, as Taneo, Noya, Setiyati, and Melany (2019) suggest.

Rogers' "diffusion of innovations" underscores the role of young consumers and gastronomy enthusiasts as early adopters. Their enthusiasm, amplified by social media and tasting events, accelerates the spread of innovative flavors, quickly reaching wider audiences. This aligns with Ahamad, Sham, Ali, Afnan, Nunna, and Prasad's (2022) findings on digital strategies enhancing adoption rates, though broader acceptance among traditional consumers remains gradual.

Chesbrough's "open innovation" highlights collaborations with local suppliers, ensuring high-quality, sustainable ingredients like fresh fruits and organic milk. These partnerships enhance flavor profiles, support local economies, and build resilient supply chains, offering a competitive edge, as Dabic, Hjortso, Marzi, and Vlacic (2022) note.

To sustain this momentum, strategic actions are essential. Protecting intellectual property through patents prevents imitation while optimizing production to reduce waste, and adopting eco-friendly methods ensures environmental responsibility. Increased R&D investment—such as experimenting with vegan or low-calorie options—can further boost competitiveness (Setigadi, 2024). These steps support long-term growth, positioning Turkish ice cream as a global contender without losing its cultural roots.

In conclusion, blending tradition with innovation offers the Turkish ice cream sector a dual advantage: preserving heritage while gaining ground in local and global markets. This study's strategic recommendations—rooted in sustainable and creative practices—contribute to academic literature and industry development, paving the way for a dynamic future.

CONCLUSION

This study underscores the Turkish ice cream sector's capacity to blend traditional flavors with innovative approaches, driving local and global growth. Findings show that boutique producers transform the industry through unconventional flavors—like spicy or umami notes—and advanced techniques, echoing Schumpeter's "creative destruction" and Christensen's "disruptive innovation." Sustainable growth hinges on boosting R&D investments, safeguarding intellectual property, and adopting eco-friendly production, as supported by Chesbrough's "open innovation." Strengthening local collaborations and leveraging Rogers' "diffusion of innovations" through effective marketing further enhance competitiveness. By balancing heritage with innovation, the sector can secure a robust position in the global market.

Recommendations

1. **Boost R&D Investments:** Expand research into innovative flavors and techniques like molecular gastronomy to foster Schumpeter's creative transformation.
2. **Protect Intellectual Property:** Strengthen patent and trademark processes to shield unique products from imitation, supporting Christensen's disruptive edge.
3. **Adopt Sustainable Practices:** Use eco-friendly packaging and reduce waste, aligning with Chesbrough's sustainable collaboration principles.
4. **Enhance Local Collaborations:** Partner with local producers for high-quality ingredients, reinforcing open innovation and supply chain resilience.
5. **Leverage Digital Marketing:** Utilize social media to accelerate Rogers' diffusion process, targeting early adopters and broader audiences.
6. **Promote Experience-Based Offerings:** Host tasting events to create memorable consumer experiences, enhancing product appeal.
7. **Target Diverse Segments:** Develop vegan, gluten-free, and low-calorie options to meet varied consumer needs and expand market reach.
8. **Create Seasonal Products:** Offer limited-edition flavors with local, seasonal ingredients to spark interest and demand.
9. **Train Producers:** Provide workshops on innovation and sustainability, building capacity for industry-wide growth.
10. **Optimize Energy Use:** Integrate renewable energy into production, minimizing environmental impact and costs.

Declaration

The authors contributed equally to this study. They collaborated on all stages of the study, including its design, data collection, analysis, drafting of the manuscript, and final review. Both authors approved the final version of the study and contributed to its publication.

As authors, we declare no conflict of interest in this study. The work has been conducted independently, without personal or financial conflicts of interest. No financial or personal relationships with any institution, organization, or individual have influenced the research's design, data collection, analysis, or interpretation.

This study was approved by the Ethics Committee of Dogus University (Approval Number: 2024/121, Date: 22.08.2024). Written consent was obtained from all participants, and the study was conducted using the principles of voluntary participation.

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