KSÜ Tarım ve Doğa Derg 28 (5), 1335-1343, 2025
KSU J. Agric Nat 28 (5), 1335-1343, 2025
https://doi.org/10.18016/ksutarimdoga.vi.1633905

Determination of Olive Oil Market Segmentation with Conjoint Analysis

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ABSTRACT
Changing living conditions in the world have led to a transformation in consumption habits. It can be said that some factors that are thought to be effective on consumption are also affected by this. Therefore, it is inevitable to evaluate the determinants of the consumption dimension as a dynamic process. In this study, important factors in olive oil consumption preference were analyzed by conjoint analysis. The research was conducted throughout Türkiye. Accordingly, it was determined that the most important factor in olive oil preference is the place where olive oil is purchased. This is followed by quality, packaging, price, and color. As a result, it can be said that olive oil purchased directly from the producer is preferred in the first place based on the idea that the olive oil purchased should be safe or natural, rather than the idea that price is perceptually decisive in consumer preference. When the preference characteristics are combined, it can be stated that the most preferred criterion is olive oil with a price of $9/lt, cold pressed, glass packaged, light colored, and sold directly by the producer. It can be suggested as a correct approach that the actors who make market organizations should take these criteria into consideration and turn to the appropriate organization at every stage of the supply chain.

Agricultural Economics

Research Article

Article History
Received : 05.02.2025
Accepted : 25.07.2025

Keywords
Olive oil consumption
Multiple preferences
Market segmentation
Conjoint analysis

Zeytinyağı Pazar Segmentasyonunun Konjoint Analizi ile Belirlenmesi

ÖZET
Dünyada değişen yaşam koşulları tüketim alışkanlıklarında da dönüşüme yol açmıştır. Tüketim üzerinde etkili olduğu düşünülen bazı faktörlerin de bundan etkilendiği söylenebilir. Bu nedenle tüketim boyutunun belirleyicilerinin dinamik bir süreç olarak değerlendirilmesi kaçınılmazdır. Bu çalışmada zeytinyağı tüketim tercihinde önemli faktörler konjoint analiz yöntemi ile incelenmiştir. Araştırma Türkiye genelinde yürütülmüştür. Buna göre zeytinyağı tercihinde en önemli faktörün zeytinyağının satın alındığı yer olduğu belirlenmiştir. Bunu kalite, ambalaj, fiyat ve renk izlemektedir. Sonuç olarak, tüketici tercihinde fiyatın algısal olarak belirleyici olması düşüncesinden ziyade, satın alınan zeytinyağının güvenli veya doğal olması gerektiği düşüncesiyle ilk sırada üreticiden doğrudan satın alınan zeytinyağının tercih edildiği söylenebilir. Tercih özellikleri birleştirildiğinde en çok tercih edilen ölçütün 9$/lt fiyatına sahip, soğuk sıkım, cam ambalajlı, açık renkli ve doğrudan üretici tarafından satılan zeytinyağı olduğu söylenebilir. Piyasa organizasyonlarını oluşturan aktörlerin bu kriterleri göz önünde bulundurarak tedarik zincirinin her aşamasında ilgili organizasyona yönelmeleri doğru bir yaklaşım olarak önerilebilir.

Tarım Ekonomisi

Araştırma Makalesi

Makale Tarihçesi
Geliş Tarihi : 05.02.2025
Kabul Tarihi : 25.07.2025

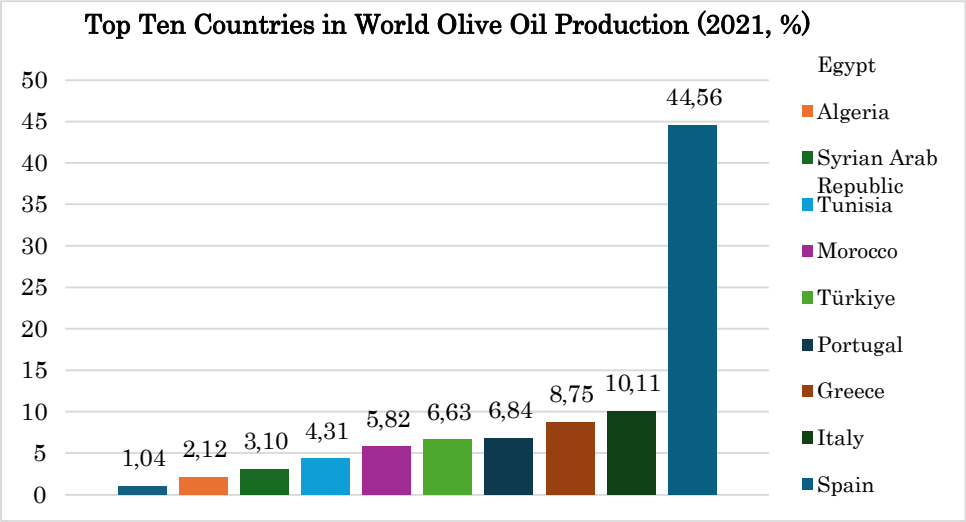
Anahtar Kelimeler
Zeytinyağı tüketimi
Çoklu tercih
Pazar segmentasyonu
Konjoint analizi

Atıf Şekli: Doğan, H.G., Bayramoğlu, Z., Ağızan, K., & Candemir, S., (2025) Zeytinyağı Pazar Segmentasyonunun Konjoint Analizi ile Belirlenmesi. *KSÜ Tarım ve Doğa Derg 28* (5), 1335-1343. https://doi.org/10.18016/ksutarimdoga.vi.1633905

To Cite : Doğan, H.G., Bayramoğlu, Z., Ağızan, K., & Candemir, S., (2025). Determination of Olive Oil Market Segmentation with Conjoint Analysis. *KSU J. Agric Nat 28* (5), 1335-1343. https://doi.org/10.18016/ksutarimdoga.vi.1633905

INTRODUCTION

A significant portion of the world's olive oil production takes place in Mediterranean countries. Olives require specific climatic conditions in terms of growing. In this respect, although it is observed that it grows on 5 continents, it grows in 38 countries on a global scale. Within this limited distribution, it can be said that 98% of the world's olive trees are in the region called the Mediterranean basin. It can be stated that more than 90% of the world's olive oil production is produced in this region, as well as olive production (Öztürk et al., 2009). In countries where olive oil production is high, it can be said that consumption is also high (Irmak and Ercan, 2017). The countries with the highest olive oil production are Spain, Italy, Greece, Portugal, Türkiye, Morocco, Tunisia, Syria, Algeria, and Egypt (FAO, 2024). Olive oil consumption is attracting increasing attention worldwide due to its health benefits and culinary versatility. The International Olive Council has estimated that global olive oil consumption will rise to 3.05 million tons in the 2022/2023 harvest year (Li, 2024). Increases in olive oil consumption in regions other than those where production and consumption are concentrated can be explained by its perceptual health benefits arising from its taste and odor characteristics (Dierkes et al., 2011). In (Foscolou et al., 2019)'s study, olive oil consumption alone was associated with successful aging, especially in older individuals.



Source: FAO, 2024.

Figure 1. Top Ten Countries in Olive Oil Production in The World
Şekil 1. Dünya Zeytinyağı Üretiminde Ilk On Ülke

According to Figure 1, Spain alone accounts for 44.56% of the world's olive oil production, with 1,492,069 tons, while Türkiye ranks fifth with 222,100 tons, accounting for 6.63% of the production. In terms of consumption, Spain ranks first with 607,670.98 tons, followed by Italy with 534,401.70 tons, Türkiye with 194,403.11 tons, Portugal with 149,450.87 tons, and Greece with 137,201.34 tons. When per capita consumption is analyzed, Portugal ranks first with 14.52 kg, followed by Greece with 13.13 kg, Spain with 12.79 kg, Italy with 9.02 kg, and Türkiye with 2.29 kg. Although Türkiye is an important producer in the Mediterranean basin, it is far behind other major world olive oil producers in terms of consumption (International Olive Council, 2015; FAO, 2024).

Olive oil production, foreign trade, and consumption in Türkiye in the last 20 years are analyzed in Figure 2. In the last 20 years, olive oil exports in Türkiye increased by 24.02%, and imports increased approximately 33.09 times. While production has increased about 3 times, consumption has increased about 32.78 times. Although Türkiye has increased its production during this period, it has lagged behind the rate of olive oil consumption. This can be explained by consumption habits, the need for raw materials, and awareness of the importance of olive oil in dietary composition. The fact that olive oil is effective in preventing cardiovascular, hypertension, cancer, digestive, and nervous system diseases has been shared with the public through some studies conducted in recent years. In a scientific conference organized at Harvard University, it was emphasized that olive oil consumption should be increased for a healthy life (Cömert et al., 2008; Cömert et al., 2012; Laleli et al., 2009). (Covas et al., 2015) stated that this increase in consumption is due to health-conscious consumers seeking the benefits of olive oil. Studies have shown that olive oil consumption can positively affect several health markers, including cardiovascular risk factors, lipid profile, insulin sensitivity, inflammation, and endothelial function. For example, the Mediterranean diet, in which olive oil is a staple food, has been associated with longevity and reduced incidence of chronic diseases such as coronary heart disease. This situation can be considered within the scope of factors other than price that affect demand in economic theory. Therefore, as in the rest of the world, there has been an

increase in the demand for olive oil in Türkiye for various reasons. Here, it can be stated that the effect of sensitivities related to food safety is important. The difficulties in the processes of ensuring food safety, the linear relationship between food and healthy living, the transformation in consumer expectations, and the related change in purchasing behaviors show that producers and suppliers need more comprehensive information for new methods to be implemented. Therefore, it is inevitable to evaluate consumer expectations and services in a dynamic process (Thompson and Sinha, 2008; Song and Parry, 2009; Lindgaard et al., 2011). Because the basis of market segmentation is to know what consumers' needs are. According to consumer expectations, producers or firms will choose one of two ways to organize this dynamic process. These are scientific knowledge and social knowledge (Garcia et al., 2014). Therefore, it may be considered a rational way to determine consumer tendencies with scientific knowledge in determining olive oil consumption preference criteria and to reveal findings for market segmentation.

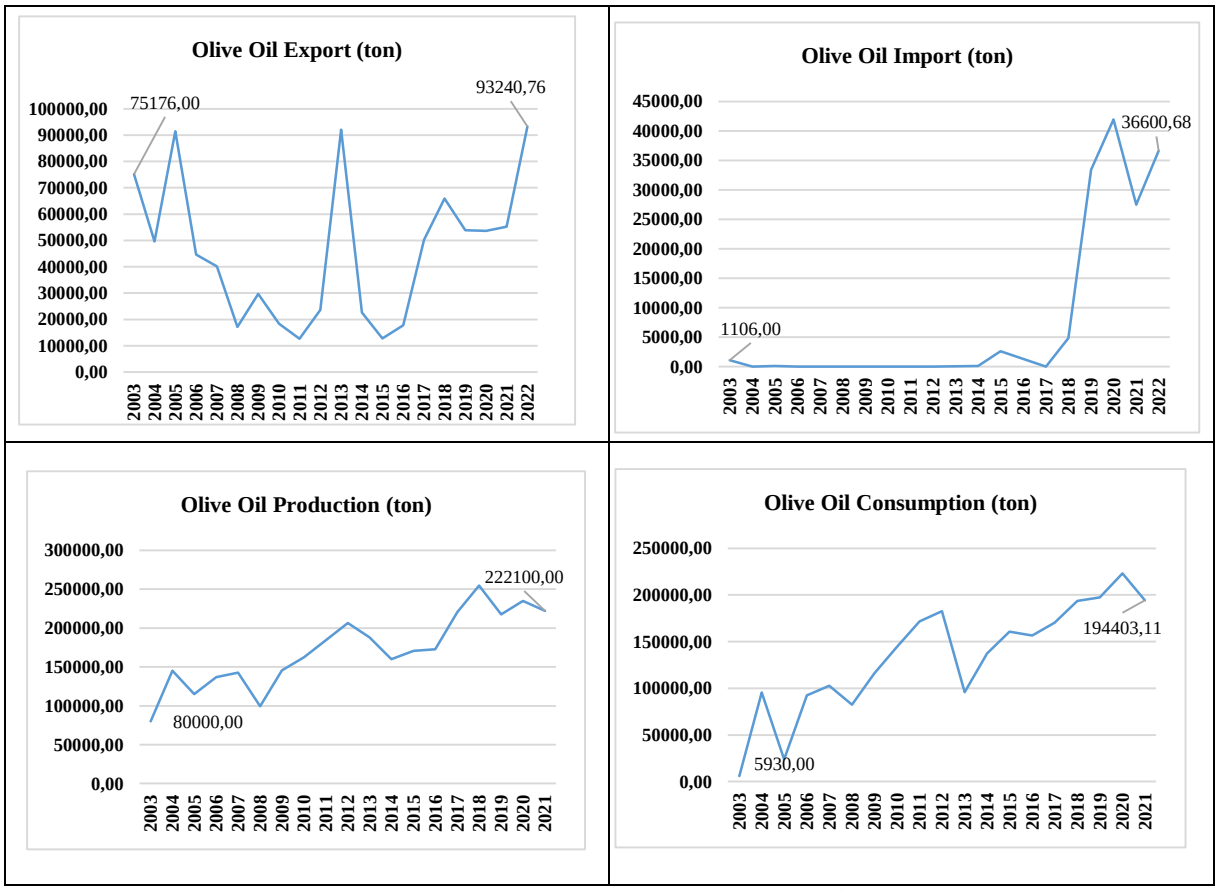


Figure 2. Olive Oil Foreign Trade, Production and Consumption Trends in Türkiye (FAO, 2024 and authors' calculations)
Şekil 2. Türkiye' de Zeytinyağı Dış Ticareti, Üretim Ve Tüketim Trendi (FAO, 2024 Ve Yazarların Hesaplamaları)

Theoretical Framework

Olive oil preference has been the subject of extensive research among consumers, driven by a combination of health and sensory considerations (García-González and Aparicio, 2010). Studies have shown that consumers tend to favor certain attributes when choosing olive oil, such as low price, extra virgin quality, and organic certification (Cañete and Díaz, 2017). Preferences may also vary geographically. For example, in Spain, Catalan olive oils are preferred over others, while olive oils from different Spanish regions are preferred over imported ones (Yangui et al., 2014). In Türkiye, the abundance of olive oil production in the Aegean region influences consumers in various cities to include olive oil in their diets (Özbek et al., 2020). Consumers' acceptance and preference for olive oil attributes have been investigated in different regions, and interesting patterns have been revealed. For example, Greek consumers exhibit a local trend, preferring Greek olive oil over oils from other Mediterranean countries, and similarly, Chilean consumers prefer domestic products over Italian and Spanish products (Latino et al., 2022). Market segmentation studies have identified distinct classes of olive oil where price is an important determinant of consumer preference but not the dominant determinant (Vita et al., 2021). In addition, consumer preferences in traditional olive oil production regions often prioritize local production, showing a preference for oils produced closer to consumption areas (Pérez and Gracía, 2023). Cross-cultural studies have also highlighted differences in

consumers' olive oil preferences. For example, US consumers have shown a preference for plain Spanish refined olive oil and California olive oil with fruity, floral, and sweet notes (Vázquez-Araújo et al., 2014). Moreover, consumers' perceptions of olive oil quality can be influenced by factors such as color; some associate, yellow-colored oils with lower quality (Gámbaro et al., 2014). Studies on consumers' olive oil preferences have examined various aspects, including the role of individual knowledge in shaping preferences. Personal characteristics and levels of knowledge have been found to influence consumers' preferences for healthier olive oils (Vita et al., 2020). Olive oil preferences may also be influenced by intrinsic and extrinsic attributes of the product; consumers may evaluate different attributes differently (Oplanic et al., 2022). As a result, consumers' preferences for olive oil are multifaceted and influenced by a variety of factors such as health concerns, sensory attributes, geographical origins, branding, and sustainability. Understanding these preferences is crucial for producers and marketers to tailor their products to effectively meet consumer demands. By considering the various factors that influence olive oil preferences, stakeholders in the olive oil industry can better meet consumer needs and improve overall market satisfaction.

Some Study Regarding Olive Oil Production, Consumption, and Foreign Trade in Türkiye

The market for agricultural products is under constant pressure to cater to the demands and consumption patterns of consumers, both economically and socially, both locally and globally. For this reason, market research is widely used by producers and marketers, taking into account consumer demands. In the literature, there are many studies on olive oil consumption in Türkiye and internationally. On a country-by-country basis, research on olive oil has been conducted in leading producing countries such as Italy (Antonialli et al., 2018; Chinnici et al., 2016, Greece (Chousou et al., 2017) and Spain (Salazar-Ordóñez et al., 2018) and in leading producing countries such as Argentina (Pardo et al., 2018), Chile (Romo-Muñoz et al., 2018), Brazil (Mesquita et al., 2016), Germany (Ward et al., 2003)] or the United Kingdom (Martínez et al., 2002). In Türkiye, (Irmak and Ercan, 2017) revealed the outlook of olive oil consumption in Türkiye with the data obtained from TUIK household surveys. (Öztürk et al., 2009) examined the olive oil economy in Türkiye. (Cömert et al., 2012) examined consumption preferences in Gölbaşı district of Ankara province and evaluated the knowledge levels of local people. (Tapkı et al, 2020; Aksoy and Kütük, 2014) studied olive oil awareness in regions where olive oil is not produced. (Özdoğan and Tunalıoğlu, 2017; Savran and Demirbaş, 2012; Özata and Cömert, 2016) revealed the quality characteristics of olive oil in their studies. When the studies conducted in Türkiye are evaluated, it can be stated that the studies are either limited to a geographical area or are based on literature and are limited in terms of national coverage. Figure 2 shows the olive oil export, import, production, and consumption of Türkiye.

In this study, the factors affecting olive oil consumption preferences in Türkiye were analyzed. It is expected that the research will contribute to the processes of determining the market segmentation in olive oil, which is highly preferred in terms of consumption habits in recent years, regulating the relevant market, and organizing the supply according to consumer expectations.

MATERIAL and METHOD

Method Used in Obtaining Data

The survey was conducted in 7 provinces selected from 7 geographical regions to represent the whole of Türkiye. The selected provinces and household sizes are given in Table 1. The sampling was carried out on households, and the surveys were conducted randomly. The socio-economic characteristics of the participants are expressed in the results section. There is a total of 10,100,070 households in the selected provinces (TÜİK, 2023). The proportional sampling method was used to determine the sample size (Newbold et al., 1995).

Table 1. Sample Size and Distribution by Province in Türkiye
Tablo 1. Örnek Hacmi ve İllere Göre Dağılımı

Province	Household number	Rate	Sample size
İstanbul	4.827.915	47.80	649
Ankara	1.920.000	19.00	258
Erzurum	205.813	2.00	28
Diyarbakir	425.723	4.20	57
Trabzon	273.720	2.70	37
Antalya	887.229	8.80	119
İzmir	1.559.670	15.40	210
Total	10.100.070	100.00	1358

$$n = \frac{N\,(pq)}{(N-1)\sigma^2 px + (pq)}$$

In the formula; n= Sample size
N= Main population (10.100.070)
$\sigma^2\ Px$: variance of the ratio p= The rate of olive oil consumption that maximizes the sample size.
q= 1-p

In the equation, N: population, n: sample volume, z: table value corresponding to 3.50% margin of error at 99% confidence limit, p: probability of consuming olive oil (taken as 50%), $\sigma 2\ Px$: variance of the proportion, 1-p: probability of not consuming olive oil. As a result of the calculation, the sample volume was calculated as 1358 questionnaires, and it was planned to be conducted in a way to ensure homogeneity in the country-wide distribution. The survey forms prepared by the authors were applied in the provinces determined within the scope of the obtained sample size.

Method Used to Analyze Data

In this study, conjoint analysis was used to determine the factors affecting olive oil preference. Conjoint analysis follows the decomposition approach. It assumes that the overall preference for a product (or service) is determined by preferences for specific features of the product, that these preferences come together, and that the participant maximizes his/her utility when deciding on the features of the product (Heck et al., 2024). When applying conjoint analysis, participants are asked questions indirectly, assuming that they cannot express their preferences reliably. Participants are presented with various sets of features with different characteristics and are asked to rate them. Based on the participants' overall ratings, their relative preferences (partial value utilities) for different levels are inferred. The determined partial value utilities can be used in simulations to investigate which feature combinations are most preferred in the relevant product choice (Orme, 2010). Conjoint models are constructed according to the additive part-value rule, which is generally preferred (Ness, 1997; Hair et al., 1990). In the additive part-value model, it is assumed that the part-value of each attribute level is independent and that the total utility of any product profile is the sum of the part-values of the attribute levels of that product profile. Assuming that S_{ij} represents the consumer's level of preference for any alternative product profile (for one of the sixteen choices presented to him), W_{iat} represents the utility or part-value corresponding to level t of attribute a for the person i, and Y_{jat} represents a variable expressing the existence of level t of attribute a in product profile j, the additive part-value can be formulated as follows:

$$S_{ij} = \sum_{\alpha=1}^{n} W_{iat} Y_{iat}$$

The aim of conjoint analysis is to calculate W_{iat} values for each feature level.

In addition to traditional conjoint analysis, the most widely used conjoint analysis today is choice-based conjoint analysis (Sawtooth Software, 2017). In choice-based conjoint analysis, participants are presented with different concepts and asked to choose one of them; In traditional conjoint analysis, participants rate the alternatives. Selecting attributes and attribute levels is a critical step in choice-based conjoint analysis. Additionally, manufacturers' preferences are categorized by the size of their business based on the average scores they give to their conjoint cards.

RESULTS and DISCUSSION

When the socio-demographic characteristics of the consumers participating in the research were analyzed, the average age was 41.92 years, 55.22% male, 44.78% female, 2.5% primary school, 56.48% university graduates, and 43.30% had a monthly income of $1507 and above. The average number of individuals in the household was 3.65, and the average monthly food expenditure was $443. The average monthly olive oil consumption amount can be expressed as 2.25 kg. The results of the conjoint analysis conducted to determine the factors affecting olive oil preference in Türkiye are given in Table 2.

Pearson's R and Kendall's tau values, which are important indicators of the appropriateness of the analysis results, were statistically significant (p<0.01). When the utility scores and importance levels obtained from Table 2 were examined, it was determined that the most important feature was the place of purchase (33.06%), followed by quality (31.32%), packaging (18.46%), price (13.68%) and color (3.45%), respectively. It can be stated that the producers' evaluation of the place of purchase as the most important parameter in olive oil preference is related to the expectation that the product they demand is natural and reliable. This can be seen from the high benefit score of the producer within the place of purchase and the high benefit score of the cold pressing feature among the

quality parameters. In a similar study conducted in Türkiye, it was determined that 43.81% of consumers purchased olive oil directly from the producer (Barış, 2017).

The combinations formed according to the results of the conjoint analysis conducted to determine the criteria for consumers' olive oil purchasing preferences are given in Table 3.

Table 2. Utility Scores and Average Importance Values as a Result of Conjoint Analysis
Tablo 2. Conjoint Analizi Sonucunda Fayda Puanları ve Ortalama Önem Değerleri

Factors Affecting Olive Oil Preference		Utility Estimate	Std. Error	Averaged Importance Score (%)
Place of purchase	Market	-0.206	0.032	33.069
	Manufacturer	0.312	0.038	
	Factory	-0.107	0.038	
	Riviera	-0.259	0.032	
Quality	Normal Pressing	0.027	0.038	31.325
	Cold Pressed	0.232	0.038	
Packaging	Pet	-0.168	0.032	18.465
	Cam	0.122	0.038	
	Tin	0.046	0.038	
Price ($)	<9	-0.140	0.032	13.688
	9-15	0.075	0.038	
	>15	0.065	0.038	
Color	Open	-0.032	0.032	3.453
	Middle	0.022	0.038	
	Cove	0.010	0.038	
(Constant)		2.716	0.030	
		Value		Sig. (p<0.05)
Pearson's R		0.988		0.000
Kendall's tau		0.929		0.000

Table 3. Total and Ranking of Utility Values for All Profiles
Tablo 3. Tüm Profiller İçin Fayda Değerlerinin Toplamı ve Sıralaması

Sorting	Price ($)	Quality	Packaging	Color	Place of Sale	Total Score
1	<9	Cold Pressed	Glass	Open	Manufacturer	0.495
2	<9	Normal Pressing	Tin	Open	Manufacturer	0.214
3	>15	Cold Pressed	Tin	Cove	Market	0.147
4	9-15	Normal Pressing	Glass	Middle	Market	0.040
5	9-15	Riviera	Pet	Cove	Manufacturer	-0.029
6	>15	Riviera	Pet	Middle	Manufacturer	-0.040
7	9-15	Cold Pressed	Pet	Open	Market	-0.099
8	<9	Cold Pressed	Pet	Middle	Factory	-0.160
9	>15	Riviera	Glass	Open	Factory	-0.211
10	9-15	Riviera	Tin	Open	Factory	-0.276
11	>15	Normal Pressing	Pet	Open	Market	-0.314
12	<9	Normal Pressing	Pet	Cove	Factory	-0.377
13	<9	Riviera	Glass	Cove	Market	-0.473
14	<9	Riviera	Tin	Middle	Market	-0.536
15	<9	Riviera	Pet	Open	Market	-0.804
16	<15	Riviera	Pet	Open	Market	-0.804

Table 3 shows the combinations created to determine the olive oil purchasing criteria of consumers. When the obtained utility scores are analyzed, it can be stated that the most preferred profile among the 16 combinations is profile no. 1. According to this result, it can be said that consumers in Türkiye prefer olive oil with a price of $9/lt, cold pressed, glass packaged, light colored and sold directly by the producer. This result coincides with the results of the importance levels in Table 2.

Olive oil is a food that is widely consumed in the world. It is preferred in almost every region in terms of both health benefits and flavor. There are many factors affecting the consumption in question. These factors create a consumption profile. In this study, the consumption profiles of households in Türkiye were determined. Consumers' olive oil consumption profile was determined as olive oil with a price of $9/lt, cold pressed, glass packaged, light colored, and sold directly by the producer. In terms of the criteria presented to the consumers, it was revealed that the most important criterion was the place of sale of olive oil. This can be explained by the sensitivity of access to safe food. Buying olive oil directly from the producer was determined as an important criterion. Price ranked fourth in terms of importance. As a result of such consumer behavior, it has been inevitable for olive oil producing enterprises to introduce new strategies instead of price-oriented strategies. These can be realized through the creation of secure brand promotion (Go´mez and Caldentey, 1999; Loureiro and McCluskey, 2000), the orientation of the brand towards quality, information, and design, and the creation of production systems specifically oriented towards Mediterranean culture. Here, a behavior that can be called consumer loyalty may emerge. One study emphasizes that consumer loyalty is more important than other criteria such as promotional practices and price (Gázquez-Abad and Sánchez-Pérez, 2009).

CONCLUSION and RECOMMENDATION

The results obtained from this research show that, although consumers' preference for the place where olive oil is purchased as a priority in their preference criteria stems from the generally accepted relationship between olive oil and health in the world, it directly reflects the consumer's perception of the producer's trust in the product sold. Because sensitivities regarding safe food are increasing day by day. Although this perception seems to be in favor of the producer and consumer, it may cause an economic loss for other actors in the olive oil supply chain. For this reason, the actors in the supply chain need to carry out their organizations with an emphasis on product sales policies, advertising, promotion, and consumer perception, especially on health. Considering production and consumption levels, taking these perceptions and criteria into consideration in production studies to meet the increasing consumption trend is considered important in terms of market organization and market balance of olive oil. Therefore, it is very important for policymakers to pay attention to studies on consumer trust, together with the actors in the food supply chain.

Contribution Rate Statement Summary of Researchers

The authors declare that they have contributed equally to the article.

Conflict of Interest

The authors of the articles declare that they have no conflict of interest.

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