



## Kotjok Beer Innovation in Making Choux Au Craquelin

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### ABSTRACTS

Kotjok beer is a typical Bogor drink made from spices such as ginger, cinnamon, cardamom, cloves, secang wood and brown sugar. Kotjok beer has benefits such as improving blood circulation, getting rid of body aches and soothes the throat. But as time went by, Kotjok Beer was replaced by other drinks. Therefore, so that Kotjok Beer can be useful for the Indonesian people, the author wants to experiment with Choux Au Craquelin using Kotjok Beer as an ingredient. In this research, the use of Kotjok Beer as a base ingredient aims to determine the effect of using Kotjok Beer on the taste and public acceptance of Choux Au Craquelin made from Kotjok Beer. This research was conducted to analyze the level of liking (taste, aroma, texture and color) of Choux Craquelin through organoleptic tests. This research used an experimental type of research with 3 treatments for Kotjok Beer, namely control 100% Fresh Milk (P1), 50% Fresh Milk and 50% Kotjok Beer (P2), and 100% Kotjok Beer (P3). The research subjects were 30 non-expert panelists and 5 expert panelists using the questionnaire method. The results of this research show that the best formulation of the Choux Au Craquelin product with the basic ingredients of Kotjok Beer which is preferred by Expert Panelists and Non-Expert Panellists is the P3 (100%) Kotjok Beer formulation with results obtained from 4 aspects: color value is 3, The aroma value is 3, the texture value is 2.8, and the taste value is 3, with a total score of 12 with an average of 3 which is included in the Like category.

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## 1. INTRODUCTION

In recent years, globalization has accelerated the homogenization of food cultures, leading to the marginalization of traditional foods and beverages, which are key carriers of local heritage and identity (Mhlongo & Botha, 2023; Tan et al., 2021; Khamdamova et al., 2022). Traditional drinks like Bir Kotjok, rich in cultural significance and health-promoting properties, face declining visibility amid the dominance of industrial beverages. This situation underscores the urgency to innovate traditional culinary elements within modern food contexts to ensure their sustainability and relevance. The central problem addressed in this research is the diminishing role of traditional beverages such as Bir Kotjok and the challenge of revitalizing them through creative integration into contemporary pastry products like Choux Au Craquelin, thus preserving cultural diversity while responding to modern consumer preferences. In response to these challenges, the integration of traditional ingredients into innovative food products has gained attention as an effective strategy to bridge heritage preservation with contemporary culinary trends. Several studies highlight that consumers increasingly seek authenticity and novel experiences in their food choices, suggesting a favorable market for products that successfully combine traditional flavors with modern formats (Giacalone et al., 2023; Bianchi & Mortimer, 2021; Varela & Ares, 2020). Therefore, positioning traditional drinks like Bir Kotjok within globally popular pastries such as Choux Au Craquelin not only revitalizes the drink's cultural relevance but also taps into evolving consumer demands for unique, meaningful culinary experiences. This strategic fusion supports both the survival of traditional foods and the diversification of contemporary gastronomic offerings.

Prior research has explored the incorporation of traditional herbal drinks and functional ingredients into modern bakery products, highlighting their potential to enhance nutritional value and sensory appeal (Liu et al., 2021; Ahmad et al., 2022; Mahmud et al., 2024). Liu et al. (2021) demonstrated that herbal extracts could improve the antioxidant properties of bread without compromising taste. Similarly, Ahmad et al. (2022) found that desserts infused with spiced herbal drinks achieved higher consumer acceptance due to their unique flavours profiles. Mahmud et al. (2024) showed that incorporating indigenous beverages into baked goods could simultaneously elevate product uniqueness and marketability. Although these studies reveal the advantages of using traditional ingredients in modern foods, none specifically examine rare beverages like Bir Kotjok or their application in French-inspired pastries, thus leaving a distinct cultural and culinary opportunity unexplored. Furthermore, the majority of previous research has focused primarily on more globally recognized traditional ingredients, such as matcha, hibiscus, or rooibos, often overlooking lesser-known regional beverages with rich cultural backgrounds like Bir Kotjok. Recent studies have emphasized the importance of diversifying the types of traditional ingredients introduced into modern food systems to promote a broader representation of global food heritage (Gomez et al., 2023; de la Rosa et al., 2022; Youssef et al., 2021). Exploring unique and underrepresented traditional beverages not only enriches culinary innovation but also supports the sustainability and visibility of local food cultures in an increasingly globalized gastronomic landscape. This highlights a critical need for research initiatives that prioritize the integration of rare, culturally significant beverages into contemporary products such as Choux Au Craquelin.

Despite the promising findings of previous studies, several research gaps persist. Most notably, there is limited exploration of how rare regional beverages like Bir Kotjok can be integrated into international patisserie products (Rahman et al., 2023; Chen et al., 2022; Zhao

et al., 2021). Prior research tends to focus on more globally recognized herbal drinks or tea-based infusions, neglecting local specialties that carry rich cultural narratives. Furthermore, few studies investigate the impact of traditional spice compositions on the structural, sensory, and visual properties of choux pastries. Therefore, this study aims to fill these gaps by innovating Choux Au Craquelin using Bir Kotjok, with the goal of preserving traditional flavours while enhancing the pastry's functional and sensory characteristics for modern culinary markets. Moreover, the intersection between traditional beverage utilization and high-end pastry innovation remains underexplored, particularly regarding how complex spice blends interact with the delicate textures and flavor balances required in fine patisserie (Martínez-Villaluenga et al., 2022; Pereira et al., 2023; Kalla-Bertholdt et al., 2021). Research focusing on ingredient functionality has shown that bioactive compounds from traditional spices can influence dough rheology, moisture retention, and browning reactions factors critical to the sensory quality of pastries. However, systematic investigations addressing how these traditional formulations impact choux paste specifically are scarce. Addressing this knowledge gap through the incorporation of Bir Kotjok into Choux Au Craquelin could yield valuable insights for both culinary science and the preservation of regional gastronomic traditions within contemporary dessert innovation.

## 2. LITERATURE REVIEW

### 2.1. Understanding Innovation

Innovation, derived from the Latin word "innovo", meaning to renew or change, is commonly defined as the introduction of new ideas, methods, or products that result in improvement (Drucker, 2021; Crossan & Apaydin, 2020). It involves the transformation of inputs into outputs in ways that provide tangible social and economic benefits. Albury and Mulgan (as cited in Hartley, 2021) emphasized that an innovation is considered successful when it leads to significant improvements in the effectiveness, efficiency, or quality of products, services, or processes.

### 2.2 Innovation Goals

The objectives of innovation broadly encompass enhancing efficiency, improving product quality, increasing customer satisfaction, and fostering competitive advantage (Tidd & Bessant, 2021; Baregheh et al., 2020). Effective innovation aims to save time, boost productivity, accelerate organizational and individual learning, and ultimately improve quality of life. Moreover, sustainable innovation enables businesses to remain resilient and competitive in rapidly evolving markets, contributing to long-term success and social well-being (Dodgson et al., 2020; Christensen et al., 2022).

### 2.3 Definition of Choux Paste

Choux paste, or *pâte à choux*, is a light pastry dough that, when baked, forms a soft, hollow shell suitable for sweet or savory fillings (Labensky et al., 2021; Gisslen, 2022). Unlike other doughs, choux rely on high moisture content to create steam during baking, causing it to puff and develop a crisp outer layer while remaining airy inside. Its versatility allows it to serve

various culinary applications, from traditional desserts like profiteroles to savoury options such as gougères.

## 2.4. History of Choux Paste

The history of choux pastry traces back to the 16th century, when Catherine de' Medici introduced it to France upon her marriage to Henry II (Davidson, 2022; Wybauw, 2020). The pastry evolved through several adaptations by court chefs, notably Pantarelli (or Panterelli), and was later refined by Marie-Antoine Carême, often called the "King of Chefs," who codified the recipe into its modern form, *pâte à choux*. Today, it remains a staple in French patisserie, forming the basis of numerous iconic desserts.

## 2.5. Understanding Bir Kotjok

Bir Kotjok is a traditional non-alcoholic beverage from Bogor, Indonesia, characterized by its foamy texture resulting from the shaking technique used during serving (Putri & Pratiwi, 2022; Ramadhan & Azizah, 2023). Made from ginger, cinnamon, cloves, cardamom, sappanwood, and palm sugar, Bir Kotjok is valued not only for its refreshing taste but also for its health benefits, including promoting blood circulation, relieving body aches, and soothing the throat. Its continued preservation is important for maintaining Indonesia's rich culinary heritage.

## 3. METHOD

### 3.1 Research Design

This study employed a quantitative experimental research design focusing on sensory evaluation (organoleptic testing) to determine consumer acceptance of Choux Au Craquelin innovated with Bir Kotjok ingredients. The main purpose of this design is to systematically examine the sensory attributes appearance, aroma, taste, texture, and overall acceptability of the developed product through controlled panel testing.

### 3.2 Data Collection Method

Data were collected using a structured survey instrument, namely a questionnaire. The questionnaire was developed to measure panelists' preferences based on a 5-point hedonic scale, where 1 indicated "strongly dislike" and 5 indicated "strongly like." This method allows for standardized collection of panelists' subjective perceptions, enabling comparison across different sensory attributes.

### 3.3 Sampling

Two groups of panelists were involved:

- Expert Panelists: Five culinary experts with professional experience in baking and sensory evaluation participated to provide technical assessments of the product.
- Non-Expert Panelists: Thirty consumer panelists with no professional background in baking were recruited to represent general consumer preferences.

Participants were selected using purposive sampling to ensure they could provide relevant insights for the sensory evaluation, based on their familiarity with bakery products and availability for the testing session.

### 3.4 Experimental Procedure

The experimental procedure involved:

1. Preparation of Choux Au Craquelin samples using a standardized recipe incorporating Bir Kotjok.
2. Presentation of the samples to both expert and non-expert panelists under controlled conditions (same portion size, presentation, and temperature).
3. Panelists were instructed to assess the products independently, based on appearance, aroma, taste, texture, and overall preference, and to fill out the questionnaire immediately after tasting.

### **3.5 Data Analysis**

The collected data were analyzed using descriptive statistical techniques:

- Mean (average): To determine the central tendency of panelists' ratings for each attribute.
- Median: To understand the midpoint value of the responses, minimizing the impact of outliers.
- Mode: To identify the most frequently occurring rating for each sensory attribute.
- Standard Deviation: To assess the variability or consistency in panelists' responses.

Descriptive analysis was conducted separately for expert and non-expert panelists, and results were compared to identify differences in perception between the two groups.

### **3.6 Instrument Validation**

Prior to use, the questionnaire was subjected to content validation by three independent culinary and sensory evaluation experts to ensure that the items appropriately captured all relevant sensory dimensions. A pilot test with five individuals was conducted to confirm clarity, reliability, and usability of the instrument.

### **3.7 Ethical Considerations**

All participants were informed about the study's objectives and procedures and provided their consent prior to participation. The research adhered to ethical standards for research involving human subjects, ensuring confidentiality and voluntary participation.

## **4. RESULTS AND DISCUSSION**

### **4.1. Results of the Choux Au Craquelin Product Questionnaire using Kotjok Beer as an Expert Panelist**

In the manufacture of Choux Au Craquelin products using Bir Kotjok ingredients, conclusions were obtained from the results of several questionnaire data for 5 Panelists who were included in the Expert Panelist category using 4 (four) aspects, including: Color, Aroma, Texture, and Taste in 3 experimental formulations.

The total for the color aspect of the 3 trial formulations got a score of 2.9 which can be concluded as tending to Like, the total for the aroma aspect of the 3 trial formulations got a score of 2.9 which can be concluded as tending to Like, the total for the texture aspect of the 3 trial formulations got a score of 2.9 which can be concluded as tending to Like, and the total for the taste aspect of the 3 trial formulations got a score of 2.5 which can be concluded as tending to Like. Based on the results of the questionnaire study of the Choux Au Craquelin

product using Bir Kotjok ingredients, a total of 35 results were obtained from the whole which were in the Like category.

**Table 1** Results of the Choux Au Craquelin Product Questionnaire using Kotjok Beer as the Expert Panelist

Percobaan	Dimensi	Total Skor	Mean	Median	Modus	Standar Deviasi
P1	warna	2,8	2,8	3	2	0,83
	aroma	2,8	2,8	3	2	0,83
	tekstur	2,8	2,8	3	2	0,83
	rasa	3	3	3	2	1
P2	warna	3	3	3	3	0,7
	aroma	2,8	2,8	3	2	0,83
	tekstur	3	3	3	2	1
	rasa	2,8	2,8	2	2	1
P3	warna	3	3	3	3	0,7
	aroma	3	3	3	4	1
	tekstur	2,8	2,8	3	3	0,44
	rasa	3,2	3,2	3	3	0,83
<b>Total</b>		<b>35</b>	<b>35</b>	<b>35</b>	<b>30</b>	<b>9,99</b>
<b>Rata-Rata</b>		<b>2,916666667</b>	<b>2,916667</b>	<b>2,916667</b>	<b>2,5</b>	<b>0,8325</b>

The findings from the expert panelists revealed that the Choux Au Craquelin products incorporating Bir Kotjok were generally well-received across all sensory dimensions colour, aroma, texture, and taste falling into the "tend to like" category. The average scores around 2.9 for colour, aroma, and texture indicate that the visual and textural qualities of the choux remained appealing despite the inclusion of a traditional spiced beverage. This supports previous studies suggesting that the integration of herbal or spice-based ingredients into bakery products can enhance sensory richness without significantly compromising structural quality (Liu et al., 2021; Ahmad et al., 2022; Zhang et al., 2023). The findings highlight that traditional ingredients like Bir Kotjok, when appropriately formulated, can harmonize with modern pastry frameworks while maintaining desirable consumer attributes.

Despite the generally positive ratings, the taste aspect scored slightly lower (2.5) compared to other attributes, suggesting that the strong, complex flavours from Bir Kotjok may require refinement to achieve broader acceptability among expert tasters. This pattern aligns with previous research indicating that the introduction of intense spice profiles into Western-style baked goods can sometimes challenge conventional flavour expectations, leading to a need for careful flavor balancing (Mahmud et al., 2024; Chen et al., 2022; Rahman et al., 2023). Adjustments in formulation, such as modifying spice concentrations or combining with neutral flavour bases, could help enhance palatability while preserving the distinctive character of the traditional drink.

Overall, the results underscore the feasibility of innovating bakery products through the infusion of indigenous beverages, providing both cultural enrichment and functional benefits. The successful adaptation of Bir Kotjok into Choux Au Craquelin supports the broader movement toward culinary innovation that values tradition alongside modernization (Mhlongo & Botha, 2023; Tan et al., 2021; Wibowo et al., 2024). Furthermore, these findings contribute to a growing body of knowledge advocating for the revitalization of regional flavors within global culinary markets, promoting sustainability, cultural preservation, and diversification of bakery offerings.

#### 4.2. Questionnaire Results for Choux Au Craquelin Products Using Kotjok Beer Ingredients Non-Expert Panelists

In the manufacture of Choux Au Craquelin products using Bir Kotjok ingredients, conclusions were obtained from the results of several questionnaire data to 30 Panelists who were included in the Non-Expert Panelist category using 4 (four) aspects, including: Color, Aroma, Texture, and Taste in 3 experimental formulations.

The total for the color aspect of the 3 experimental formulations got a score of 3.3 which can be concluded as tending to Like, the total for the aroma aspect of the 3 experimental formulations got a score of 3.3 which can be concluded as tending to Like, the total for the texture aspect of the 3 experimental formulations got a score of 3.2 which can be concluded as tending to Like, and the total for the taste aspect of the 3 experimental formulations got a score of 3.3 which can be concluded as tending to Like. Based on the results of the questionnaire study of the Choux Au Craquelin product using Bir Kotjok ingredients, the total result was 39.7 out of the whole which was in the Very Like category.

**Table 1.2** Results of the Choux Au Craquelin Product Questionnaire using Kotjok Beer as an ingredient for Non-Expert Panelists.

Percobaan	Dimensi	Total Skor	Mean	Median	Modus	Standar Deviasi
P1	warna	3,4	3,4	3	3	0,56
	aroma	3,5	3,5	3,5	3	0,5
	tekstur	3,3	3,3	3	3	0,54
	rasa	3,5	3,5	4	4	0,62
P2	warna	3,2	3,2	3	3	0,52
	aroma	3,4	3,4	3,5	4	0,57
	tekstur	3,3	3,3	3	3	0,53
	rasa	3,2	3,2	3	3	0,69
P3	warna	3,2	3,2	3	3	0,59
	aroma	3,3	3,3	3	4	0,66
	tekstur	3,1	3,1	3	3	0,46
	rasa	3,3	3,3	4	4	0,92
<b>Total</b>		<b>39,7</b>	<b>39,7</b>	<b>39</b>	<b>40</b>	<b>7,16</b>
<b>Rata-Rata</b>		<b>3,3</b>	<b>3,3</b>	<b>3,25</b>	<b>3,3</b>	<b>0,59</b>

The responses from non-expert panelists indicate a positive acceptance of the Choux Au Craquelin products infused with Bir Kotjok ingredients. The scores for color, aroma, texture, and taste all hovered around 3.2 to 3.3, consistently falling into the "tend to like" category. Notably, the cumulative score placed the product in the "very like" category, suggesting that the integration of traditional flavours into familiar pastry formats resonates well with general consumers. This finding supports earlier research indicating that the incorporation of culturally distinctive ingredients can increase consumer interest and emotional engagement, especially when presented in accessible food forms (Lalor et al., 2021; Bianchi & Mortimer, 2021; Varela & Ares, 2020).

Interestingly, non-expert panellists rated the taste aspect slightly higher compared to expert panellists, highlighting that general consumers may be more open to novel flavours profiles when the product context (e.g., a sweet pastry) is familiar and comforting. This aligns with previous studies that found non-expert consumers tend to assess innovative foods more positively based on emotional and hedonic experiences rather than strict technical evaluation (Ares et al., 2022; Guimarães et al., 2023; Tuorila & Hartmann, 2020). The familiar format of

Choux Au Craquelin likely provided a cognitive anchor that facilitated greater acceptance of the new taste introduced by Bir Kotjok's unique spice blend.

Overall, the positive reception among non-expert panellists suggests strong market potential for pastry innovations that creatively adapt traditional beverages like Bir Kotjok. The successful fusion of heritage ingredients into contemporary food products not only supports culinary innovation but also contributes to the preservation and revitalization of local food cultures (Giacalone et al., 2023; Mhlongo & Botha, 2023; Rahman et al., 2023). Future efforts could explore broader demographic testing and product optimization to further refine formulations that appeal to both local and international markets, ensuring that traditional flavours gain new life in global culinary contexts.

## 5. CONCLUSION

Based on the research conducted under the title "Innovation of Kotjok Beer in Making Choux Au Craquelin," several key findings were obtained. The development of Choux Au Craquelin using different formulations fresh milk, a 50% fresh milk and 50% Bir Kotjok blend, and 100% Bir Kotjok showed significant variations in product characteristics. The formulation using fresh milk produced a white-colored product with a sweet milky aroma, a distinct milk flavor, and a soft texture. The combination of 50% fresh milk and 50% Bir Kotjok resulted in a slightly brownish product, with a subtle Bir Kotjok fragrance and taste while maintaining a soft texture. Meanwhile, the use of 100% Bir Kotjok produced a brown-colored product, characterized by a stronger Bir Kotjok aroma and taste, accompanied by a similarly soft texture. The sensory evaluation results indicated that both expert and non-expert panelists expressed a preference for the P3 formulation (100% Bir Kotjok). This was evidenced by the ratings across four sensory aspects, with a color score of 3, aroma score of 3, texture score of 2.8, and taste score of 3, leading to a total score of 12 and an average of 3, categorized as "Like." These findings demonstrate that the P3 formulation successfully maintained sensory appeal while integrating traditional flavors. Overall, the acceptance of Choux Au Craquelin using Bir Kotjok ingredients received a positive response from the community, particularly in the P3 formulation. This suggests that the integration of Bir Kotjok into contemporary pastry products is not only feasible but also well-received in terms of color, aroma, texture, and taste, highlighting its potential for further culinary innovation and cultural preservation.

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