CONSUMER BEHAVIOR IN THE SOURDOUGH BREAD MARKET: ECONOMIC AND MARKETING FACTORS AS DETERMINANTS OF PURCHASE

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ABSTRACT

Sourdough bread has been gaining popularity among consumers, driven by an increasing interest in healthier dietary choices. Experts in food technology, nutrition, medicine, and gastronomy emphasize the numerous health benefits associated with its consumption, including improved digestion and a lower glycemic index. The aim of this study was to segment consumers using cluster analysis based on their attitudes and habits related to sourdough bread consumption. Four distinct consumer clusters were identified, each characterized by different perceptions of the product. The second part of the analysis examined the influence of economic and marketing factors on consumer attitudes, while the socio-demographic analysis provided insights into dietary habits and bread consumption patterns. The results contribute to a deeper understanding of consumer behavior and can serve as a foundation for the development of targeted marketing strategies, as well as for improving sourdough bread production and promotion. This research highlights the importance of aligning food production with consumer expectations and the growing demand for nutritionally beneficial products.

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Introduction

The term "sourdough bread" refers to bread made using starter cultures. Sourdough is a mixture of flour and water that is subsequently fermented by both homofermentative and heterofermentative lactic acid bacteria (LAB) and yeasts (El Sheikha & Mahmoud, 2016; Vrček et al., 2014; Catzeddu, 2019). This fermentation results in a product with a characteristic flavor, aroma, and volume (El Sheikha & Mahmoud, 2016; Vrček et al., 2014; Papadimitriou et al., 2019). Lactic acid bacteria and yeasts can develop spontaneously or through the process of inoculation. Spontaneous fermentation is the oldest known method of producing this type of bread. In the bread-making process, the primary role of yeast is to generate carbon dioxide, while lactic acid bacteria are responsible for producing lactic acid, acetic acid, or both (Catzeddu, 2019). Although sourdough is an equally valid method for leavening dough, baker's yeast is far more commonly used today. One reason for the preference toward this method is the complexity involved in maintaining sourdough starters and monitoring the fermentation process (Catzeddu, 2019). There are notable differences between sourdough bread and bread made with baker's yeast, particularly in terms of sensory qualities, texture, and nutritional value. Sourdough bread has a more pronounced flavor, a denser crumb structure, and a longer shelf life compared to bread made with baker's yeast. It also offers superior nutritional benefits, as documented in numerous scientific studies, including a lower glycemic index (GI) and increased mineral bioavailability. In recent years, growing consumer demand for tastier and healthier bread has contributed to the rising popularity and price of sourdough bread (Brant, 2007; Catzeddu, 2019).

Product quality can be defined as a product's ability to fulfill a specific function, which may involve attributes such as durability, ease of use, reliability, and other valuable features (Amanah, 2010). Consumers often base their purchasing decisions on the perceived quality of the product (Malekpour, 2022). Quality can also be viewed as the outcome of a subjective process in which the customer compares their expectations with experience (Suchánek, 2017). As a multidimensional concept, product quality requires manufacturers to focus on and emphasize specific attributes of the product (Matzler & Sauerwein, 2002; Witell & Lofgren, 2007). Moreover, producers need to identify the key attributes that drive consumer satisfaction and motivate consumption (Harrington, 2017). These key factors typically include the product itself, its price, associated services, distribution channels, and brand image (Zamazalová, 2008). The Total Food Quality Model is commonly used to explore how consumers perceive the quality of gastronomic products. This model encompasses four key, interrelated dimensions: the hedonic characteristics of the food (or gastronomic product), its health aspects, convenience, and the production process (Mascarello, 2014). Since consumer assessments and perceptions can vary significantly, their consequences are inevitable. These consequences manifest in consumer behavior and attitudes, as well as in the ways consumers seek out and process information about specific products (Brunsø et al., 2002; Grunert, 2005). In addition to this model, food and beverage quality is also evaluated by consumers based on external and internal product attributes (Lee & Lou,

2011). Extrinsic attributes are features related to a product that do not form part of its physical composition, such as price, brand, country of origin, quality seals, or even store layout (Ampuero & Vila, 2006; Gellynck et al., 2009). In contrast, intrinsic attributes pertain to the product itself and include elements such as appearance, color, shape, and presentation (Gellynck et al., 2009). In addition to these attributes, perceptions of product quality are also influenced by sensory characteristics, health-related aspects, and factors associated with preparation and storage suitability (Choroszy, 2021). The relative importance of these attributes depends on the consumer's sociodemographic profile (Choroszy, 2021). Sociodemographic characteristics typically include gender, age, socioeconomic status, and household size. Environmental factors encompass economic variables, while marketing factors relate to the labeling and declarations of food products. One of the key attributes influencing a consumer's decision to purchase a product, including bread, is taste. Producers have recognized the importance of this sensory characteristic, as consumers often perceive taste as the primary indicator of bread quality (Longin et al., 2020; Rapp et al., 2017). The flavor of bread, including sourdough varieties, is shaped by compounds found in both the crumb and crust. Microbial activity during the fermentation process plays a crucial role in determining the final flavor profile. Although over 510 compounds (both volatile and non-volatile) have been identified in bread, only a limited number contribute significantly to its overall taste (Pu et al., 2019a). Among the most important flavor-contributing chemical compounds are aldehydes, alcohols, esters, ketones, and pyrazines (Pico et al., 2016; Warburton, 2021). The baking process also contributes to flavor development through the Maillard reaction (Xu et al., 2020; Dong, 2020). Studies have shown that the regulation of temperature and baking time during this reaction is a key factor influencing the formation of flavor-active compounds in the final product (Antonella et al., 2020; Fu et al., 2020).

Texture is another important parameter influencing consumer decisions when purchasing ready-to-eat products (Altamirano-Fortoul et al., 2012). The understanding of texture as a sensory property of food varies between consumers and scientific literature (Chen, 2015). Within scientific circles, several definitions exist, all converging on the notion that food texture is a multisensory experience (Chen, 2015). However, texture can also be a point of criticism among consumers. For example, a study examining barley bread investigated the correlation between sensory perception (specifically texture) and the perception of satiety. The results confirmed a relationship between these two variables. In the context of bread, texture refers to the uniformity and freshness of the crumb, the crispness of the crust, and the overall mouthfeel (Altamirano-Fortoul et al., 2012). Fermentation plays a crucial role in shaping bread texture. Organic acids, such as lactic and acetic acid, lower the product's pH, which in turn slows starch retrogradation. The result is a softer texture and extended shelf life (Islam & Islam, 2024). However, attention must be paid to the duration of fermentation. If fermentation is prolonged beyond optimal levels, changes in gluten proteins can occur, leading to reduced loaf volume and a firmer, less desirable texture.

Materials and methods

This study aimed to examine the factors influencing consumer perceptions of bread quality, with a particular focus on sourdough bread, in Serbia. The research was conducted in the spring of 2025 through an online survey. The study was based on the research model developed by Gellynck et al. (2009) and adapted from the work of Bajkanović et al. (2024). The survey questionnaire was derived from these studies, with certain modifications. These modifications primarily concerned the structure of the questions: in addition to general questions about bread, respondents were also presented with items specifically related to sourdough bread. The survey was divided into three sections. The first section addressed sociodemographic characteristics, including gender, age, household size, and socioeconomic status. The second section of the survey focused on questions designed to provide insight into respondents' bread purchasing and consumption habits. Participants were asked to indicate how frequently they consume bread, with which meals they typically consume it, whether they bake bread themselves or purchase it, and, in the case of purchasing, to specify the place of purchase. Regarding sourdough bread in particular, respondents were informed that its preparation involves the use of wild yeast, i.e., yeast produced naturally rather than obtained industrially. Based on this, one of the questions in this section asked respondents who bake their bread to indicate whether they use industrial or wild yeast in the process. The third section of the survey examined consumer perceptions of bread quality based on internal and external attributes. Using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), respondents rated their level of agreement with statements related to these attributes. The internal attributes assessed focused on the nutritional and health-related aspects of the product. Respondents were asked to indicate the extent to which they agreed with statements such as "Sourdough bread is healthier" and "Sourdough bread is suitable for diabetics." Statements such as "Bread is suitable for digestion" and "Bread is a basic foodstuff" reflected the nutritional aspect of bread. In addition to these, the survey also included attributes related to food properties, sensory qualities, and production. Examples of statements within these categories included "Sourdough bread has a distinctive taste" and "Few people are familiar with the bread-making process." As noted in the introduction, quality perception was also assessed in relation to factors linked to the external environment, namely economic and market-related aspects. Within these dimensions, respondents expressed their level of agreement with statements such as "Bread is expensive" and "Bread from artisanal bakeries is of better quality." A total of 310 respondents participated in the study. The collected data were analyzed using SPSS 15.0. The framework for identifying the key structural variables was adapted from the study conducted by Bajkanović et al. In their research, the structural variables included sensory, health, and nutritional dimensions, whereas in the present study, the focus was on sensory, health, and production variables. These variables served as the basis for analyzing consumer perceptions of bread quality. Cluster analysis was employed to segment consumers according to their perceptions of bread quality. To identify differences among clusters for the selected factors, a one-

way ANOVA was conducted. Additionally, chi-square tests were used to examine associations between clusters and respondents' sociodemographic characteristics, as well as their bread-purchasing habit

Results and discussions

Cluster analysis identified four distinct consumer groups. The results indicate clear differences between the clusters. The first cluster consists of enthusiasts – consumers for whom all three factors (sensory, health, and production) have positive loadings. The second cluster comprises consumers for whom none of the examined aspects are important, as reflected in their negative factor loadings. Notably, the strongest negative loading in this group is associated with the production aspect. These consumers also tend to perceive bread as "unhealthy." The third cluster includes consumers who place importance on the health aspect of bread (positive factor loading) but hold negative views toward both the production and sensory aspects (negative factor loadings). The fourth cluster consists of consumers who have a positive attitude toward the production and sensory aspects but a negative attitude toward the health aspect. For this group, the strongest positive loading is associated with the sensory aspect.

Table 1. Market segmentation based on the perception of bread quality using cluster analysis (n=310)

Cluster Market segmentation	1 Enthusiasts	2 Unhealthy	3 Healty	4 Taste	Sig.
Shere %	47,7	9,4	26,1	17,1	
Factors					
Health aspect	1.04	-1.22	0.32	-0.57	0.000
Senzory aspect	0.90	-1.22	-0.47	0.51	0.000
Produce aspect	0.88	-1.34	-0.37	0.47	0.000

$p<0.05$

As noted in the introduction, consumer perceptions of bread quality can be shaped by a variety of factors, including environmental influences (economic and marketing), socio-demographic characteristics, and product-related attributes. The attributes corresponding to the latter category are presented in *Table 2*. One of the sensory-related statements included in the survey was "The taste of bread is uninteresting (boring)." The analysis revealed no statistically significant differences between the clusters regarding this statement. However, for the other two sensory-related statements, "Sandwiches are a popular product" and "Special types of bread go well with festive meals," statistically significant differences were observed. Consumers from three of the clusters expressed a positive attitude toward these statements, whereas members of the "unhealthy" cluster maintained a neutral stance. The highest ratings for these two items were recorded among the first and fourth clusters. For the fourth cluster, this finding is unsurprising,

as the sensory aspect of bread is an important factor for these consumers. The first cluster, labeled enthusiasts, demonstrates a particularly strong interest in the sensory experience of bread. This group can be characterized as consumers who are open to trying new products and eager to explore diverse sensory experiences offered by food.

Table 2. Factors influencing the perception of bread quality (attributes related to food properties)

Consumer segment	Enthusiastic	Unhealthy	Healty	Taste	Sig.
Sensory taste The taste of bread is perceived as uninteresting (boring).	2.39	2.24	2.50	2.26	0.513
Sandwiches are considered a popular product.	4.71	3.16	4.31	4.45	0.000
Special types of bread complement festive meals well.	4.65	3.02	3.86	4.45	0.000
Health attributes Additives are used in bread production.	4.40	3.35	4.14	4.51	0.000
I have limited knowledge about the nutritional value of bread.	3.26	2.82	3.29	3.16	0.156
Production attribute Few people are familiar with the bread production process.	4.03	3.04	3.80	3.92	0.000

$p<0.05$

Based on the above findings, it can be concluded that clusters with a positive attitude toward these statements equally enjoy both additive-free bread and bread served with spreads or fillings. Regarding the health-related attributes of bread, statistically significant differences were observed between the identified clusters. In modern food production, the use of additives has become almost unavoidable (Bajkanović et al., 2021). However, research conducted by Bajkanović and colleagues indicates that many consumers lack sufficient awareness of the presence of additives in food products and their potential negative effects on human health. Given that certain additives may adversely affect consumer health, an important question arises: is it possible to produce any consumer food product entirely without them? A study conducted in 2016 by Jonkuvienė and colleagues offers a promising perspective. The researchers highlighted the potential of Lactobacillus reuteri as a starter culture additive that could enhance both the safety and shelf life of bread, presenting an alternative to conventional chemical additives.

All consumer groups agreed that additives are used in bread production, except for those in the second cluster, whose responses indicated a neutral stance. Considering that this group demonstrates a negative attitude toward all examined aspects, it is reasonable to assume that they either do not consume bread or consume it in minimal quantities. While most consumers are aware that additives are used in the production of food products, a more concerning issue emerges: their insufficient knowledge about the nutritional value of bread. Bread remains a staple food in many countries and represents an important component of a balanced diet (Rybicka, 2019; Canesin, 2021).

Consequently, ensuring a balanced and optimized nutrient profile in bread is essential (Aghalari et al., 2022). Bread provides key nutrients, including carbohydrates, proteins, iron, calcium, and vitamins (Alsuhaibani, 2018). With an average daily consumption of 300 grams, bread can supply the body with a meaningful proportion of essential nutrients, thereby contributing to the maintenance of an adequate nutritional status (Namayandeh SM, 2015–2016). Scientific studies have demonstrated that sourdough fermentation can enhance the bioavailability of nutrients and lower the glycemic index (GI) of bread. However, it remains unclear whether these effects on cereals translate into tangible clinical benefits (Ribet et al., 2023). Although our findings reveal no statistically significant differences between cluster groups on this issue, the generally neutral attitudes expressed by consumers are cause for concern. Particularly noteworthy is that even the group for whom the health aspect is of primary importance also expressed neutrality toward this claim. This result suggests that consumers may possess only partial awareness of bread's nutritional properties, with much of their knowledge likely derived from limited or superficial sources, most often media channels such as advertisements, rather than from comprehensive dietary education.

The environmental factors examined in this study included economic and marketing influences *(table 3)*. Based on the collected and processed data, we can conclude that statistically significant differences exist between clusters concerning economic factors. Although all cluster groups generally expressed either a neutral stance or disagreement with the presented statements, notable differences still emerged. For the first statement ("Bread is expensive"), significant statistical differences were observed between the first and second cluster groups, as well as between the first and fourth cluster groups. In both cases, enthusiasts perceived bread as expensive compared to consumers in the second cluster. The second statement ("Because of the current inflation, I cannot afford better-quality bread") revealed significant differences between the second and fourth clusters. Consumers in the fourth cluster group agreed that inflation limits their ability to purchase higher-quality bread. The third statement explored the role of price in bread selection, aiming to capture the extent to which cost considerations influence consumer purchasing decisions. Based on the collected and processed data, the following results were obtained: significant statistical differences were found between the fourth and second, fourth and first, and second and third consumer groups. For consumers in the fourth group, price plays an important role when choosing bread, particularly in comparison with the second group. Likewise, for the first group of consumers, price is somewhat more important than it is for the fourth group. In the comparison between the second and third groups, price was found to be more important to the third group of consumers. Globally, bread consumption often increases during times of crisis (Stanković et al., 2007). However, data from the Statistical Office of the Republic of Serbia show the opposite trend: bread consumption in Serbia has been declining since 2015. In 2007, average consumption was 109.5 kilograms per person per year. The most recent research indicates that a three-member household consumes 282 kilograms of bread annually, corresponding to approximately 97 kilograms per person.

A similar decline has been observed in parts of Europe. Research conducted in the Czech Republic shows that the population consumes more wheat-based pastries than bread. Historical data indicate that immediately after World War II, bread consumption exceeded 80 kilograms per capita, but by 2016 this figure had fallen by almost 50%, reaching just 39 kilograms per person. In contrast, the consumption of pastries in 1949 was 16 kilograms per capita, but in the following decades, this figure tripled (Suchánek et al, 2018) It is also important to consider the broader economic and social consequences arising from recent global events, particularly the COVID-19 pandemic and the Russian–Ukrainian war. A relevant study conducted in Italy by Amicarellio and colleagues examined the state of artisanal bakeries and the production of artisanal bread in 2021. The paper analyzes the costs of bread production in artisanal bakeries before and during the crisis caused by the COVID-19 pandemic and the war. The aim of the study was to use economic assessments and analysis to highlight methods for reducing or avoiding these costs, with the goal of helping artisanal bakeries maintain their competitiveness and secure their place in the market (Amicarellio et al., 2023) Given these contextual factors, the neutral attitude observed among the cluster groups toward bread consumption is somewhat unexpected. This result may indicate that even within these clusters, overall bread consumption is relatively low. Regarding marketing aspects, the analysis revealed significant statistical differences between the clusters. For the first statement ("Bread is an artisanal product") and the third statement ("Bread from artisanal bakeries is of better quality compared to others"), the first and second cluster groups agreed, while the third and fourth clusters displayed a neutral attitude. To proceed with the analysis, it is necessary to clarify the term artisanal, specifically, what types of foods fall under this category and whether sourdough bread qualifies as such. According to the School of Artisanal Food, artisanal products share several defining characteristics: they are produced using non-industrialized methods; the preparation process is often passed down from generation to generation; producers maintain a special relationship with, and respect for, the ingredients used; and the creators possess extensive experience, a scientific understanding of the preparation process, and a strong sense of environmental and economic responsibility. What further distinguishes artisanal products, according to this school, is the continuous pursuit of education and refinement of craft by their makers. Based on these criteria, sourdough bread can be confidently classified as an artisanal product.

Table 3. Factors influencing the perception of bread quality (external factors)

Consumer segment	Enthusiastic	Unhealthy	Healthy	Taste	Sig.
Economic factors Bread is expensive	3.26	2.53	3.12	3.44	0.001
Due to the current inflation in the market, I cannot afford better-quality bread	2.86	2.06	2.65	2.41	0.008
The price of bread is important to me when choosing it	3.22	2.12	3.09	2.92	0.000

Consumer segment	Enthusiastic	Unhealthy	Healthy	Taste	Sig.
Marketing Bread is an artisanal product.	4.22	4.20	3.32	3.45	0.000
The description of the bread is more important than the nutritional value and/or the brand.	3.37	3.12	2.79	2.86	0.016
Bread from artisan bakeries is of better quality than others.	4.09	3.98	3.04	3.17	0.000

$p<0.05$

Based on the presented results, significant statistical differences within the socio-demographic framework were found for the variables Age and Average income, while no significant differences were observed for Gender. Although gender differences were not statistically significant, certain tendencies can still be noted. More women than men participated in this research, with the majority belonging to the tasta cluster group; interestingly, most male respondents were also in this same group. Regarding age, the healthy cluster group was characterized by a higher proportion of younger respondents. In terms of income, the majority of participants reported earnings below the national average. This fact is likely to influence their decisions regarding where they purchase bread, as well as their daily bread consumption. Consequently, given that most respondents have below-average incomes, the results obtained for economic factors, particularly in terms of price sensitivity, are not surprising. The place of bread purchase by cluster group is presented in *table 4*. Based on the data, there are significant statistical differences among the clusters. Unlike the research on which this study was based, where as many as 80% of respondents reported buying bread from artisanal bakeries, in our study, respondents generally do not have the habit of visiting such establishments. The largest proportion of participants purchase bread from grocery stores. Possible reasons include the wide product assortment, shopping convenience (e.g., discounts), and lack of time to visit a bakery or artisanal bakery. Although there are no official statistics on the number of bakeries offering sourdough bread, their presence is notably smaller compared to commercial bakeries and supermarkets. Another contributing factor is price: sourdough bread is generally more expensive than bread sold in standard bakeries or supermarkets, which may further influence purchasing decisions.

Table 4. Influence of socio-demographic characteristics on the perception of bread quality

Characteristic			Costumer segment						p
	Enthusiastic		Unhealthy		Healthy		Taste		
Gender	n	%	n	%	n	%	n	%	
Male	26	29,2	8	9	28	31,5	27	30,3	p=0,105
Female	46	20,8	41	18,6	76	34,4	58	26,2	
Age									
18-30	14	23,9	14	7,7	75	41,4	46	25,4	p=0,000
31-45	17	23,9	22	31	10	14,1	22	31	

Characteristic			Costumer segment						p
	Enthusiastic		Unhealthy		Healthy		Taste		
Over 45	9	15,5	13	22,4	19	32,8	17	29,3	
Income									p=0,005
Below average	16	18,8	6	7,1	38	44,7	25	29,4	
Average	48	32,7	9	31	19	23,5	22	41,5	
Above average	72	23,2	49	15,8	104	33,5	84	27,4	

p<0.05

Table 5 presents the results on daily bread consumption across all four cluster groups. The analysis indicates significant statistical differences (p = 0.005). The majority of respondents consume less than 100 grams of bread per day, which is slightly more than 60%, with most of them belonging to the "unhealthy" group. This finding aligns with data from the Republic Institute of Statistics, which confirms a steady decline in bread consumption in Serbia. When the place of purchase and bread consumption patterns are considered alongside economic factors, the results are unsurprising. The table also includes information on the type of yeast used by respondents who bake bread at home. These results are consistent with expectations: only 20 respondents in total (across all cluster groups) reported using wild yeast. Future research could explore the factors that discourage individuals from making their yeast and engaging in the process of preparing sourdough bread.

Table 5. Analysis of consumer habits when consuming bread

Characteristic			Costumer segment						p
	Enthusiastic		Unhealthy		Healthy		Tasste		
Place of bread purchase	n	%	n	%	n	%	n	%	p=0,002
Bakery	20	27,8	9	18,4	36	34,6	41	48,4	
Artisan bakery	5	6,9	6	12,2	4	3,8	4	4,7	
Grocery store	38	52,8	24	49	59	56,7	33	33,8	
I don't buy it, I make it myself	9	12,5	10	20,4	5	4,8	7	8,2	
Daily consumption of bread									
Less than 100 grams	30	41,7	32	65,3	49	47,1	47	55,3	p=0,113
100-200	37	51,4	15	30,6	44	42,3	29	34,1	
More than 200 grams	5	6,9	2	4,1	11	10,6	9	10,6	
Use of yeast									p=0,090
Starter (Wild yeast)	9	17	5	13,2	4	6,9	2	3,6	
Commercial yeast (dry, fresh)	44	83	33	86,8	54	93,1	53	96,4	

p<0.05

Conclusions

The study identified four distinct consumer segments in terms of their perception of sourdough bread quality. The structural variables used as the basis for market segmentation were derived from the work of Gellynck et al. and Bajkanović et al. The first segment, labeled enthusiasts, comprises consumers with a positive attitude toward all three factor loadings: health, sensory, and production aspects. The second segment consists of consumers who perceive bread as unhealthy. The third segment includes those who prioritize the health aspect of bread, while the fourth segment is characterized by consumers who place the greatest importance on the sensory (taste) aspect. From this, we can conclude that each group's perception of bread quality reflects its specific priorities. For enthusiasts, bread is not only healthy and tasty, but the production process also plays a significant role in shaping their positive perception. For this group of consumers, price is not a determining factor when choosing bread. They recognize bread as an artisanal product and believe that it is of superior quality when purchased from artisanal bakeries. Although the price of artisanal bread is higher than that of bread sold in commercial bakeries or supermarkets, this does not appear to influence their purchasing decisions. Considering the income structure, it can be inferred that this segment includes individuals with above-average earnings. Furthermore, it is noteworthy that some enthusiasts bake bread themselves using wild yeast, and a higher proportion of them consume 100 grams or more of bread per day.

The second cluster group consists of consumers who perceive bread as unhealthy, as reflected by the negative factor loadings across all three dimensions: sensory, health, and production. When considering economic and marketing factors, the latter appear to carry somewhat more weight for this group. Interestingly, these consumers maintain a neutral attitude toward all economic variables. Despite viewing bread as unhealthy, they hold a positive opinion of products from artisanal bakeries, believing that bread from these establishments is of better quality. Notably, within this cluster, the largest proportion of respondents bake their own bread, making them second only to the enthusiasts in terms of using wild yeast for bread preparation. These observations suggest that this group primarily regards commercially available bread in stores and bakeries as unhealthy. Consistent with this perception, their bread consumption tends to be low, mostly less than 100 grams per day.

The third cluster group consists of consumers who, unlike the previous group, perceive bread as healthy, as indicated by a positive factor loading for this variable. However, despite this perception, their familiarity with the nutritional value of bread remains neutral. Additionally, they agree with the notion that few people are familiar with the bread production process. The most common places for bread purchase within this group are bakeries or local grocery stores. Notably, only a small proportion of these consumers bake bread themselves or buy it from artisanal bakeries. Given their positive perception of bread's health benefits, it was expected that this group would include a higher number of individuals who bake bread at home using wild yeast or who purchase bread from artisanal bakeries. However, the results indicate otherwise. The last group

consists of consumers for whom the sensory aspect of bread is particularly important. Similar to previous groups, they believe that bread from artisanal bakeries is of superior quality. However, when examining their purchasing habits, it becomes evident that this group, too, generally does not frequent artisanal bakeries. Based on the findings of this research, several conclusions can be drawn. Firstly, the overall nutritional knowledge and appreciation of sourdough bread among all consumer groups remain low. Although the majority of respondents report incomes below the national average, the price of bread does not appear to be a decisive factor in their purchasing decisions. This suggests that most consumers could afford higher-quality bread but generally do not frequent bakeries that produce it (dopuniti). Additionally, among those who bake bread at home, a larger proportion use commercially purchased or fresh yeast rather than wild yeast in the preparation process.

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Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.). They should be brief.

Conflict of interests

The authors declare no conflict of interest.

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