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Research Article

CONSISTENCY BETWEEN PACKAGING IMAGES AND CONTENTS: IS BUTTER REALLY BUTTER?

Sena YILMAZ^{1*} (orcid.org/0000-0001-5732-6878)

Rahman TEMİZKAN² (orcid.org/0000-0002-9750-1543)

¹ Eskişehir Osmangazi University, Institute of Social Sciences, Eskişehir, Türkiye.

² Eskişehir Osmangazi University, Faculty of Tourism, Department of Gastronomy and Culinary Arts, Eskişehir, Türkiye.

Abstract

This study examines the relationship between butter-related packaging claims and declared ingredient information in packaged food products, alongside consumers' awareness of food fraud, purchasing experiences, and perceptions of food safety and regulatory oversight. Although butter holds cultural and culinary significance in Türkiye, its prominence in product names and packaging raises questions about how clearly consumers are informed about the composition of foods marketed with butter-related claims. The study employed a multi-component research design combining product-label analysis with a consumer questionnaire. First, the declared ingredient information of 15 packaged food products available in national supermarket chains between November 2024 and January 2025 was examined. Second, consumer data were collected through a structured questionnaire involving 392 respondents. Descriptive statistical analyses were conducted using SPSS 26, and open-ended responses were analysed thematically using NVivo 15. The product-label analysis and survey findings were examined separately. The findings revealed that butter-related claims were prominent in the biscuit and cookie categories, although some products declared relatively low proportions of butter, ranging from 1% to 7%, while others listed butter flavouring without clearly declaring butter as an ingredient. As the analysis relied on product labels rather than laboratory testing, these findings reflect declared ingredient information and do not independently verify actual product composition. In the consumer survey, 57% of respondents reported familiarity with concepts related to food adulteration and fraud. Furthermore, 73% selected the strongest negative response category regarding the adequacy of food inspections; when both negative response categories were combined, approximately 87% expressed an unfavourable assessment of inspection adequacy. The findings also suggest that reported purchasing experiences cannot be explained by ingredient information or awareness alone. The study highlights the importance of clear and consistent communication between butter-related packaging claims and ingredient declarations. It also points to the need for further research into how product labelling, price, consumer knowledge, and perceptions of food authenticity relate to purchasing behaviour. Improving the clarity of ingredient information and evaluating existing labelling practices may help support informed consumer choices and strengthen confidence in food information.

Keywords: Food Labelling, Packaging, Consumer Perception, Food Fraud.

Introduction

What factors influence consumers' decision to buy a product? Does content affect purchasing behavior? Or can a beautifully packaged product easily find its place in the market? In light of these

* Corresponding author: senayilmaz.98@outlook.com

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questions, the products labeled "butter" and marketed as such will be examined in terms of content and packaging. Additionally, the factors influencing consumers' purchasing decisions will be identified. The aim here is to see what concepts butter, one of the basic products that comes to mind when Turkish cuisine is mentioned, evokes in consumers, and to determine whether these associations influence purchasing behavior. Products labeled "butter" sold in chain supermarkets will be included in the research. With this limitation, the aim is to observe whether consumers in these supermarkets, which cater to different income levels, purchase products considering their quality or simply because the price appeals to them.

By definition, packaging is a covering made of a material suitable for the product, protecting it from external factors until it reaches the consumer (Kuru and Ceylan, 2019: 1742). Design is essential for the product to reach the consumer. Akgün (2013: 2) states that the design on a product, the physical structure of the packaging, and the label information on it attract the consumer's attention in a short time, such as two or three seconds, and a purchase decision is made within three to ten seconds. In this case, competition is inevitable. Therefore, the target consumer profile (demographic characteristics, supply, demand) should be carefully evaluated, the information to be conveyed to the consumer about the product should be stated on the package, and the product's attractiveness should be checked before marketing (Nancarrow, Tiu Wright and Brace, 1998: 114).

The nutritional values stated on a product are usually found in the nutritional information table and the ingredient list on the back of the product. Clearly stating these values is of great importance, taking into account factors such as consumers' different dietary habits or illnesses (Özgen, 2004: p.20).

According to the Turkish Food Codex Guide on Food Labeling and Consumer Information, manufacturers should not provide misleading information to consumers when labeling food products. The information on the product label should reflect the nature of the food and should not suggest a different product group (TGK, 2024: 1).

According to the TGK regulation, the use of images that evoke butter on vegetable oil packaging is prohibited (2024: 1). This aims to prevent the creation of a misleading perception in the consumer. Furthermore, the word "butter" cannot be written in different font sizes on products that do not contain butter or butter flavoring (TGK, 2024: 17).

Another practice implemented to protect consumers is the use of customary and descriptive names. While the name given to the product as it is known to consumers (biscuit, puff pastry, etc.) is referred to as the common name, the descriptive name that indicates the product's contents and prevents confusion with other products (e.g., caramel-filled soft candy) is referred to as the identifying name (TGK, 2024: 18).

CONCEPTUAL FRAMEWORK

Food Fraud, Product Authenticity, and Consumer Protection

Food fraud is a multidimensional issue involving the intentional misrepresentation of food products for economic gain. It may include the substitution of ingredients, dilution, unauthorised additions, falsification of product information, and misleading representations of a product's identity or quality (Nairaud & Pruniaux, 2003). Spink and Moyer (2011) distinguish food fraud from conventional food safety incidents by emphasising the intentional and economically motivated nature of fraudulent practices. Although the primary motivation may be financial, food fraud can also create public health risks when undeclared or inappropriate substances are introduced into food products.

An important characteristic of food fraud is the imbalance between the information available to producers and that available to consumers. Manufacturers generally possess more detailed information about production processes and ingredient composition, whereas consumers usually depend on information communicated through packaging, labelling, and commercial descriptions

(Giannakas & Yiannaka, 2023; Schrobback et al., 2023). This asymmetry limits consumers' ability to independently verify the authenticity of products at the point of purchase. Consequently, product authenticity is not merely a question of whether the information on a label is available; it also concerns whether the declared characteristics accurately represent the product being sold (Giannakas & Yiannaka, 2023; Moreira et al., 2021).

The European Commission identifies intentional deception, the violation of relevant agri-food legislation, and the acquisition of an undue economic advantage as central elements in identifying food fraud (European Commission, n.d.). This perspective highlights the distinction between an unintentional discrepancy in product information and deliberate misrepresentation (European Commission, n.d.; Winkler et al., 2023). Accordingly, the presence of an ingredient declaration or a particular packaging design should not, by itself, be interpreted as evidence either of authenticity or of fraud. Establishing actual adulteration requires evidence appropriate to the suspected form of misrepresentation (Donarski et al., 2020).

Within this conceptual framework, product authenticity refers to the correspondence between a product's actual characteristics and its represented identity, composition, and other relevant attributes (Robson et al., 2021). This distinction is particularly important for packaged foods whose ingredients cannot be directly assessed by consumers before purchase. Examining declared product information can help identify how a product is represented to consumers, although such an examination cannot independently verify its actual chemical composition.

Packaging as a Source of Consumer Information

Packaging functions as both a physical means of protecting food and a communication interface between producers and consumers. Through product names, ingredient declarations, visual elements, and other information, packaging establishes expectations about the product before consumption (Spence & Van Doorn, 2022; Kelly et al., 2024). Consumers may use these external cues to infer characteristics that cannot be directly observed at the point of sale (Spence & Van Doorn, 2022).

Pramudya and Seo (2019) explain that consumer responses to food products can be shaped by both intrinsic attributes, such as sensory characteristics, and extrinsic attributes, including packaging-related cues. These cues may influence expectations, product evaluations, and decision-making processes. However, the influence of packaging does not imply that visual characteristics necessarily determine purchasing behaviour or that consumers disregard ingredient information. Rather, packaging represents one source of information that consumers may consider alongside price, previous experience, brand familiarity, and other product characteristics.

The distinction between perceived and actual product attributes is central to understanding packaging communication. A product may create expectations of quality or authenticity through its name, visual presentation, or descriptive language, but these expectations do not independently establish the product's composition (Spence & Van Doorn, 2022; Rebollar et al., 2017). Consequently, packaging should be examined both as a source of declared information and as a potential influence on how consumers interpret that information (Spence & Van Doorn, 2022).

Food Labelling, Information Interpretation, and Consumer Trust

Food labelling provides a formal means of communicating information about product composition and characteristics. Nevertheless, the presence of label information does not guarantee that consumers will read, understand, or interpret it in the manner intended by the producer or regulator (Cowburn & Stockley, 2005; Grunert & Wills, 2007). The meaning consumers derive from labels may depend on their prior knowledge, expectations, familiarity with food products, and confidence in the organisations responsible for providing the information (Miller & Cassady, 2015; Tonkin et al., 2015).

Tonkin et al. (2016) investigated how consumers develop trust-related judgements through their interactions with food labels. Their qualitative study demonstrated that consumers interpret label elements in ways that may extend beyond their formal regulatory meanings. The researchers also found that consumers combine different elements of label information when forming judgements about the trustworthiness of those providing it. These findings indicate that consumer trust is shaped not only by the information communicated but also by how that information is interpreted.

This distinction is relevant to packaged food products because consumers may use product names, ingredient lists, and visual cues collectively when assessing whether a product meets their expectations. However, the interpretation of packaging information and the verification of product authenticity are separate processes. Consumers may perceive a product as trustworthy without possessing sufficient evidence to establish its actual composition (Kendall et al., 2019). Conversely, a lack of detailed consumer knowledge does not necessarily mean that the product itself is adulterated (Kendall et al., 2019; Spink & Moyer, 2011).

Accordingly, consumer awareness, label interpretation, and product authenticity should be treated as related but distinct concepts. Consumer awareness concerns the extent to which individuals recognise and understand relevant product information. Label interpretation concerns how consumers make meaning from the information presented (Miller & Cassady, 2015). Product authenticity concerns the correspondence between the product's actual characteristics and its represented identity or composition (Spink & Moyer, 2011). Distinguishing these concepts helps avoid equating consumer perceptions with objectively verified product characteristics.

Conceptual Relevance to the Present Study

The present study is positioned at the intersection of food authenticity, packaging communication, and consumer responses. These concepts provide the basis for examining how packaged products are represented and how consumers respond to information associated with those products (Robson et al., 2021; Spence & Van Doorn, 2022).

The product-level component examines 15 packaged food products available in selected supermarket chains, focusing on product names, ingredient lists, and packaging information. This component documents the characteristics communicated through the selected products' packaging. It does not establish whether the products contain undeclared ingredients or whether their actual composition corresponds to their declarations.

The consumer-level component analyses survey responses from 392 participants to describe consumer perceptions and responses relevant to the study. These responses provide information about consumers' reported views and experiences but do not independently verify the composition of the products examined.

The two components are analysed and reported separately. Accordingly, the study does not claim to establish a direct relationship between individual packaging characteristics and consumer behaviour, nor does it infer the presence of adulteration from packaging information alone. In mixed-methods research, the extent to which separate datasets are integrated determines the nature of the conclusions that can be drawn from their combined interpretation (Fetters et al., 2013). In the present study, product representations and consumer responses are therefore examined as distinct aspects of food authenticity and consumer information. This distinction provides a basis for interpreting the findings within the limits of the evidence collected.

Objective

This study aims to analyze the contents of foods labeled and packaged as containing butter, and to draw attention to the underdeveloped label-reading habits of adults, which, despite their awareness, are not reflected in their behavior. Additionally, it aims to highlight the value of butter, one of the most fundamental products of Turkish cuisine, which is known worldwide and for which people travel to different destinations to experience it.

Importance

Butter, traditionally consumed from breakfast tables as the first meal of the day (Say, Esen and Güzeler, 2018: p. 37) to numerous recipes (Güldemir and Halıcı, 2009: p. 566), holds great importance in Turkish culinary culture. Investigating the reality behind the products currently used in butter, a traditionally consumed product, and raising public awareness in this context, underscores the importance of this study for the future of butter.

Literature Review

In line with the purpose of this study, the keywords “butter, Turkish cuisine, packaging, adulteration” were searched on Google Scholar and related studies were listed.

Butter Adulteration and Food Authenticity

Food adulteration represents a significant challenge to food authenticity, consumer protection, and confidence in the food supply chain. Butter is particularly susceptible to economically motivated adulteration because milk fat can be partially or entirely replaced with less expensive fats and oils of vegetable origin. In the Turkish context, Tenekeci (2016) investigated food adulteration in the roasted peanut product group, focusing on practices that may compromise food authenticity. The study reported the presence of colouring agents in some samples and highlighted the importance of increasing consumer awareness of food adulteration. Although the study focused on roasted peanuts rather than butter, it provides a relevant example of food adulteration in the Turkish food industry. This broader perspective supports the importance of examining product authenticity and consumer awareness across different food categories.

Novais et al. (2024) investigated a documented case of butter adulteration using nuclear magnetic resonance (NMR) spectroscopy and stable carbon isotope ratio analysis. The analysis of 21 samples seized by the Brazilian Federal Police revealed mixtures of dairy fat and vegetable oils, including soybean and palm oils. These findings demonstrate the importance of analytical methods for verifying butter authenticity and identifying discrepancies between the declared identity and actual composition of food products.

Similarly, Soha et al. (2015) examined whether fatty acid composition and sterol profiles could be used to determine the authenticity of milk fat in adulterated butter. Their findings indicated that fatty acid profiles and sterol measurements alone may be insufficient to establish authenticity reliably. Taken together, these studies highlight the technical challenges associated with detecting butter adulteration and emphasise the importance of distinguishing between product identity, declared composition, and verified authenticity.

Food Packaging, Product Perception, and Purchasing Behaviour

Food packaging is an important communication tool that can influence consumers' perceptions of product quality, value, and brand identity. Wang (2013) investigated the influence of visual packaging design on perceived food product quality, perceived value, and brand preference. The study demonstrated that consumers' evaluations of packaging design were associated with their assessments of food products and brands. These findings suggest that packaging should be considered not only as a protective and informational element but also as a factor that may contribute to product evaluation and purchasing decisions.

In the Turkish context, Kuru and Ceylan (2019) examined the influence of packaging design on purchasing behaviour in relation to healthy product preferences. Their study is relevant to understanding how packaging characteristics may shape consumers' perceptions and food purchasing decisions. This perspective is particularly important when evaluating packaged food products, as consumers may use visual packaging cues to form judgements about product quality and healthiness.

Huang and Lu (2016) examined the effects of package colour and nutrition content claims on consumers' perceptions of food healthiness and purchase intention. Their findings indicated that packaging colour influenced perceived healthiness for certain types of food products and that these perceptions were associated with purchase intention. Taken together, these studies suggest that packaging design and visual cues may play a role in shaping consumer perceptions and purchasing decisions. However, perceived product quality and healthiness should be distinguished from the actual composition and authenticity of food products.

Food Labelling, Consumer Awareness, and Trust

Food labelling plays an important role in communicating product composition and enabling consumers to make informed purchasing decisions. However, the availability of information does not necessarily guarantee that consumers fully understand or trust the information presented. Moreira et al. (2021) examined consumers' knowledge of food labelling and food fraud, focusing on the perceived usefulness and reliability of label information and consumers' awareness of fraudulent practices. Their findings indicated that the presentation of label information could affect consumers' interest in and understanding of the information provided. The study also identified differences in consumer confidence regarding the composition of different food products and highlighted the importance of educational initiatives to improve knowledge of food labelling and food fraud.

In the Turkish context, Eren (2024) examined the importance of food safety tracking systems and geographical indications in enhancing the gastronomic value of destinations, focusing on Balıkesir Province. The study highlighted the contribution of local products to destination attractiveness and the role of food safety monitoring in strengthening consumer confidence. These findings provide a complementary perspective on the relationship between food safety, product identity, and perceived value. Although the study focused on destination gastronomy rather than butter adulteration, it is relevant to the broader discussion of food authenticity and consumer trust in traditional and local food products.

These findings are relevant to products for which consumers rely on packaging and labelling to assess quality and composition. In the context of butter and butter-containing products, consumers may use declared ingredients and visual packaging characteristics when evaluating products, although these cues do not independently verify authenticity. Therefore, examining product composition alongside consumer awareness and perceptions can provide a more comprehensive understanding of food purchasing behaviour and confidence in food information.

Research Gap

Previous research has addressed butter adulteration, packaging design, and consumer knowledge of food labelling from different perspectives. Studies of butter adulteration have primarily focused on the analytical identification of foreign fats and the limitations of authenticity testing (Novais et al., 2024; Soha et al., 2015). Research on packaging has examined the relationship between visual design, perceived product quality, and purchase intention (Huang & Lu, 2016; Wang, 2013). In addition, research on food labelling has highlighted the importance of consumer understanding, confidence in declared information, and awareness of food fraud (Moreira et al., 2021).

Despite these contributions, the relationship between the actual composition of packaged butter products, packaging-related consumer perceptions, and consumer awareness warrants further investigation within a single research framework. The present study addresses this intersection by examining selected packaged products alongside consumer survey data. By considering both product-related characteristics and consumer perceptions, the study seeks to contribute to the literature on food authenticity, packaging communication, and consumer awareness in the context of Turkish food products.

Method

Research Design and Data Collection

This study employed a two-component research approach to examine the declared composition and packaging characteristics of selected packaged food products and consumers' perceptions and purchasing behaviour. The first component involved a content analysis of packaged products, while the second involved a quantitative consumer survey. These components addressed different aspects of the research problem and were analysed separately.

Product Content Analysis

The first component consisted of a content analysis of 15 packaged food products available in selected national supermarket chains in Türkiye. The products were identified during the period from November 2024 to January 2025. All eligible products available in the selected supermarkets during the data collection period were included in the analysis. The examination focused on product names, ingredient lists, and packaging information, with particular attention to information relevant to the products' declared butter content and composition.

The analysis was based on the information provided on product packaging. Accordingly, the findings reflect the declared product composition and packaging information rather than the results of laboratory tests. The analysis was intended to document the characteristics of the selected products and identify relevant information communicated to consumers through their packaging.

Consumer Survey

The second component involved a quantitative survey designed to examine consumer perceptions and purchasing behaviour. The target population consisted of individuals from different income groups who purchased products from the selected supermarket chains. Data were collected through an online questionnaire using the snowball sampling method, a non-probability sampling technique in which initial participants facilitate the recruitment of additional respondents. A total of 392 participants completed the questionnaire.

The questionnaire was adopted, with the original author's permission, from Tenekeci's (2016) master's thesis entitled *Adulteration/Imitation in the Food Sector: The Case of Roasted In-Shell Peanuts*. The original questionnaire items were retained without modification. The suitability of the questionnaire for the objectives of the present study was reviewed by the researcher in consultation with the academic supervisor. Before the main survey, the questionnaire was administered to 10 individuals to assess the clarity and comprehensibility of the questions. This preliminary assessment was intended to identify potential difficulties in understanding the items. No changes were made to the original questionnaire items following this assessment. The final questionnaire was subsequently administered to 392 participants.

Data Analysis

The product content analysis and consumer survey data were analysed separately using different analytical procedures. Quantitative survey data were analysed using IBM SPSS Statistics version 26. Descriptive statistical techniques were used to summarise the survey responses and describe the characteristics of the collected data.

Open-ended responses obtained through the questionnaire were analysed using NVivo version 15. The responses were examined, coded, and organised into thematic categories to identify recurring patterns and themes in participants' answers.

The findings from the product content analysis and the consumer survey are reported separately. The product analysis describes the declared composition and packaging characteristics of the selected products, whereas the survey analysis presents consumers' responses and perceptions. No formal integration of the two datasets was conducted during the analysis. Consequently, the

findings from the two components are interpreted within the scope of their respective data sources and analytical procedures.

Findings

In line with the objective of the study, products labeled "with butter" and offered for sale between November 1, 2024, and January 1, 2025, at four different supermarket chains catering to various income groups were examined. The products offered during this period are listed in Table 1, detailing their descriptive names, weights, and fat contents and ratios. The ingredient statement below is taken from the ingredients section on the product packaging. The proportion of ingredients marked with a question mark (?) is unknown; therefore, they have been left marked with a question mark. To avoid influencing the competitive landscape, brand names appearing in the products' descriptive names have been replaced with "X." The aim here is to determine the composition of the products and whether they actually contain butter as indicated in their names.

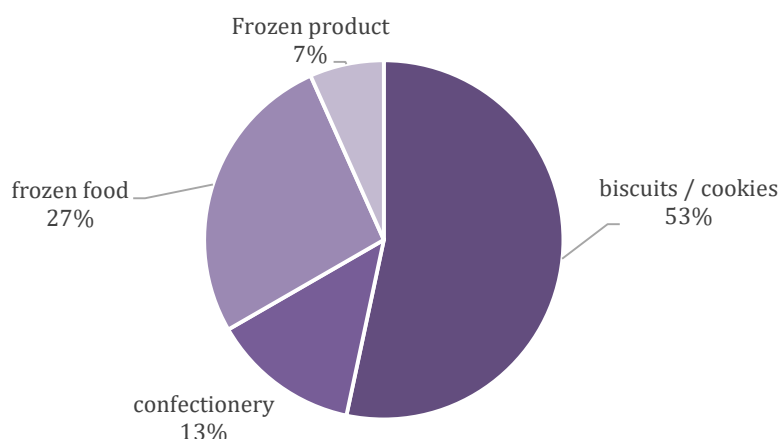
Table 1. Foods characterized as containing butter and their compositions.

	Product Name	Weight	Fats/Oils Contained And Their Proportions
1	X Butter Caramel Waffle	252 gr.	Vegetable Margarinee (Palm, Fully Hydrogenated Palm, Cottonseed, Canola, Sunflower, Flaxseed) Flavourings (butter, vanilla) Butter (%7) Flavourings (caramel, butter)
2	X Butter Bonbon Candy	43 gr.	Butter (contains milk) (%5) Flavoring (?)
3	X Butter Cookie	152 gr.	Butter(milk) %1 Flavoring (?)
4	X Cinnamon Butter Cookie	80 gr.	Butter (lactose)(%32) Vegetable oil (Sunflower oil)
5	X With Butter Puff Pastry	1000 gr.	Vegetable margarinee [vegetable oils (in varying amounts palm, canola, cottonseed,sunflower) Butter (%1) (pasteurized cow's milk cream, butter culture), Butter flavouring
6	X Butter and Cheese Water Börek	800 gr.	Butter (%5) Sunflower oil(?) Vegetable solid fat(?)
7	X Chicken Döner & With Butter Rice Pilaf	300 gr.	Sunflower oil & Butter (%2)
8	X Butter-Style Çayeli Beans	250 gr.	Butter (%4) Vegetable oil (Sunflower oil)
9	X Coffee-flavoured Butter Cookie	80 gr.	Butter (lactose) (%32) Vegetable oil (Sunflower oil)
10	X Chocolate Orange Butter Cookie	80 gr.	Butter (lactose) (%32) Vegetable oil (Sunflower oil)
11	X Kastamonu Butter Pull Halva	240 gr.	Butter (%16)
12	X Beypazarı Dry Bread with Milk and Butter	400 gr.	Butter (%4,5) Margarine
13	X Kolay Pişir With Butter Jumbo Shrimp	250 gr.	Garlic butter sauce (%20) Butter, (%5) Margarinee Olive oil

14	X Black Cumin Butter Cookie	500 gr.	Vegetable oil (palm), Vegetable oil (cottonseed oil) Butter flavour (%?) Butter (%?)
15	X Cocoa With Butter Petit Beurre Biscuit	500 gr.	Palm oil (%?) Butter flavouring (%?)

Table 1 above lists 15 products. The product types are indicated in Graph 1. According to the data obtained, the product type where the "butter" label is most frequently seen is biscuits/cookies. The type where it is least frequently seen is frozen products.

Graph 1: Classification of products according to their types.



When the products were examined in terms of their content, it was stated that all products except the one in row 15 of Table 1 contained butter. In addition to butter, vegetable oils (palm, sunflower, cotton, canola, flaxseed) were also used. When examining the products that stated they contained butter, it was indicated in parentheses that they contained milk (2,3,5). Butter production can contain a maximum of 2% non-fat milk solids and 16% water (Badem, 2021:323). In this case, it is thought that stating the percentage of milk content would be healthier for the consumer.

According to the Turkish Food Codex, the use of flavorings in the product and their indication as "flavored, tasted" on the label is considered appropriate. It was observed that some of the products included in the review contained flavorings (1,2,3,5,14,15). However, the percentage of flavorings used was not specified. In addition, the butter content was not specified in several of the products (14, 15). Product number 15, although it does not contain butter, is labeled as containing butter and offered for sale. This is a misleading situation for the consumer. Selling the product as butter-flavored would be more deceptive for the consumer.

In line with the aim of this study, consumers were asked questions about food adulteration and imitation, labeling fraud, and butter-based products. Consumers were asked about their knowledge of adulteration and imitation, and in what ways they felt misled regarding butter-based products. The aim of these questions was to assess the level of awareness among consumers.

Participant Data

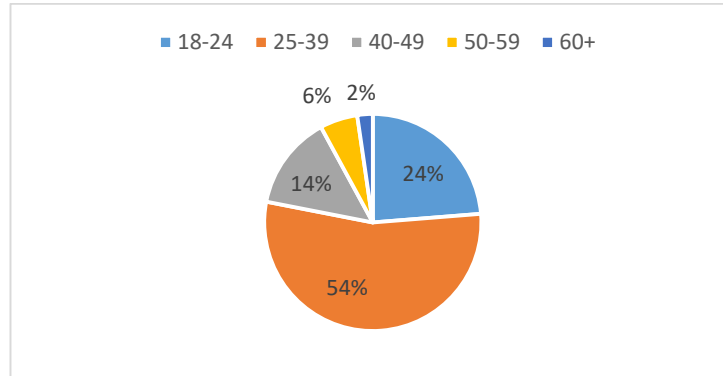
A total of 392 people participated in the survey conducted within the scope of the study between January and November in 2025. Participants were asked the survey questions used in Tenekeci's (2016) study, "Adulteration/Imitation in the Food Industry: The Example of Roasted Shelled Peanuts". Accordingly, a total of 24 questions were asked: 5 questions on demographic information, 10 questions on measuring knowledge of imitation and adulteration, and 9 questions on purchasing experience. 10 of the questions in the study were answered with multiple-choice answers, while the

remaining 14 questions were answered with open-ended answers. The section containing multiple-choice answers was analyzed in the SPSS software package, and the open-ended questions were analyzed in the NVivo 15 program.

Demographic Data

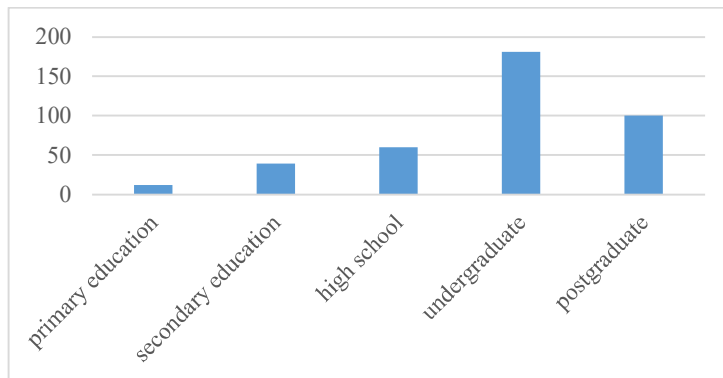
Of the 392 participants in the study, 56% (223) were male and 43% (169) were female.

Graph 2. Age Distribution of Participants.



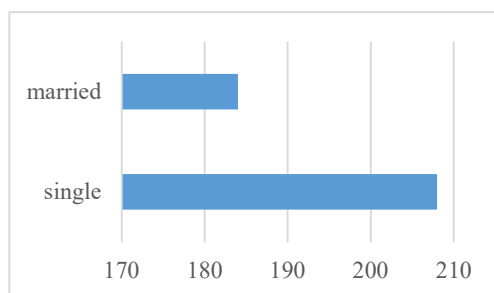
According to the data in Figure 2, 54% of the participants are between 25-39 years old, and 24% are between 18-24 years old. This indicates that the study group has a young participant base. Gezmen Karadağ and Türközü (2017:290) showed in their study that age, gender, and education level directly affect label reading. Looking at the education level of the participants in Figure 3, it is seen that the education level is high. In this case, it can be assumed that the vast majority of participants pay attention to packaging, labels, etc. in food products.

Graph 3. Educational Background of Participants.

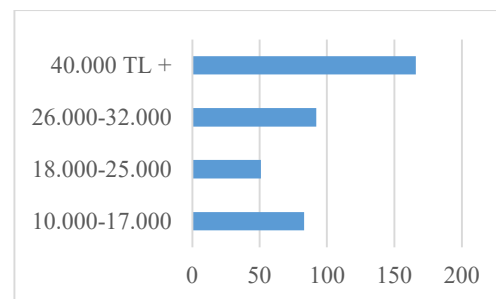


According to the data in Graph 4, 53% of the study group are single. Graph 5 shows the income status of the participants. According to the graph, the income status of the participants is observed to be higher than the average.

Graph 4. Marital Status of Participants.



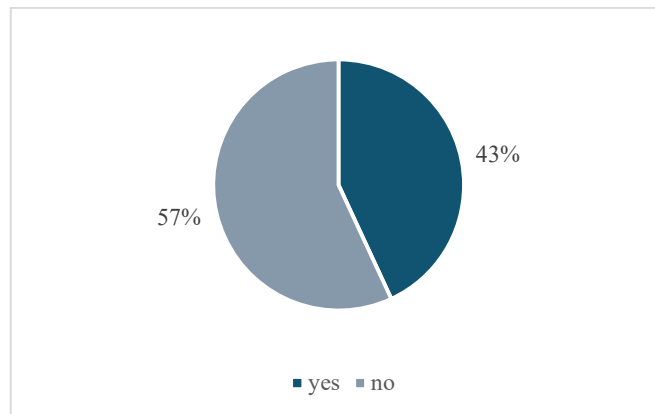
Graph 5. Income Status of Participants.



Knowledge Level Regarding Counterfeiting and Adulteration

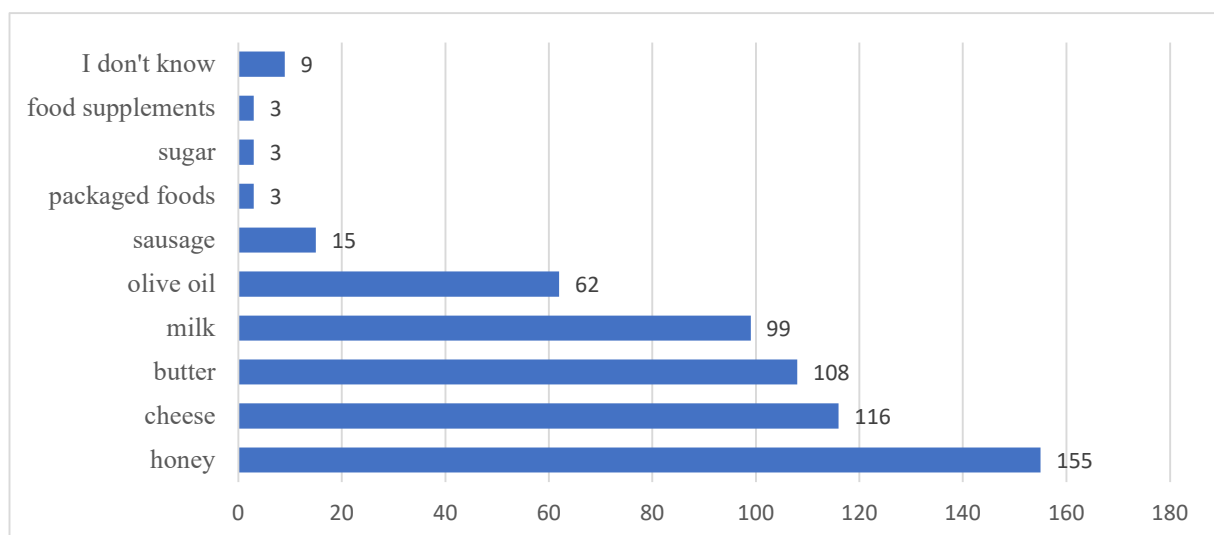
In this section, the knowledge levels of participants regarding the concepts of counterfeiting and adulteration in food products were observed. The questions and the answers given to the questions are summarized. In Graph 6, the participants' level of knowledge regarding the concepts of counterfeiting and adulteration was observed. Since the word "adulteration" was asked many times in the preliminary study conducted during the research process, the word "counterfeiting" was added as an explanation. When adulteration is mentioned, it corresponds to the situation where the natural properties of a product are changed with another additive (Ertas and Topal, 2009:39). According to the answers given, 57% of the participants indicated that they were familiar with the concepts by marking the "yes" option. This shows that the study was conducted on the right target group.

Graph 6 Shows the responses to the question, "do you know the concepts of food adulteration and counterfeiting?"



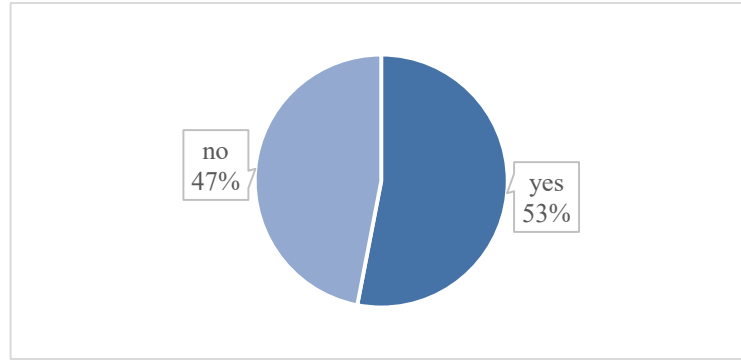
Participants were asked to list the top 3 foods that came to mind when they heard the term "food adulteration and imitation." The responses were grouped and counted as shown in Graph 7. According to this, the top 3 foods they considered most prone to adulteration and imitation were, in order: honey, cheese, and butter.

Graph 7. Chart showing responses to the question, "Can you name the top 3 foods that come to mind when you hear the term 'food adulteration and imitation'?"



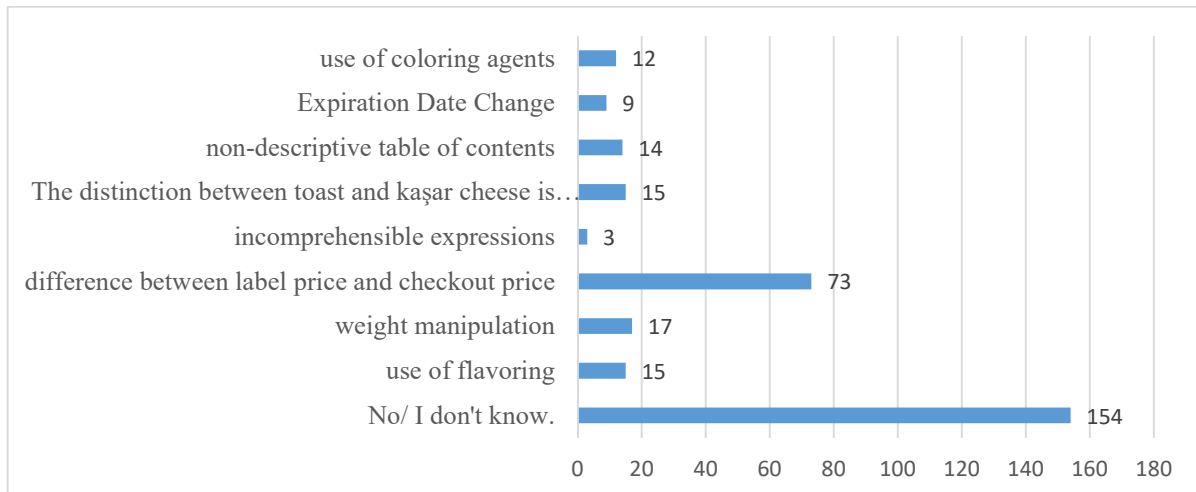
The concept of labeling fraud in food refers to situations such as incorrect expiration dates or inaccurate product descriptions. 53% of participants stated that they were aware of the concept of labeling fraud (Graph 8).

Graph 8. Graph related to the question, "Do you know the concept of labeling fraud in food?"



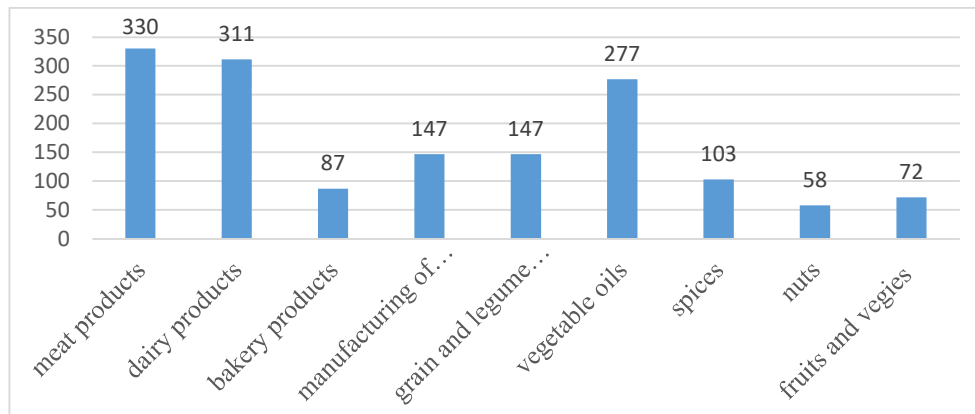
Participants were asked to provide examples of labeling fraud they had encountered. The responses were grouped and counted as shown in Graph 9. In general, participants were aware of labeling fraud but did not encounter it in their daily lives. Additionally, instances such as the label price differing from the cashier price, incorrect weight information, and the lack of direct labeling of flavorings were mentioned.

Graph 9. Graph showing responses to the question, "Have you encountered any examples of food labeling fraud? If so, what are they?"



Participants were given the 9 food groups shown in Graph 10 as options and asked to indicate 3 product groups that they generally considered to be produced unsafely. Multiple responses were analyzed by separating them. The three most frequently mentioned groups were meat and meat products, milk and dairy products, and vegetable oils.

Graph 10. Graph showing responses to the question, "Please indicate 3 food groups from the following list that you generally consider to be produced unsafely?"



Participants were asked, “Are there any instances of food fraud, adulteration, or imitation that you haven’t encountered but suspect or have heard of? If so, what are they?” The responses were analyzed using content analysis and thematic analysis to examine the types of fraud perceived by participants regarding food products. The data was coded using the NVivo program; the codes were combined under thematic frameworks, and the findings were presented in a comparative manner with the literature. Before analyzing the open-ended responses of the participants, the following steps were applied:

- Removing meaningless responses such as “No, I don’t know, I haven’t heard of,”
- Combining repetitive responses,
- Correcting spelling and meaning errors,
- Cleaning up stop-words,
- Grouping similar expressions under the same code using the stem-matching method. This stage resulted in a more consistent and analyzable structure for the data. The most frequently occurring words resulting from the manual frequency analysis performed on the cleaned data are shown in Table 2.

Table 2. Word analysis and grouping table.

Word	Frequency	Related Theme
Milk	29	Adulteration in dairy products
Oil	26	Oil adulteration
Sausage	19	Meat products
Honey	17	Honey and confectionery adulteration
Coloring	15	Additive-dye
Spices	14	Adulteration in vegetable products
Olive Oil	12	Oil blending adulteration
Additive	11	Use of additives
Chesee	10	Adulteration in dairy products
Adding Water	9	Dilution adulteration

Table 2 shows the product categories where participants perceived food fraud to be most prevalent. Table 3 includes the thematic grouping of the specified products, codes, and sample statements from participants.

Table 3. Thematic coding and participant statements.

Theme	Codes	Participant Statements
Theme 1: Dairy Products Adulteration	Adding water to milk Using margarine instead of butter Reducing the fat content in products such as cream and yogurt Making Kashar cheese with starch/thickening agents ➤ Re-releasing spoiled milk onto the market	"I suspect water is being added to the milk." "Margarine is being sold as butter." "The ingredients of Kashar cheese are not accurate."
Theme 2: Adulteration in oils	Mixing sunflower oil with olive oil Adding coloring/dye Selling low-quality oils under the name of extra virgin olive oil.	"I think the olive oil has been colored." "It's said to be mixed with sunflower oil."

Theme 3: Fraud in Meat and Meat Products	Using different types of meat instead of beef (horse/donkey, etc.) Mixing offal in sausages Low-quality additives in meatballs/salami/sausages Applying coloring to minced meat	"It is said that donkey and horse meat are used instead of beef." "Offal is mixed into the sausages."
Theme 4: Adulteration in Honey and Confectionery Products	Production of fake honey Adding sugar, glucose, and sweeteners to honey Using coloring agents for appearance	"Most of the honey is fake." "I think sugar has been added to the honey."
Theme 5: Adulteration in Spices and Herbal Products	Adding sawdust to spices Adding textile dye Using peas instead of pistachios	"I heard that textile dyes are added to the spices." "It is said that peas are used instead of peanuts."
Theme 6: Visual Manipulation of Fruits and Vegetables	Applying dye to fruits/vegetables Chemical coating to improve appearance	"Dye may be used to make fruits and vegetables look shinier."
Theme 7: Packaging and Date-Related Deception	Altering the expiration date Repackaging spoiled products Using low-quality and harmful ingredients	"Expired products are being put back on the shelves."

Looking at Theme 1, most fraudulent practices in dairy products fall into the categories of dilution and adulteration. In Theme 2, the vast majority of participants stated that it was impossible to distinguish genuine olive oil, making the oil category one of the areas where food safety concerns were most acutely felt. Theme 3 represents the concept of species substitution in food fraud and parallels the economically motivated fraud frequently encountered in the literature. Honey, included in Theme 4, was seen by participants as the most frequently fraudulent product. This is consistent with honey being classified as a "high-risk product" in the food fraud literature. Theme 5 points to fraud based on color, aroma, and texture imitation, especially in packaged products. In Theme 6, participants particularly emphasized the inability to be certain about the naturalness of fresh foods. Finally, Theme 7 reveals the issue of institutional trust, indicating insufficient oversight.



Figure 1 shows a word map of the responses to the question, "What do you think should be done to prevent imitation, adulteration, or food fraud?"

Participants primarily stated that inspections should be carried out to prevent imitation and adulteration. In addition to inspections, they mentioned increasing controls, imposing deterrent

penalties, and updating legal regulations. Participants were also asked, "Rank the negative aspects of fraud, imitation, and adulteration in food products in order of importance?" The responses are shown in Table 4. They were asked to rate these from a scale of 1 to 5, representing health, economics, and social aspects. 1 represents "not important," while 5 represents "important." Regarding health, 93% of participants indicated it was important. For the economics question, 52% said it was important, while for the social aspect, a similar percentage chose option 5.

Table 4. "Please rank the negative consequences of fraud, imitation, and adulteration practices in food in order of importance." These are the responses to the question.

	Not Important		2		3		4		Important	
	%	frequency	%	frequency	%	frequency	%	frequency	%	frequency
Health	3,3	13	-	-	1,5	6	2,0	8	93,1	365
Economy	4,3	17	7,7	30	12,5	49	23,0	90	52,6	206
Social	19,1	75	7,4	29	22,2	87	14,5	57	36,7	144

Participants were asked, "Do you think the competent food inspection authority is adequate in detecting fraud, imitation, and adulteration in food products?" and were asked to rate their response on a five-point Likert scale from "yes, it is adequate" to "no, it is not adequate." According to the responses, 73% of the participants chose the "no, it is not adequate" option. Only 3 people chose the "yes, it is adequate" option.

Table 5. "Do you think the competent food inspection authority is adequately equipped to detect fraud, imitation, and adulteration in food products?" These were the answers to this question.

	Frequency	%
Yes, that's enough.	3	0.8
Yes	2	0.5
Indecisive	46	11.7
No	55	14.0
No, it's not enough.	286	73.0
Total	392	100,0

Before asking participants about their purchasing experiences with butter-based products, the question "Do you have any opinion on the imitation, adulteration, and fraudulent practices applied to and/or likely to be applied to butter products?" was posed to gauge their thoughts and perspectives. The statements, grouped under five categories in the diagram shown in Figure 1, were identified. The most common type of fraud they perceived was related to the purity of the butter.

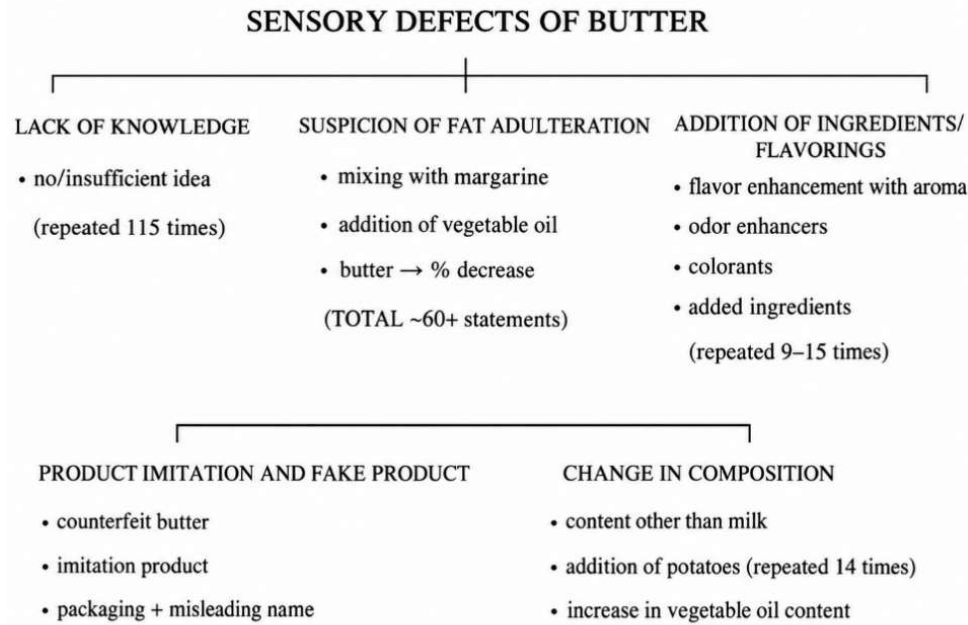


Figure 2. Data analysis regarding participants' responses to the question: "Do you have any knowledge concerning the forms of imitation, adulteration, and fraud practiced—or likely to be practiced—in products containing butter?"

Purchasing Experience

Participants were asked whether they had previously purchased specific types of products currently available in markets and similar retail outlets that feature the term "with butter" (or "butter-flavored") on their labels or packaging (see Table 1). In accordance with the study's ethical approval requirements, the brand names and specific product identifiers have been omitted from the text. The products were categorized as follows: "sweet/salty biscuits and cookies" (Table 6), "ready-made meals" (Table 7), "frozen foods" (Table 8), and "confectionery" (Table 9).

Table 6. Chart regarding the sweet/salty and biscuit/cookie category for products labeled as containing butter.

Product	Quantity	%
Not purchased	206	52.55
Butter Cookies	130	33.16
Butter Cookies with Black Cumin	18	4.59
Beypazarı Kurusu with Milk and Butter	14	3.57
Cocoa Butter Petit Beurre Biscuits	15	3.83
Cinnamon Butter Cookies	6	1.53
Coffee Butter Cookies	3	0.77
Chocolate-Orange Butter Cookies	0	0
Total	392	100.00%

According to the data in Table 6, 52.5% of the participants stated that they did not purchase any of the listed products. Among the products that were purchased, the most preferred item was the "Brand X" butter cookie.

Table 7. Chart regarding the "butter-labeled" ready-meal category.

Product	Quantity	%
Not purchased	355	90.3
Easy Cook Buttered Jumbo Shrimp	14	3.5

Çayeli Beans with Butter	12	3.05
Chicken Döner & Buttered Rice Pilaf – Not purchased	6	1.5
Easy Cook Buttered Jumbo Shrimp & Chicken Döner & Buttered Rice Pilaf	3	0.76
Chicken Döner & Buttered Rice Pilaf	2	0.51
Total	392	100.00%

In the "ready-to-cook meals with butter" category shown in Table 7, 90.3% of the participants stated that they had not purchased any of the products. Among the products that were purchased, the "X Easy-Cook Jumbo Shrimp with Butter" was the most frequently cited item.

Table 8. Graph regarding the "frozen foods labeled as containing butter" category.

Product	Quantity	%
Not purchased	250	63.7
Butter Puff Pastry	132	33.6
Butter Cheese Börek	10	2.5
Total	392	100.0

Table 8 presents the butter-containing products listed in the frozen food category. Participants indicated that they did not purchase the products, at a rate of 63.7%. Brand X butter-based puff pastry was reported as purchased by 33.6% of participants.

Table 9. Graph regarding the confectionery category labeled as containing butter.

Product	Quantity	%
Not purchased	235	59.9
Butter Confectionery	134	34.1
Butter Çekme Halva	23	5.8
Total	392	100.00

Table 9 presents the products in the confectionery category. While 59.9% stated they did not make a purchase, 34.1% indicated they had purchased the "X brand" butter-flavored confectionery product.

Table 10. Purchase / Content comparison.

Product Group	Perceived Value	Butter Expectation	Actual Content	Consumer Response	Conclusion
Cookies–Snacks	Taste, convenient consumption	High name effect	1–32%, but preference rate is not related to content	Highest purchase rate	Taste and habit are the determining factors
Ready-to-Eat Meals	Convenience, savory satiety	Moderate	2–5% butter	Moderate purchase rate	Intended use, rather than content, is influential
Traditional Products	Locality / sense of trust	Moderate	4.5–16%	Low/moderate preference	Authenticity alone is not sufficient

Frozen Products	Specific experience	Low expectation	5% butter + margarine	Demand exists among a specific consumer segment	Experiential consumption
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The research findings presented in Table 10 indicate that the relationship between ingredient composition and purchasing behavior for butter-containing products is not direct. In particular, in the cookie and snack categories, high butter content did not increase consumer demand; conversely, products with the lowest butter content (e.g., cookies containing 1% butter) were more frequently purchased by consumers. This suggests that factors such as taste, habit, accessibility, and price play a more decisive role in consumer preferences than ingredient transparency.

In the ready-to-eat food category, consumer expectations are lower; products offering convenience were purchased despite having low butter content. While the perception of "authentic and trustworthy ingredients" appears relevant for traditional products, this factor did not prove to be a decisive driver of purchasing decisions. In the seafood category, consumption preferences are specific and experience-oriented, appealing to a more limited yet loyal consumer base.

Overall, even when butter is prominently highlighted in the product name and packaging, the low actual butter content often goes unnoticed by consumers or fails to significantly influence their behavior. The proportion of butter used is not the primary variable explaining purchasing tendencies. These results demonstrate that behavioral factors—such as past experience, taste expectations, and intended use—carry more weight in consumer product selection than information regarding specific ingredients.

Discussion

This study examined the ingredient information and labelling of packaged food products marketed with references to butter, together with consumers' awareness of food fraud, purchasing experiences, and perceptions of food safety and regulatory oversight. The findings indicate that the prominence of butter-related claims on packaging does not always correspond to a similarly prominent declaration of butter in the ingredient list. This pattern was particularly evident in the cookie and biscuit categories, in which some products declared relatively low proportions of butter, while others listed butter flavouring without clearly declaring butter as an ingredient. These observations highlight the importance of examining product names, packaging claims, and ingredient declarations together when evaluating how butter-related information is communicated to consumers.

An important distinction must be made between the composition declared on product labels and the actual composition of the products. The product analysis in this study was based on packaging information and did not include laboratory testing. Therefore, the reported percentages represent declared ingredient information and cannot independently establish the verified butter content of the products. Similarly, when butter was not listed as an ingredient, this indicates that butter was not declared in the ingredient information examined; it does not constitute laboratory evidence that the product contained no butter. Despite this limitation, the findings identify cases in which the prominence of butter-related wording warrants closer examination in relation to the information provided in ingredient lists. The relevant question is whether the overall presentation of each product enables consumers to understand its composition accurately and whether the labelling complies with the applicable provisions of the Turkish Food Codex.

The relationship between packaging, product information, and consumer decision-making provides a useful context for interpreting these findings. Kuru and Ceylan (2019) examined the influence of packaging design on purchasing behaviour, while Gunaratne et al. (2019) experimentally investigated how different chocolate packaging designs influenced consumers' product evaluations and willingness to purchase. Research has also shown that visual and textual packaging elements can attract consumer attention and shape product preferences (Fenko et al., 2018). Together, these

studies highlight the role of packaging in communicating product characteristics and shaping consumer responses. In the present study, the emphasis placed on butter in product names and packaging may influence how consumers interpret the products, particularly when ingredient information is less prominent than the product name. However, the present research did not experimentally assess packaging design or isolate its effect on purchasing decisions. Consequently, the findings are consistent with the broader literature on packaging and consumer behaviour but do not establish that butter-related packaging claims directly cause particular purchasing choices.

Price may also be relevant to consumer responses to food labelling. Silinkina (2025, p. 506) discusses the role of food labelling in consumer trust and purchasing decisions, while Fernqvist et al. (2024) identify price, product information, sensory perceptions, context, and personal and social influences as factors associated with food choice. This perspective is relevant to the present study, in which butter cookies were among the frequently reported purchases, although some products in this category declared relatively low proportions of butter. However, the available data do not establish that these products were purchased more frequently because they were cheaper or because of their declared butter content. The survey did not link the price and composition of individual products to the purchasing decisions of individual respondents. Therefore, price, taste expectations, product accessibility, and habitual purchasing should be considered possible explanations for the observed purchasing patterns rather than confirmed determinants.

The survey findings also indicate a distinction between self-reported awareness and reported purchasing experiences. Fifty-seven per cent of respondents indicated familiarity with concepts related to food adulteration and fraud. This result suggests that these concepts were recognised by a substantial proportion of the sample; however, familiarity with terminology should not be equated with objectively measured knowledge of food fraud. The purchasing data likewise suggest that awareness of food-related concerns does not necessarily translate into consistent purchasing practices based on ingredient information. However, the findings do not demonstrate that awareness has no influence on consumer behaviour. Rather, they indicate that awareness alone is insufficient to explain purchasing patterns and that consumer decisions may involve multiple considerations. Further research using validated knowledge measures and product-specific purchasing scenarios would help clarify the relationship between food fraud awareness and actual purchasing behaviour.

The open-ended responses provide additional insight into the food categories that respondents associate with a risk of adulteration. Cooking fats and oils, honey, sucuk, dairy products, and olive oil were among the products identified by participants as potential areas of concern. These responses demonstrate that respondents associate food fraud with the possibility of ingredient substitution and manipulation. In relation to butter-labelled products, the declaration of vegetable oils or flavourings alongside butter-related claims may therefore be relevant to consumers' concerns about product authenticity and transparency. Nevertheless, these findings reflect respondents' perceptions rather than verified evidence of adulteration in the products or categories mentioned. This distinction is important because perceived risk and confirmed food fraud represent different forms of evidence and should not be interpreted interchangeably.

Perceptions of regulatory oversight constitute another important finding. In the survey, 73% of respondents selected the strongest negative response category concerning the adequacy of food inspections. When both negative response categories are combined, approximately 87% of respondents expressed an unfavourable view of inspection adequacy. This distinction is important for accurately representing the results. The findings indicate substantial concern about regulatory oversight among the participants, but they do not independently demonstrate that existing inspection mechanisms are objectively insufficient. Similarly, 93% of respondents considered the health consequences associated with food adulteration to be important. This result reflects the perceived importance of potential health consequences rather than an objective assessment of respondents' health-risk knowledge or the actual health effects of the products examined. Taken

together, these findings highlight the relevance of consumer trust, perceived food safety, and confidence in regulatory oversight within discussions of food labelling and food fraud.

Overall, the findings suggest that clear and consistent communication of product composition is important when butter is emphasised in product names or packaging. Consumers should be able to interpret such claims alongside accessible and understandable ingredient information. Manufacturers should therefore ensure that product names, packaging statements, and ingredient declarations communicate product characteristics consistently. Regulatory authorities may also consider whether existing labelling practices provide sufficient clarity and whether additional guidance is needed to minimise potential consumer misunderstanding. However, proposals such as establishing minimum butter-content thresholds or introducing additional labelling requirements require separate legal, technical, and regulatory assessment. The present study identifies issues warranting further examination but does not, on its own, establish that any particular product violates food-labelling legislation.

Several limitations should be considered when interpreting these findings. First, the product analysis covered 15 packaged products available in selected national supermarket chains during the data collection period; therefore, the results should not be generalised to all butter-labelled products on the Turkish market. Second, because the analysis relied on ingredient declarations rather than laboratory testing, the study cannot verify the actual composition of the products. Third, the consumer survey used snowball sampling and therefore does not provide a probability-based representation of the Turkish population. In addition, the product-label analysis and consumer survey were analysed separately, without a direct product-level linkage to individual purchasing decisions. Accordingly, the study cannot determine whether a specific product's declared butter content influenced a particular respondent's purchase. Future research could address these limitations by combining laboratory-based composition analysis with systematic coding of packaging claims and visual elements, a more representative consumer sample, and product-specific or experimental investigations of purchasing behaviour. Such research would help establish more clearly how declared ingredient information, packaging, price, and consumer knowledge relate to perceptions of authenticity and food purchasing decisions.

Conclusion

This study examined the consistency between butter-related claims and declared ingredient information on packaged food products, alongside consumers' awareness of food fraud, purchasing experiences, and perceptions of food safety and regulatory oversight. The findings provide insights into how butter is presented on product packaging and how consumers report their awareness and purchasing experiences in relation to food authenticity.

First, the product-label analysis identified differences between the prominence of butter-related claims on packaging and the ingredient information provided for certain products. In some cookies and biscuits, relatively low proportions of butter were declared, while other products listed butter flavouring without clearly declaring butter as an ingredient. These findings highlight the importance of examining product names, packaging claims, and ingredient lists together to assess the clarity of information communicated to consumers. However, because the analysis was based on packaging information rather than laboratory testing, the findings concern declared ingredient composition and do not independently establish the actual butter content of the products.

Second, the consumer survey revealed that familiarity with concepts related to food adulteration and fraud does not necessarily correspond to purchasing decisions based exclusively on ingredient information. Although 57% of respondents reported familiarity with these concepts, the purchasing data indicate that consumers continued to report purchasing products in categories where some items declared relatively low proportions of butter. These findings suggest that awareness alone may not fully explain consumer purchasing behaviour. Nevertheless, the study did not directly measure the individual effects of price, taste, habit, or convenience, nor did it establish a causal

relationship between declared butter content and purchasing decisions. Further research is therefore needed to determine how these factors interact with consumer knowledge and product perceptions.

Third, the survey revealed substantial concern about regulatory oversight. Seventy-three per cent of respondents selected the strongest negative response category regarding the adequacy of food inspections. When both negative response categories are combined, approximately 87% expressed an unfavourable assessment of inspection adequacy. In addition, 93% of respondents considered the health consequences associated with food adulteration to be important. These findings demonstrate the relevance of perceived food safety and confidence in regulatory oversight among the participants, although they should not be interpreted as objective evaluations of inspection effectiveness or consumers' actual knowledge of health risks.

The study contributes to the literature by bringing together an analysis of declared ingredient information for selected butter-labelled products and a consumer survey addressing food fraud awareness, purchasing experiences, and perceptions. By examining these two components within the same research project, it highlights questions concerning the clarity of butter-related claims and the relationship between food labelling and consumer perceptions. However, because the product analysis and survey were conducted and interpreted separately, the study cannot establish a direct relationship between the declared composition of individual products and the purchasing decisions of individual respondents.

The findings have implications for food manufacturers and regulatory authorities. Manufacturers should ensure that product names, packaging statements, and ingredient declarations communicate product characteristics clearly and consistently. Regulatory authorities may consider reviewing relevant labelling practices and strengthening appropriate inspection and public information mechanisms. Greater accessibility of ingredient information and transparent communication about product composition may also help consumers make more informed purchasing decisions. Proposals such as establishing minimum butter-content thresholds for the use of butter-related claims, introducing additional labelling requirements, or expanding QR-code-based traceability systems warrant further evaluation in light of applicable legislation, technical feasibility, and consumer needs.

Several limitations should be acknowledged. The product analysis was restricted to 15 packaged products available in selected supermarket chains, and the declared ingredient information was not verified through laboratory analysis. Furthermore, the consumer survey relied on snowball sampling, which limits the generalisability of the findings to the wider Turkish population. The separate analysis of product labels and survey responses also prevented direct product-level comparisons with individual purchasing behaviour. Future studies could address these limitations by incorporating laboratory-based composition analysis, a broader and more representative product sample, probability-based consumer sampling, and experimental research examining how packaging claims and ingredient information influence consumer evaluations and purchasing intentions.

In conclusion, the findings emphasise the importance of clear, consistent, and transparent communication of ingredient information on packaged foods marketed with references to butter. Improving the correspondence between product claims and declared composition, alongside strengthening consumer access to reliable information, represents a relevant direction for future research and practice. Further evidence is required, however, to establish how specific labelling practices affect purchasing behaviour and to determine which regulatory measures would be most effective in promoting informed consumer choices.

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