



Natinombur Gastronomy: Cultural Meaning, Nutritional Composition, and Culinary Tourism Potential in Samosir

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ABSTRACTS

Natinombur is a traditional Batak Toba dish consisting of grilled tilapia served with a distinctive spiced sauce featuring andaliman and rias. This study aims to explore the cultural meaning, nutritional composition, and culinary tourism potential of Natinombur in Samosir Regency. Using a qualitative, ethnographic approach, data were collected through in-depth interviews with six informants, comprising traditional community leaders, small- and medium-sized enterprise (SME) practitioners, and tourists. Natinombur embodies the Batak community's resilience and creativity in overcoming hardship. The ability to transform minimally available ingredients into a nutritious and flavorful dish reflects a culinary intelligence passed down through generations. Serving the dish in a large communal tray symbolizes equality—there is no hierarchy at the dining table when sharing Natinombur. The dish originated during the colonial era as a practical, nutrient-dense meal prepared with natural ingredients and no added oil, requiring only a short preparation time; every part of the dish can be consumed. This demonstrates that Natinombur is fundamentally a zero-waste dish. Per 100 grams of serving, Natinombur contains 203 kcal of energy, 23.76 g of protein, 9.05 g of fat, and 7.26 g of carbohydrates. The dish is also rich in omega-3 fatty acids, antioxidants, and natural bioactive compounds that promote health. From a gastronomic perspective, the combination of savory and spicy flavors with the distinctive numbing sensation of andaliman creates an exclusive culinary experience. Despite its great potential as a flagship attraction for Samosir tourism, the preservation of Natinombur is currently threatened by global food trends, instability in raw material prices, and a lack of interest among young people. Going forward, the sustainability of this culinary heritage requires close collaboration between traditional leaders, SME entrepreneurs, and local government, supported by vigorous digital promotion.

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1. INTRODUCTION

Indonesia is a country with extraordinary culinary diversity, where each ethnic group possesses cooking traditions that reflect its history, ecology, and social values (Prastowo et al., 2023; Wijaya, 2019). Among the diverse culinary heritage of the Indonesian archipelago, the cuisine of the Batak Toba people from North Sumatra is renowned for its bold and distinctive flavor profile, owing primarily to the use of andaliman (*Zanthoxylum acanthopodium*) as the primary spice, which is not found in the culinary traditions of other ethnic groups (Adrian et al., 2023; Saragih & Raihandhany, 2023). One dish that forms part of the Batak culinary heritage is Natinombur—grilled tilapia (Mozambique tilapia) served with a traditional spice-based sauce. Natinombur is more than an ordinary culinary dish; it is also traditionally served at Thanksgiving ceremonies, where parents feed their children as a prayer for lifelong success, health, and prosperity (Sihombing, 2023). According to the traditional leaders interviewed in this study, the dish originated during the colonial era when access to food was severely limited. The community's ability to transform fish heads parts typically discarded into a flavorful, nutritious meal reflects local ingenuity worthy of appreciation. Every part of the fish, including the bones, is charred until crispy like crackers, and is consumed communally from a large tray, making Natinombur a symbol of togetherness and the spirit of cooperation characteristic of the Batak people.

Tilapia is a high-quality protein source that provides a complete profile of essential amino acids and omega-3 fatty acids, which support cardiovascular health and brain function (Islam et al., 2021). The charcoal-grilling process without added oil renders Natinombur relatively low in fat, making it a potentially healthier dietary option compared to fried foods. Furthermore, the use of andaliman as the primary spice provides significant functional value, as it contains bioactive compounds such as alkaloids and terpenoids with demonstrated antimicrobial and antioxidant activity (Adrian et al., 2023). From a gastronomic perspective, Natinombur represents a harmonious fusion of traditional cooking techniques with local wisdom in ingredient selection. Gastronomy is not merely about taste; it also encompasses the social, cultural, and historical context behind a dish (Bessi ere, 2013). It is within this context that the study of Natinombur becomes important not only to document its nutritional value and processing techniques, but also to understand its socio-cultural role within contemporary Batak society.

Globalization and modernization pose real challenges to the sustainability of traditional cuisine. Younger generations increasingly exposed to global cuisine food culture tend to shift toward more accessible instant and modern foods (Almerico, 2014). This phenomenon also affects Natinombur, as the availability of key ingredients such as andaliman becomes increasingly limited and their prices remain volatile, while young people's interest in learning the traditional cooking techniques continues to decline. Based on this background, this study aims to: (1) explore the history and socio-cultural meaning of Natinombur; (2) identify the ingredient composition and nutritional value of Natinombur; and (3) assess the potential of Natinombur as a culinary tourism attraction in Samosir.

2. METHODS

2.1. Research design

This study employed a qualitative approach using a culinary ethnographic method, positioning the researchers as the primary instruments for holistically collecting, analyzing, and interpreting data (Creswell & Poth, 2016). This approach was selected because the

research focuses on a deep understanding of the meaning, cultural values, and culinary practices of Natinombur, which cannot be reduced to mere numbers or statistics.

2.2. Research location and time

The study was conducted in Samosir Regency, North Sumatra—a region recognized as the center of Batak Toba culture and a Lake Toba tourist destination. This location was selected purposively because it is the place of origin of Natinombur, and traditional eateries serving the dish authentically still operate there. Data collection was carried out from January to March 2026.

2.3. Research informants

Informants were selected using purposive sampling, choosing individuals with in-depth knowledge of and direct experience with Natinombur. A total of six informants participated, comprising two traditional community leaders, two Batak culinary SME practitioners, and two tourists who had consumed Natinombur in Samosir. The complete informant profiles are presented in Table 1 below.

Table 1. Informant profile.

Informant	Age	Experience
Traditional Leader	90 years old	Traditional leader since the age of 18
	63 years old	Traditional leader since marriage in 1990
SME Practitioner	30 years old	Worked for 7 years at RM Pelayaran 1 and 4 years at RM Pelayaran 2, Panguruan
	45 years old	Worked for 15 years at RM Hasian 1, Pekanbaru, and 2 years at RM Hasian 2, Samosir
Tourist	23 years old	Has traveled frequently and consumed Natinombur in Samosir
	18 years old	Has traveled frequently to Samosir with family and consumed Natinombur on several occasions

2.4. Data collection techniques

Data collection employed three primary techniques. First, in-depth interviews (*in-depth interview*) guided by a semi-structured interview protocol covering aspects of history, cultural meaning, processing techniques, nutritional value, preservation challenges, and tourism potential. Second, participant observation at traditional Batak eateries to directly observe the Natinombur preparation process. Third, documentation through field notes and photographs throughout the research process. All interviews were conducted in Indonesian and lasted between 45 and 90 minutes per informant.

2.5. Data analysis

Data were analyzed using thematic analysis following the stages of verbatim transcription, open coding, axial coding, and selective coding to identify key themes emerging from the data (Braun & Clarke, 2006). Data validity was ensured through source triangulation (comparing responses across informants from different groups), method triangulation (comparing interview results with observations), and member checking (returning findings to informants for confirmation).

3. RESULTS

3.1. Historical significance and social culture of Natinombur

3.1.1. History of Natinombur

Natinombur is a side dish originating from the Batak Toba region. Interviews with community leaders revealed that Natinombur emerged during the colonial era, when the Batak community faced severe limitations in food access. During that period, fish heads and other parts that were typically discarded were prepared using a simple, direct-grilling technique without oil. The spices used were foraged wild herbs growing around settlements, including andaliman, local small tomatoes (*tomat randat*), rias, and candlenut. The name “Natinombur” originates from a Batak Toba language term for a dish in which every part is edible, from the flesh to the charred, crispy fish bones (Wahyuni et al., 2022). Traditional leaders corroborated this by explaining that the zero-waste concept in Natinombur reflects the Batak philosophy of not wasting resources, especially during difficult times (Abror et al., 2024; Almerico, 2014). The dish is served in a large tray and shared among all family members, sometimes up to 15 people at once. The practice of eating together from a single tray symbolizes strong family bonds, where harmony is maintained even in conditions of poverty. By the 1970s, Natinombur was already considered a luxurious and delicious meal, given that food variety was still very limited.

3.1.2. Social culture of Natinombur

Culturally, Natinombur does not belong to the category of Batak ritual foods that follow strict portioning rules (*jambar*), such as goldfish *arsik*, pork *saksang*, Manuk Napinadar, or Lappet. Nevertheless, it occupies a strong cultural position as a home-cooked dish that reflects Batak social values, particularly the principle of togetherness (*dalihan na tolu*) and respect for available natural resources. Traditional leader L. S. emphasized that Natinombur symbolizes the Batak community's resilience and creativity in the face of hardship. The ability to transform minimally available ingredients into a nutritious and flavorful dish reflects a culinary intelligence passed down through generations. Serving the dish communally in a large tray symbolizes equality—there is no hierarchy at the dining table when sharing Natinombur. Fish is regarded as a symbol of purity and prosperity, while sambal tombur represents warmth and the value of family togetherness. The dish is frequently used to express respect, gratitude, and solidarity in various Batak traditional ceremonies (Tampubolon & Saleh, 2025). Although Natinombur lacks a specific ritual meaning, it serves as a medium for preserving ethnic identity. M. N. stated that Natinombur's unique flavor and processing techniques serve as markers of Batak ethnic identity, distinguishing it from the cuisines of other ethnic groups in Indonesia. In the context of the diaspora, Natinombur even becomes a marker of homesickness—evidenced by customers of RM Hasian traveling from the United States solely to experience the authentic taste of Natinombur once again.

3.2. Nutritional composition

3.2.1. Ingredients and processing techniques

Based on information obtained from two culinary SME practitioners, specifically R. S. from RM Pelayaran 2 and J. S. from RM Hasian, Natinombur has a relatively consistent spice composition, although minor variations exist among practitioners. In general, the main

ingredient is fresh tilapia—ideally sourced from the lake rather than from fish cages—and it is grilled over charcoal. The details of the spices and their functions are presented in Table 2.

Table 2. Natinombur spice composition and functions.

Ingredient	Amount	Function in the Dish
Nile Tilapia (<i>Oreochromis niloticus</i>)	1 kg	Main ingredient to be combined with the spice blend
Andaliman (<i>Zanthoxylum acanthopodium</i>)	50 g	Gives a bitter taste, a distinctive 'numb' sensation on the tongue, a fresh aroma
Rias stem (<i>Nicolaia speciosa</i>)	2 medium stalks	Natural fragrance; imparts a distinctive Batak herbal flavor
Kemiri (<i>Aleurites moluccanus</i>)	7 pieces	Thickens the sauce; adds savory depth and natural fat
Local small tomatoes (<i>tomat randat</i>) or regular tomatoes	70 g or 2 large pcs	Source of fresh acidity; balances the overall flavor
Bird's eye chili and red chili	100 g and 20 g	Provides spiciness
Shallots and garlic	5 pcs and 4 pcs	Base spice; enhances aroma
Lime / asam unte sira	2 medium pcs	Used for marinating the fish; eliminates fishy odor; refreshes the flavor
Peanuts	50 g	Adds texture and depth of flavor to the sauce
Salt	1–2 tsp	Balances and enhances the overall flavor

The traditional preparation of Natinombur involves several stages. The tilapia is first cleaned, scaled, and butterflied, then marinated with lime juice and salt for approximately 10 minutes. This marination process helps reduce the fishy odor while also tenderizing the fish meat. The fish is then grilled over charcoal until fully cooked. For the spice sauce, all ingredients except andaliman are dry-roasted first, then coarsely ground using a hand grinder or blender. Andaliman is added last to preserve its fresh aroma and numbing sensation, which can dissipate under excessive heat. According to SME Practitioner R. S. acknowledged making a small adaptation by using a blender to grind the spices. This change does not significantly alter the taste but speeds up the preparation process. Meanwhile, J. S. from RM Hasian affirmed that he has made no changes whatsoever to the traditional recipe or technique, as the authenticity of the flavor is the primary attraction that keeps his customers—including the Batak diaspora living abroad—coming back.

3.3. Social culture of Natinombur



Figure 1. Natinombur Dish

From a nutritional standpoint, Natinombur has an excellent nutrient profile. Nile Tilapia (*Oreochromis niloticus*) is a high-quality animal protein source with a protein content of 18–20 g per 100 g of fish meat, and it contains a complete profile of essential amino acids, including lysine, methionine, and tryptophan (Furuya et al., 2023; Islam et al., 2021). The oil-free grilling process preserves the unsaturated fatty acid content, particularly omega-3 fatty acids (EPA and DHA), which play a critical role in cognitive function and heart health. The use of andaliman spice (*Zanthoxylum acanthopodium*) provides significant functional added value. Andaliman is known to contain active compounds, including alkaloids, flavonoids, and terpenoids, with antimicrobial, antioxidant, and anti-inflammatory activities (Adrian et al., 2023). The hydroxy- α -sanshool compound in andaliman is responsible for the characteristic bitter or 'numb' sensation on the tongue, which is a neurosensory response from transient receptor activation in the oral mucosa (Wijaya et al., 2019). Other nutritional components contributing to the nutrient value of Natinombur include candlenut, which is rich in healthy fats and vitamin E, and tomatoes, which serve as a source of lycopene and vitamin C. Rias or torch ginger (*Nicolaia speciosa*), used as a natural fragrance, also contains polyphenolic compounds that function as natural antioxidants (Ali et al., 2020; Bogoriani et al., 2022; Hakim et al., 2022). Overall, Natinombur can be classified as a traditional food with high nutrient density, with great potential to be developed as a functional food.

Table 3. Nutritional content of Natinombur.

Ingredient	Weight (g)	URT	Energi (kcal)	Protein (g)	Lemak (g)	Karbohidrat (g)
Nile Tilapia	1000	1 large fish	960.00	200.80	17.00	0.00
Andaliman	50	5 tbsp	49.50	2.30	0.50	9.00
Torch ginger stem	150	2 medium stalks	51.00	1.35	1.50	10.05
Candlenut	70	7 pcs	472.50	13.30	44.10	5.60
Local small tomato	70	7 pcs	1.50	0.06	0.00	0.24
Bird's eye chili	100	40 pcs	120.00	4.70	2.40	19.90
Red chili	20	5 pcs	7.20	0.20	0.06	1.46
Shallot	40	5 pcs	18.40	0.60	0.12	3.68
Garlic	20	4 pcs	22.40	0.90	0.04	4.62
Lime	100	2 medium pcs	44.00	0.50	0.20	10.00
Peanuts	50	½ cup	283.50	12.90	24.62	8.06
Total			2030	237,61	90,54	72,61
Total per serving	100		203	23,76	9,05	72,6

Based on Table 3, the total nutritional content of Natinombur per serving is 203 kcal of energy, with macronutrient composition dominated by 23.76 g of protein, 9.05 g of fat, and 7.26 g of carbohydrates. The high protein content of this dish is primarily attributable to tilapia, the main ingredient, which is a high-quality animal protein source with a complete essential amino acid profile (Furuya et al., 2023). This high protein content plays an important role in supporting the body's physiological functions, including tissue repair, enzyme and hormone synthesis, and immune system maintenance. Moreover, the combination with other ingredients, such as peanuts, contributes plant-based protein that complements the amino acid profile, thereby improving overall protein quality. On the other hand, the relatively high fat content in Natinombur is largely derived from candlenut and peanuts, which contain

unsaturated fats beneficial to health. Carbohydrate content is relatively lower than that of protein and fat, giving this dish the characteristics of a high-protein, high-fat dish. Given this composition, Natinombur has the potential to serve as a good protein source in the community's dietary patterns, particularly in supporting daily protein requirements and improving nutritional status.

3.4. Culinary tourism potential of Natinombur

3.4.1. Tourist perceptions of Natinombur

Both tourists who participated in this study gave highly positive evaluations of Natinombur, as presented in the following table.

Table 4. Tourist perceptions of Natinombur.

Evaluation Aspect	Tourist Evaluation	Description
Taste	Excellent	Unique flavor from andaliman; refreshing numbing sensation on the tongue
Aroma	Very appealing	Distinctive aromatic spice fragrance that whets the appetite
Fish Texture	Good	Tender flesh; head and tail crispy like crackers
Andaliman Spice	Liked	Distinctive aroma and sensation not found elsewhere
Tourism Potential	Strongly agree	Worthy of being a culinary tourism attraction in Samosir
Recommendation to Others	Yes	All tourists are willing to recommend
Intention to Revisit	Yes	All tourists are interested in trying it again

Both tourists agreed that the sensation of andaliman's taste, which gives a unique 'numb' or bitter effect on the tongue, is a culinary experience that cannot be found anywhere else. Tourist A. P. specifically emphasized that Natinombur's flavor is found only in Samosir, making it an exclusive attraction that encourages repeat visits. Both expressed their willingness to recommend Natinombur to others and intend to try it again on future visits to Samosir.

3.4.2. Traditional leaders' perceptions of Natinombur

Based on the interview findings, traditional leader L. Sinaga views Natinombur as more than a simple meal; it is a reminder of the Batak people's historical resilience during the colonial era, when food was prepared hastily with minimal resources and without oil. He explained that the dish was placed on a large communal tray with sweet potato, making it a powerful symbol of family unity amidst hardship. In the same vein, traditional leader Mangiring Naibaho added that Natinombur embodies a zero-waste food philosophy, where every part of the fish can be consumed, and even the remaining bones are re-grilled until crispy like crackers. Both affirmed that Natinombur is fundamentally not a formal ritual dish governed by portioning rules (jambar) like pork or goldfish arsik, but rather a home-cooked dish that has become a cultural identity marker (Hadawiyah et al., 2025). Facing the declining interest of younger generations who are increasingly drawn to instant foods, Mangiring Naibaho recommended concrete steps such as organizing traditional cooking competitions, documenting authentic recipes in published books, and featuring Natinombur at various festivals, given that traditional Batak Toba food is increasingly being abandoned by younger generations who prefer modern foods (Nurhasanah, 2024). Meanwhile, L. Sinaga strongly

emphasized once again the importance of parents habituating their children to cook this richly spiced dish at home, so that children do not forget their ancestral heritage, in line with the ongoing dialectic between preserving culinary traditions and the pressures of modernization facing the Batak Toba community.

3.4.3. SME practitioners' perceptions of Natinombur

Meanwhile, the SME practitioners who deal directly with the market—namely R. Sitanggang (RM Pelayaran 2) and J. Silaban (RM Hasian 2)—encountered more practical challenges. R. Sitanggang felt the intense competition from contemporary foods that are far cheaper, such as fried chicken (*ayam penyet*). At the same time, both noted the same difficulties with the availability and price volatility of key raw materials—a common challenge for traditional culinary SMEs in the modern era. The price of andaliman, which at its peak surged to IDR 500,000–600,000 per kilogram, posed a major obstacle to maintaining both the price and portion quality of their dishes. In responding to these challenges and the changing times, the two practitioners adopted different strategies. R. Sitanggang chose to adapt slightly by using a blender to grind the spices for greater efficiency, and suggested presentation innovations in which the fish and sauce are served separately to be more appealing to modern consumers. In contrast, J. Silaban insists on grinding the spices manually with a traditional hand grinder to preserve the flavor's authenticity, exactly as in the ancestral recipe, because he believes the andaliman sensation is the irreplaceable primary attraction—reflecting the dialectic between tradition and innovation in the preservation of Batak Toba cuisine. To expand its market reach, J. Silaban has successfully leveraged the digital era by live-streaming cooking on TikTok. This strategy has proven effective in increasing culinary product visibility and attracting new consumers (Widodo et al., 2024). This self-driven promotional strategy has successfully generated curiosity among young people and attracted tourists from other regions, including Indonesian diaspora members from the United States who long for the authentic taste of Batak cuisine.

4. DISCUSSION

4.1. Natinombur from a gastronomic perspective

Gastronomy, as the science that studies the relationship between humans and food, encompasses not only the sensory and technical aspects of cooking, but also the social, cultural, and historical dimensions of a dish (Bessi re, 2013). Within this framework, Natinombur is a perfect example of how a dish can reflect the socio-historical conditions of the community that produced it. The oil-free fish-grilling technique that characterizes Natinombur is consistent with research across various cultures, demonstrating that traditional communities tend to develop energy-efficient cooking methods that utilize locally available resources (Almerico, 2014). The use of charcoal as a heating medium imparts a smoky aroma (*smoky flavor*) that is highly valued in contemporary gastronomy and has even become a trend in global fine dining cuisine (Piochi et al., 2023; Vazquez et al., 2025).

The spice components of Natinombur demonstrate a high degree of culinary intelligence. Andaliman is not merely a flavor agent—it functions as a sensory agent that creates a multidimensional eating experience by activating trigeminal receptors. The compound hydroxy- α -sanshool in andaliman simultaneously activates TRPV1 and TRPA1 receptors, producing a distinctive sensation that is simultaneously astringent, tingling, and refreshing, making this spice an irreplaceable gastronomic experience (Koo et al., 2007). This is what

makes Natinombur a truly unique and irreplaceable gastronomic experience. The 'zero waste' principle in serving Natinombur, where even the fish bones are utilized by grilling them until crispy, reflects an approach that is now very relevant to the principle of sustainability in modern gastronomy. This concept aligns with the 'nose-to-tail' movement in contemporary cuisine, which emphasizes the use of all parts of food ingredients to address the global problem of food waste (Martin-Rios et al., 2022; Pinto et al., 2022).

4.2. Nutritional value in the context of functional food

Natinombur has great potential to be developed as a functional food—that is, a food that not only meets basic nutritional requirements but also provides additional health benefits beyond conventional nutritional function (Fekete et al., 2025; Temple, 2022). Consistent with this concept, Natinombur can be categorized as a functional food because it contains various components that contribute to health. Examining its serving profile, every 100 grams of Natinombur provides 203 kcal of energy, supported by a dense macronutrient composition of 23.86 grams of protein, 9.05 grams of fat, and 7.26 grams of carbohydrates. This high-protein ratio reinforces Natinombur's status as an excellent muscle-building side dish. Beyond macronutrient fulfillment, omega-3 fatty acids from tilapia, bioactive compounds from andaliman, and antioxidants from supplementary ingredients such as tomatoes and other spices contribute to beneficial physiological effects on health (Asbur & Khairunnisyah, 2018).

Consistent with this concept, Natinombur can be categorized as a functional food because it contains various components that contribute to health (Ma et al., 2025). The omega-3 fatty acid content from tilapia and the bioactive compounds from andaliman, along with antioxidants from supplementary ingredients such as tomatoes and other spices, contribute to beneficial physiological effects on health. The combination of these ingredients forms a synergistic nutritional matrix in supporting overall bodily health. Notably, the charcoal-grilling process used in Natinombur is nutritionally superior to frying. Grilling has been shown to better preserve unsaturated fatty acid content compared to frying, while also reducing the formation of harmful trans-fat compounds (Suryati et al., 2022; Tan et al., 2023). The lower caloric content, due to the absence of cooking oil, makes Natinombur a more suitable choice for individuals who are mindful of their total fat intake. Connecting this with the account of traditional leader L. S., who noted that people in the past who regularly consumed Natinombur enjoyed good health and long lives, this is consistent with epidemiological evidence on the benefits of fish-based diets in reducing the risk of cardiovascular disease, type 2 diabetes, and other degenerative diseases (Jayedi et al., 2021; Jiang et al., 2021; Ricci et al., 2023). Although further clinical studies are required to confirm these claims, this tendency indicates the potential of Natinombur as a healthy dietary component worthy of deeper investigation.

4.3. Preservation challenges in the era of globalization

The findings of this study confirm a globally documented trend in the literature: that traditional foods face serious threats from food globalization. The homogenization of food culture, driven by the expansion of the fast-food industry and changes in urban lifestyles, has eroded local culinary diversity worldwide (Almerico, 2014). In Samosir, this phenomenon is evident in the declining interest of younger generations in Natinombur and the growing preference for modern foods perceived as more 'trendy'. The challenge of raw material availability—particularly for andaliman—represents a structural issue that requires serious attention. The price of andaliman, which at its peak reached IDR 500,000–600,000 per kilogram, poses a dilemma for SME practitioners: maintaining flavor authenticity while

reducing production costs. This situation is compounded by the fact that andaliman grows only in specific areas of North Sumatra and has yet to be successfully cultivated on a large scale (Nurlaeni et al., 2024). This extreme price instability threatens the long-term sustainability of Natinombur culinary businesses. The low involvement of younger generations in preserving Natinombur also poses a challenge that requires systematic solutions. Unlike in the past, when culinary knowledge was directly transmitted within family units, changes in social structure and high population mobility have made intergenerational knowledge transfer increasingly difficult (Bessièrè, 2013). Young people who grow up in urban settings often lack sufficient experience or exposure to the traditional cuisine of their ancestral homeland.

4.4. Culinary tourism potential and development strategy

Culinary tourism has grown into one of the most dynamic segments of the global tourism industry. Tourists are no longer simply looking for a place to eat; they seek authentic and memorable gastronomic experiences as an integral part of their journey (Kovalenko et al., 2023; Moura et al., 2025). In this context, Natinombur possesses all the attributes required to become a strong culinary tourism attraction in Samosir: uniqueness of flavor, cultural authenticity, historical significance, and geographical exclusivity. The tourist experiences documented in this study demonstrate that Natinombur can create a deep impression and foster revisit intentions—a key indicator of successful culinary tourism (Bessièrè, 2013). The word of mouth effect generated by tourist satisfaction, which is then amplified by social media platforms such as TikTok and Instagram, forms an organic and effective promotional ecosystem. RM Hasian's strategy of live-streaming cooking sessions on TikTok is a successful example of how traditional culinary SME practitioners and local governments can leverage digital technology to reach a wider market. Collaboration among traditional leaders as guardians of authenticity, SME practitioners as economic drivers, and the government as a policy facilitator represents a culinary tourism governance model that has proven effective across various gastronomic tourism destinations worldwide (Dordai et al., 2026; Giampiccoli & Mnguni, 2022). Culinary festivals, traditional cooking competitions, and culinary education programs that engage younger generations can serve as effective tools to both preserve and promote Natinombur to a wider audience.

5. CONCLUSION

Natinombur is a Batak Toba culinary heritage with significant gastronomic, nutritional, cultural, and tourism value. The dish was born of the Batak community's local ingenuity in responding to food scarcity during the colonial era and has since evolved into a distinctive symbol of identity and togetherness. From a nutritional perspective, Natinombur holds great potential to be developed as a functional food. Each 100-gram serving is rich in essential nutrients, providing 203 kcal of energy, 23.76 g of protein, 9.05 g of fat, and 7.26 g of carbohydrates, making it a potentially excellent protein source for the body. Beyond macronutrient fulfillment, the omega-3 fatty acid content from tilapia and the bioactive compounds from andaliman, along with antioxidants and antimicrobial agents from the accompanying spices, contribute to beneficial physiological effects on health. From a gastronomic standpoint, Natinombur's distinctive flavor profile — particularly the numbing sensation of andaliman — renders it an exclusive culinary experience that cannot be replicated elsewhere, and constitutes a compelling tourism attraction in Samosir. Nevertheless, the primary challenges in preserving Natinombur include the influence of food

globalization, the scarcity and price volatility of raw materials, and declining youth engagement. Synergistic collaboration among tradition guardians, business practitioners, and the government, complemented by the optimization of digital technology, remains the critical key to expanding reach and sustaining this remarkable dish.

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