UNDERSTANDING CONSUMER SEGMENTS: MARKET PREFERENCES OF URBAN OLIVE CONSUMERS IN IRAQ

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Abstract

The Iraqi olive industry faces substantial changes due to the government's ambitious efforts to promote the expansion of olive cultivation. Despite this growth, the market for olive products remains underexplored, particularly from a consumer behavior perspective. This study aims to identify distinct consumer segments within Iraq's urban olive market by examining the behavioral, demographic, and psychographic characteristics that differentiate these groups. A questionnaire capturing these characteristics was administered to 250 olive consumers across three major regions. The principal component analysis together with cluster analysis were utilized to analyze the data. Principal component analysis identified two factors, grouping olive consumers into Loyal Local Olive Enthusiasts and Price-Conscious Olive Oil Consumers. Cluster analysis yielded three segments: Health-Focused Table Olive Consumers, Value-Seeking Olive Oil Consumers, and Trusting Local Olive Consumers. The identified segments differ from each other regarding their product choices, their price awareness, and their commitment to domestic products. The research results offer producers and policymakers specific guidance to create marketing approaches that meet consumer needs while promoting sustainable growth of Iraq's olive industry.

Keywords: Cluster analysis; Consumer preferences; Market segmentation; Olives; Principal component analysis.

1. Introduction

Iraq produced over 33,000 tons of olives in 2021 (FAOSTAT, 2023). Although primarily a food item, olives also hold cultural and religious significance. Studies indicate that 98%

of Iraqi olive production is processed as table olives, with only 2% used for oil (USAID, 2011). Since local supply cannot meet demand, Iraq imports a considerable quantity of olives from countries such as Turkey, Egypt, and Spain (OEC, 2020). This situation has prompted both the Iraqi Central Government and the Kurdistan Regional Government to expand olive cultivation.

Olives have substantial potential to boost the income of rural communities. Despite this, the market for olive products in Iraq remains relatively underexplored. To meet consumer demand, olive producers need insights into the preferences of different consumer groups. Consumer segmentation is a valuable tool for understanding the perspectives and intentions of particular groups (Nie & Zepeda, 2011). Through segmentation, marketers can better target their strategies to particular consumer groups, making these strategies more effective and relevant, which ultimately increases consumer satisfaction and loyalty. Dividing olive consumers into distinctive groups can help policymakers and industry stakeholders design and deliver marketing strategies that improve the profitability of the Iraqi olive industry. However, consumer preferences and market opportunities in Iraq's olive market remain unclear due to a lack of data.

While consumer behavior in global food markets has been widely studied, much research on olives mainly focuses on production economics or generic market trends. Few studies examine detailed segmentation of olive consumers based on behavioral and psychographic attributes. For example, Tempesta and Vecchiato (2019) examined demand for extra-virgin olive oil in Italy's Veneto region, focusing on factors such as production location, origin designation, organic certification, and traditional cultivation. They found strong market segmentation, with preferences varying for Protected Denomination of Origin, handcrafted processes, and organic production. The study also highlighted the importance of traditional landscape preservation in olive growing, but only for certain market segments.

Di Vita et al. (2021) identified market segments among homogeneous olive oil consumers by exploring preferences and quality perceptions, revealing three main quality classes: basic, popular, and premium. This study emphasized how different quality perceptions influence consumer choices. Zhllima et al. (2015) analyzed consumer preferences for table olives and their willingness to pay, using conjoint choice experiments and latent class analysis. Results showed a strong preference for domestically produced table olives, with varying preferences and willingness to pay across groups. Other studies (Panico et al., 2014; Roselli et al., 2017; Liberatore et al., 2018; Ilak Perurić, 2020; Murgado-Armenteros et al., 2021) have also explored segmentation based on product attributes or health claims, mainly in more developed Mediterranean markets.

Despite providing valuable methodological and contextual insights, these studies primarily address mature markets, focusing on product attributes or pricing, and rarely combine detailed behavioral, demographic, and psychographic data for comprehensive segmentation. Moreover, there is a notable gap in research on emerging olive markets and consumer preferences in culturally unique, less-studied contexts like Iraq. The few available studies in Iraq (Hussein and Shaba, 2017; Abdulqader et al., 2022) have mainly focused on production or basic marketing outcomes, without systematically segmenting consumers or integrating behavioral and psychographic dimensions.

This study directly addresses these gaps by applying established segmentation methods to a new context of Iraq's urban olive market, incorporating a richer set of variables (demographic, behavioral, and psychographic). In doing so, it responds to calls

for increased diversity in food consumer research and offers practical guidance for local industry development and future academic work in market segmentation.

The main research question here is: Which behavioral and psychographic traits distinguish consumer segments in Iraq's urban olive market? By identifying and profiling these segments, the study offers valuable insights for producers and policymakers to tailor marketing strategies that better serve consumers and foster sustainable growth in Iraq's olive sector. To achieve this, a questionnaire was created and distributed. The study explores market trends by analyzing data from a sample of olive consumers using principal component analysis (PCA) and cluster analysis (CA). First, PCA identified key factors influencing preferences, then CA grouped consumers based on their characteristics.

The analysis identified three distinct consumer clusters: *Health-Focused Table Olive Consumers*, *Value-Seeking Olive Oil Consumers*, and *Trusting Local Olive Consumers*. These segments show a range of preferences, from price sensitivity to health awareness, providing useful guidance for businesses targeting specific niches. This research adds to the limited body of knowledge on consumer behavior in Iraq's olive market and offers practical insights for producers and marketers.

The paper is organized as follows: Section 2 describes the research methods, including data collection and analysis techniques. Section 3 presents the PCA and CA results and discusses the findings. Finally, Section 4 concludes with practical implications and suggestions for future research.

2. Methodology

2.1 Data Collection

This study was conducted in different regions of Iraq based on regional olive demand in different parts of the country. Regions included are the Kurdistan Region, the Nineveh Plain, and Southern Iraq. Based on the data provided by the official agricultural departments, the Nineveh Plains make up 60% of the Iraqi olive consumption market, while the Kurdistan Region and the other parts of Iraq make up 20% of the market each.

A structured, anonymous questionnaire was developed, and 250 olive consumers participated voluntarily. The questionnaire was pilot tested with 15 olive consumers to ensure content validity and clarity before full deployment, and minor refinements were made based on feedback. Data were collected through personal interviews. Participants were ≥18 years old, involved in family grocery shopping, and reported consuming table olives. The sample size was determined using a 90% confidence level and a 5% margin of error using the survey sample size formula presented by Taherdoost (2017). The survey consisted entirely of closed-ended questions. A random sampling method was employed due to the absence of precise population data for each region. The population was selected based on geographic locations, assuming differences between table olive consumers in each region in terms of demographic, psychographic, and behavioral characteristics. The Kurdistan Region, Nineveh Plain, and Southern Iraq were deliberately chosen to reveal the diverse preferences of urban olive consumers across Iraq. Each region provides unique insights into consumer behaviors and market dynamics, which align with the study's goal of identifying market opportunities for local olive producers. By incorporating these distinct regions, the study seeks to offer a thorough understanding of consumer segments and their purchasing behaviors within the olive market.

Data were collected in person at regional markets from September to December 2022. Due to the lack of data on consumer expenditure by official departments, primary data were collected. The political and economic conditions in the region constrained the process of data collection and limited the voluntary participation of olive consumers. For central and southern Iraq, the survey was distributed online via personal networks.

The questionnaire was structured with closed-ended questions designed to capture demographic, behavioral, and psychographic characteristics of olive consumers. The type of survey questions and scales is presented in Tables 1, 2, and 3. First, behavioral characteristics included olive type, purchase quantity, purchase frequency, supplier type, and product boycott, as shown in Table 1. The *type* variable was modeled using two dummy variables (table olive and olive oil), with raw olive as a baseline. The variable of *quantity* is a continuous variable representing the quantity of olive products purchased by an individual at least once in the four weeks before the study. The variable of *frequency* is continuous, representing the purchase frequency of olive products by an individual in the four weeks before the study. The variable for *supplier* was modeled using two dummies (retailer and wholesaler), where the farmer serves as a baseline. The variable for *boycott* equaled 1 if an individual has ever boycotted olive products because of a poor experience; 0 otherwise.

Next, psychographic characteristics included attention, product availability, purchasing from relatives, purchasing purpose, product loyalty, distance, and preference for local products, as shown in Table 2. Individuals who pay more attention to the price when purchasing the product were coded 1, while those who pay attention to the quality of the product were coded 0. The variable *availability* equaled 1 if an individual could find what they were looking for in olive products in markets; 0 otherwise. The lack of certification and labeling, especially for local products, has pushed some consumers to buy olive products from relatives to meet their demands. Individuals represented their opinion on the statement of usually buying olives from relatives with agree, disagree, and neither agree nor disagree, while the last opinion was used as a baseline.

The purpose of buying olive products took three levels (health benefits, culture, and others), and thus, two binary response variables were included in the analysis; others served as a baseline. An individual's loyalty to olive products was likely to correlate positively with olive consumption. The variable *loyalty* equaled 1 if an individual considered himself/herself loyal to local olive products and 0 otherwise. The distance to the point of sale is anticipated to reduce product consumption. Most respondents indicated they were willing to drive long distances to purchase olive products. Therefore, two binary response variables of agree and disagree were included in the analysis, while using neither agree nor disagree as a baseline. Finally, individuals who prefer buying local olives were coded 1, while those who prefer imported products were coded 0.

Then, demographic characteristics included age, gender, religion, marital status, education, employment, and income, as shown in Table 3. Age included 4 dummies (25–34, 35–44, 45–54, and 55+), where 18–24 served as a baseline. Gender was a binary variable, taking the value 1 if an individual is male and 0 otherwise. Religion was represented by including 3 dummy variables (Muslim, Christian, and Yazidi), with others serving as a baseline. Marital status was a binary indicator, taking the value 1 if single and 0 otherwise. Education included 2 dummies (bachelor's and master's or higher), with less than a bachelor's degree as a baseline. Employment was represented by including 4 dummy variables (part-time, unemployed, self-employed, and others), with full-time serving as a

baseline. Income was represented by including 3 dummy variables (1 to less than 2, 2 to less than 3, and 3 and above) with less than 1 million Iraqi dinars as a baseline.

2.2 Statistical Analysis

A multivariate statistical approach was used to analyze the survey data. A two-step analysis was performed. The first step utilized PCA to condense the information from the original variables into a reduced-dimensional space (Verde et al., 2015). The PCA was then used to utilize homogeneous consumer groups through the second stage of CA. By integrating the description of the phenomena, the PCA enables us to confirm which variables may best explain the primary attributes of consumers while minimizing the degree of information omitted in terms of explained variance. This is accomplished by generating a new set of orthogonal variables from the initial collection of correlated variables. Varimax rotation has been applied to optimize the sum of the variance of the square loadings and to make PCA results easier to comprehend (Kaiser, 1960). Lastly, factor loadings below 0.3 (Field, 2024: 692) were suppressed in the factor matrix analysis.

To measure the suitability of data for PCA, the Kaiser-Meyer-Olkin (KMO) and Bartlett's tests were used. The KMO test measures the sampling adequacy of the entire model and for each variable in the model separately. KMO values less than 0.5 indicate the variable is not adequate for PCA and therefore should not be included in the analysis (Mooi et al. 2018). From the Kaiser criterion, the value of the variable related to having a preference for local products was below 0.5, resulting in the removal of the variable from the analysis. To interpret the PCA results with confidence, the overall KMO result needs to be larger than 0.50 (Mooi et al. 2018). Estimating KMO using behavioral and psychographic characteristics of olive consumers resulted in an overall value of 0.59 for the KMO test, confirming the interpretation of the KMO test with certainty. While higher KMO values are preferable, values close to 0.6 are still considered acceptable (Field, 2024) for exploratory factor analysis in social science research, particularly when working with contexts where obtaining larger sample sizes may be challenging. Given the scarcity of prior data on Iraqi olive consumer behavior, the marginal KMO value reflects the inherent complexity and variability in this emerging market.

As a means to evaluate the goodness of the model, the Bartlett test is frequently employed to test the hypothesis that the identity matrix and correlation matrix correspond (Samantha Kumara & Canhua, 2010). The factorial model may not be appropriate when the Bartlett test is not significant, as this implies the identity matrix and correlation matrix may coincide. The chi-square test for Bartlett's test of sphericity resulted in a value of 645.67 with a p-value of 0.000, indicating that the variables were intercorrelated. Thus, the use of the factorial model is appropriate.

Finally, the PCA yielded two factors with eigenvalues exceeding 1 (Kaiser, 1960), effectively capturing 94% of the total variance. The results from the PCA were utilized to conduct a two-stage cluster analysis. In the first stage, Ward's linkage method was employed to create a hierarchical clustering that minimizes the sum of squared differences within each cluster (Zhllima et al., 2015). The three-group solution, with a Caliński-Harabasz pseudo-*F* value of 271.54, was the largest, indicating that this solution is the most distinct compared to the other group solutions. The second stage involved partitional clustering with k-means, utilizing the four clusters established in the prior stage (Alamgir

& Naveed, 2021). This led to an acceptable level of overlap (38%) between the two clustering methods.

3. Results and Discussion

3.1 Descriptive Statistics

The market research showed that table olives were the most popular product (64%), followed by olive oil (24%) and raw olives (12%), as shown in Table 1. Half of consumers reported buying one kilogram of olive products per week (50%). In terms of purchase frequency, 59% of consumers bought olive products once a week. Since 67% of consumers purchased olives from retailers, they are likely to influence consumer choice. A significant proportion of consumers boycotted olive products after poor-quality experiences. This typically occurred when products lacked consistent grading or were damaged by poor handling and processing. 1.

Table 1 – Behavioral Characteristics of Olive Consumers

Characteristics	Percentage
What type of olive products did you buy last week?	
Raw olive	12
Table olive	64
Olive oil	24
What quantity of olive products did you purchase last week?	
1	50
2	23.6
3	10.4
4	6.4
5 and more	9.6
What is your frequency of purchase in a week?	
1	59.2
2	28.8
3	10
4 and more	2
From whom do you usually purchase olive products?	
Farmer	22
Retailer	67.6
Wholesaler	10.4
Have you ever boycotted olive products because of a poor experience?	
Yes	23.2
No	76.8

Source: Authors' analysis

The survey revealed that table-olive consumers placed higher importance on product quality than on price, as indicated in Table 2. The findings indicate that producers and retailers should consider grading olives or adding value through processing to meet market requirements for different products. The majority of consumers could find the olive products they required in marketplaces. Local olive farmers distribute their products through pickle shops, yet their products also reach other retail outlets, including minimarkets. The political tensions between the Kurdistan Region in the north and the Central Government in the south could potentially limit the supply chain.

Most consumers select trusted suppliers, including relatives, to purchase olives because they want to avoid poor experiences and ensure product quality. A government-imposed national standard would establish trust between producers and consumers. The majority of respondents selected health advantages as their main reason for consuming table olives instead of cultural preferences. Most respondents expressed their commitment to local olive products. Social closeness between farmers and consumers should create stronger relationships, which would drive local consumers to choose products from local producers. Most participants indicated they would travel one mile to buy olive products. The high willingness to purchase local products stems from two main factors: consumer dedication to local products and the desire to stay healthy through olive consumption.

Table 2 – Psychographic Characteristics of Olive Consumer Segments

Characteristics	Percentage
What do you pay more attention to while buying olive products?	
Price	18
Quality	82
Do you usually find what you are looking for in olive products to purchase in markets?	
Yes	76.8
No	23.2
"You usually buy olives from relatives." How do you agree with this statement?	
Disagree	29.2
Neither agree nor disagree	25.6
Agree	45.2
Why do you buy olive products?	
Health benefits	74.8
Culture	22
Other	3.2
Do you consider yourself a loyal customer of local olive products?	
Yes	68.84
No	31.16
"I will take long distances to get olive products." How do you agree with this statement?	
Disagree	36.8
Neither agree nor disagree	21.2
Agree	42

Source: Authors' analysis

The survey participants who consumed olives were primarily middle-aged men, as shown in Table 3. Women tend to avoid surveys because of cultural and religious restrictions, which explains their underrepresentation in the study. The survey participants worked either full-time or operated their businesses, which indicates their ability to purchase olive products at market prices. The survey participants indicated that their monthly income fell below one million Iraqi dinars. People in the country showed reduced confidence in reporting their wealth status because of the unstable political and economic situation and security concerns. The reported income levels may be lower than the actual amounts due to these factors.

Table 3 – Demographic Characteristics of Olive Consumers

Characteristics		Percentage
Age	18-24	11.6
	24-34	24
	35-44	36.4
	45-54	16.4
	55+	11.6
Gender	Male	63.2
	Female	36.8
Religion	Muslim	70.8
	Christian	12.8
	Yazidi	13.2
	Other	3.2
Marital Status	Single	29.6
	Married	70.4
Education	Less than Bachelor	54.4
	Bachelor's degree	22.4
	Master's or higher degree	23.2
Employment	Full-time	41.6
	Part-time	12.8
	Unemployed	16.4
	Self-employed	29.2
Income (million IQD)	< 1	57.6
	1 to < 2	27.6
	2 to < 3	3.6
	3 and above	11.2

Source: Authors' analysis

The descriptive statistics provided an overview of consumer behaviors and preferences, which serve as a foundation for the subsequent cluster analysis aimed at identifying discrete consumer segments. The following section interprets these clusters in the socio-cultural context of the Iraqi olive market.

3.2 Principal Component Analysis

The PCA identified two underlying factors that explained approximately 93.98% of the total variance. The KMO test value (0.593) and the Bartlett test value (0.000) are significant concerning model fit, as shown in Table 4.

Table 4 – Rotated Component Matrix of the General Characteristics of Olive Product Consumption

Variable	Factor 1	Factor 2
	Loyal Local Olive Enthusiasts	Price-Conscious Olive Oil Consumers
Table olive	-0.0889	-0.8670
Olive oil	0.0344	0.8063
Buying quantity	0.5094	0.1298
Buying frequency	0.4065	0.3504
Buying from farmers	0.8170	-0.0100
Buying from retailers	-0.8325	-0.0849
Boycotting experience	0.2414	0.2145
Price of the product	-0.1420	0.4937
Product availability	0.3805	-0.0574
Buying from a relative	0.3470	0.0901
Health benefits	0.0347	-0.3260
Loyal to local product	0.3323	-0.3217
Taking long distances	0.3206	-0.0587
Total Variance	54.25%	39.73%
KMO test	0.5933	
Bartlett test	0.0000	

Source: Authors' analysis

The first factor yielded an eigenvalue of 1.94, explaining 54% of the total variance. This factor was characterized by purchasing olive products in large quantities (+0.509) and regularly (+0.406). Additionally, this segment preferred to purchase directly from farmers (+0.817) rather than retailers (-0.832). Moreover, in this segment, the product is usually available in the markets (+0.380), and they generally prefer to buy from relatives they can trust (+0.347). Finally, this group of consumers considers themselves loyal to local products (+0.332), and they are willing to go long distances to buy the product (+0.320). This segment was labeled "*Loyal Local Olive Enthusiasts*" to reflect these characteristics.

The second segment is concerned with consumers who prefer olive oil (+0.806) to table olives (-0.867). This factor obtained an eigenvalue of 1.42, explaining 39% of the total variance. The factor was characterized by frequent olive oil consumption (+0.350) and an emphasis on price (+0.493) over quality. These consumers are into olive oil as a cultural tradition and not for health benefits (-0.326), and they do not prefer local products (-0.321). Hence, this cluster is referred to as "*Price-Conscious Olive Oil Consumers*".

Consumer segments can also be analyzed using a cultural and social perspective beyond the labels like “price-conscious” and “loyal.” For instance, the loyalty to local olive products seems to be based on trust, community identity, and perceived authenticity, which support relational buying behavior that is often driven by social closeness and traditional bonds. On the other hand, the price-conscious consumers reflect the economic factors and the perceptions of product value and quality within a competitive market. This approach puts our quantitative results in the larger psychosocial context of Iraqi olive consumers, thus improving the explanation and practical relevance of the segmentation.

The two principal components obtained through PCA represent the underlying consumer attributes that summarize the complex behavioral and psychographic characteristics of olive consumers. These components—reflecting distinctions such as loyalty to local products versus price sensitivity—provide a reduced-dimensional foundation for further segmentation. In order to identify homogeneous consumer groups that share similar profiles along these dimensions, the extracted factor scores were used as input variables for cluster analysis. This two-step approach ensures that the consumer clusters are based on the most informative and statistically sound summary variables, thereby providing a better understanding of distinct market segments within the Iraqi urban olive consumer population.

3.3 Cluster Analyses

The two PCA-extracted components were used in the cluster analysis. Three homogeneous clusters were obtained based on the Calinski-Harabasz Index, also referred to as the variance ratio criterion. The main features of these groups are shown in Table 5. At a 5% significance level, Tukey's honest significance tests highlight the mean differences across clusters.

The “*Health-Focused Table Olive Consumers*” segment led the market with 52% of the total market share under Cluster 1. The health benefits of table olives were most important to the people who bought table olives within Cluster 1. The table olive market requires brands to target their advertising toward customers who value health benefits because this demographic represents the market majority. Brands should utilize certifications along with promoting the health benefits of table olives to appeal to this specific market segment. The combination of informative blog posts and social media content about the health advantages of olives through content marketing will drive consumer interest while developing brand loyalty. Brands need to work with nutritionists and health influencers to reach a wider audience and create deeper engagement with their target market. The product should be presented in effective promotional strategies along with packaging designs that show health advantages to increase the interest of these customers.

The name of the second cluster referred to "*Value-Seeking Olive Oil Consumers*," since this cluster shows sensitivity toward price during olive oil purchases. This cluster represents 29% of the market. Brands targeting olive producers in Iraq need to develop advertising strategies that demonstrate competitive pricing combined with special product benefits to successfully market their products to this consumer group. These consumers value quality together with the price, so the advertising must highlight distinctive olive oil features, which include source and production standards to validate the price. The product should display easy-to-understand labels that highlight its favorable attributes when compared to competitor products to build customer trust and credibility. Testimonials from

customers, together with consumer feedback, act as trusted social indicators that help build credibility and show how valuable the product is to consumers who seek quality.

Table 5 – Descriptive Statistics of the Behavioral and Psychographic Variables for the Three Market Segments

Variables	Full sample		Cluster 1			Cluster 2			Cluster 3		
			Health-Focused Table Olive Consumers			Value-Seeking Olive Oil Consumers			Trusting Local Olive Consumers		
	N = 250		N = 130			N = 73			N = 47		
	Mean	S.D.	Mean	S.D.		Mean	S.D.		Mean	S.D.	
Table olive	0.64	0.48	1.00	0.00		0.00	0.00		0.56	0.50	
Olive oil	0.24	0.43	0.00	0.00		0.69	0.47		0.28	0.45	
Buying quantity	2.02	1.32	1.60	1.08	A	1.96	1.24	A	2.65	1.42	
Buying frequency	1.55	0.75	1.30	0.65		1.59	0.71		1.86	0.80	
Buying from farmers	0.22	0.42	0.00	0.00	A	0.00	0.00	A	0.68	0.47	
Buying from retailers	0.68	0.47	1.00	0.00		1.00	0.00		0.00	0.00	
Boycotting experience	0.23	0.42	0.16	0.36	A	0.26	0.44	AB	0.32	0.47	B
Price of the product	0.18	0.38	0.13	0.34	A	0.30	0.46	B	0.17	0.38	AB
Product availability	0.77	0.42	0.71	0.45	A	0.78	0.42	AB	0.84	0.37	B
Buying from a relative	3.24	1.05	3.03	1.03	A	3.30	0.98	AB	3.48	1.10	B
Health benefits	0.75	0.44	0.81	0.40	B	0.61	0.49	A	0.75	0.43	AB
Loyal to local product	0.68	0.47	0.68	0.47	AB	0.54	0.50	A	0.77	0.43	B
Taking long distances	3.08	1.06	3.00	1.08	A	3.00	0.97	A	3.25	1.10	A

Using Tukey's honest significance tests, significant differences are highlighted by different upper-case letters across columns at $P < 0.05$.

Source: Authors' analysis

The smallest cluster included 18% of the market. The segment of consumers who trust local olive products falls under this segment name. The products this group seeks are found in local marketplaces by this segment. The products of these customers became their first choice when they had negative experiences because they would not purchase from others. The members of this group maintain complete dedication to their local olive products. The brand needs to establish powerful local distribution channels to connect with "*Trusting Local Olive Consumers*." The consumers from this group value local relationships, so emphasizing local olive product origins will create greater appeal. Transparency together with quality assurance needs to establish trust because their history shows they boycotted local products in the past. Positive customer feedback along with word-of-mouth marketing will help this segment trust the brand more. The fact that these consumers maintain loyalty to local olive products makes loyalty programs with repeat purchase rewards beneficial for both consumers and producers.

The "*Value-Seeking Olive Oil Consumers*" segment displays price-conscious behavior while choosing olive oil because they prefer affordable prices along with clear explanations about product quality and special sourcing methods to validate price levels. This consumer segment stands apart from other groups because they prioritize loyalty and health advantages over price considerations. The "*Trusting Local Olive Consumers*" segment shows evidence of powerful social dynamics because members choose to purchase olives from family members, and they avoid buying products after receiving poor service. The behaviors reveal how trust, along with community identity and social relationships, shapes what people decide to buy. Marketing strategies for this segment need to focus on local sourcing alongside transparency and community engagement while using word-of-mouth and loyalty programs to establish and maintain consumer trust.

Table 6 demonstrates the demographic data characteristics that describe the different segments of olive consumers in the market. Middle-aged consumers made up the majority of the surveyed population, with the health-focused table olive segment showing the largest numbers. Older consumers who identified as part of the trusting local olive segment. Christians who valued olive oil were mostly part of the Value-Seeking segment, but most married respondents belonged to the Health-Focused Table Olive segment. The market requires producers to create targeted campaigns that use community-focused promotions for elderly consumers together with health-promoting content for middle-aged consumers to improve both sales performance and brand loyalty in competitive conditions.

Table 6 – Descriptive Statistics of the Demographic Variables for the Three Market Segments

Variables	Full sample		Cluster 1			Cluster 2			Cluster 3		
			Health-Focused Table Olive Consumers			Value-Seeking Olive Oil Consumers			Trusting Local Olive Consumers		
	N = 250		N = 130			N = 73			N = 47		
	Mean	S.D.	Mean	S.D.		Mean	S.D.		Mean	S.D.	
Middle-aged	0.60	0.49	0.69	0.46	B	0.58	0.50	AB	0.40	0.50	A
Old-aged	0.28	0.45	0.27	0.45	AB	0.22	0.42	A	0.40	0.50	B
Male	0.63	0.48	0.65	0.48	A	0.51	0.50		0.77	0.43	A
Muslim	0.71	0.46	0.84	0.37		0.60	0.49	A	0.51	0.51	A
Christian	0.13	0.33	0.08	0.28	A	0.22	0.42	B	0.11	0.31	AB
Yazidi	0.13	0.34	0.07	0.25	A	0.11	0.31	A	0.34	0.48	
Married	0.70	0.46	0.82	0.39	B	0.52	0.50	A	0.68	0.47	AB
Basic edu.	0.54	0.50	0.47	0.50	A	0.53	0.50	A	0.77	0.43	
Bachelor deg.	0.22	0.42	0.22	0.42	A	0.27	0.45	A	0.15	0.36	A
Full-time employ.	0.42	0.49	0.45	0.50	A	0.34	0.48	A	0.43	0.50	A
Low-income	0.58	0.50	0.56	0.50	A	0.55	0.50	A	0.66	0.48	A
Middle-income	0.30	0.46	0.31	0.46	A	0.32	0.47	A	0.26	0.44	A

Using Tukey's honest significance tests, significant differences are highlighted by different upper-case letters across columns at $P < 0.05$. The mean is the percentage of respondents who exhibit that characteristic.
Source: Authors' analysis

4. Conclusions

This study provides key information on the attitudes and behaviors of Iraqi local olive consumers. Olive producers can benefit from knowing the factors that influence consumer decisions to purchase olive products, as consumer demand for olives continues to grow. Consumers of table olives were frequent buyers who were loyal to local olives, typically purchasing from family farmers. Table olive users represent the largest consumer segment that purchases the product due to its health benefits. In contrast, olive oil consumers are more price-sensitive and less loyal to local products, which are often priced at a premium.

Based on the research's findings, some significant suggestions for promoting the olive sector can be made. For all olive products, improved labeling should go beyond generic quality claims by adopting recognized certifications that resonate with consumer trust and health concerns. For example, obtaining ISO certification would assure standardized quality management, while organic labeling could appeal strongly to health-conscious segments by highlighting chemical-free and environmentally sustainable production practices. These certifications can enhance product credibility both locally and in export markets.

Marketing approaches should be finely tuned to the distinct preferences of each consumer group. For the Traditional and Trusting Local Olive Consumers, who value social and kinship ties, community outreach programs are most effective. This could include partnerships with local cooperatives, farmer associations, and trusted community figures to communicate product benefits and build loyalty through face-to-face engagement and local events. Word-of-mouth and relationship-driven marketing campaigns would foster trust and reinforce community identity.

In contrast, the Younger, Health-Conscious Consumer segment is more responsive to digital marketing campaigns. Utilizing social media influencers, targeted online ads, and health-focused content on platforms such as Instagram and TikTok would align with their media consumption habits and values. Messaging could emphasize health benefits, nutritional information, and modern lifestyle alignment to capture their attention.

Consumers in the Kurdistan Region demonstrated a higher willingness to pay for olive products than elsewhere. However, the official data shows that only 20% of locally produced olives are sold in that region. Regionally, the Kurdistan market’s higher willingness to pay presents an opportunity for value-added strategies. Local producers and policymakers could invest in local olive processing facilities to reduce costs, improve quality control, and create premium-branded products. Additionally, forming producer cooperatives would strengthen bargaining power, facilitate knowledge exchange, and enhance economies of scale. These cooperative initiatives could also promote sustainability practices that appeal to environmentally conscious consumers, further differentiating Kurdistan’s olive products.

This study has some limitations. First, due to the digital divide and limited internet access in some regions of Iraq, particularly in the southern parts, the use of online surveys likely introduced sampling bias. Residents less familiar with or lacking access to digital technology may have been underrepresented, potentially skewing the sample toward younger, more digitally connected populations in these areas. Such bias limits the generalizability of the findings to the broader population of olive consumers across all regions of Iraq. Second, despite aiming for a target sample size of 300 respondents to achieve sufficient statistical power and confidence in the segmentation results, the final

sample comprised 250 participants. This shortfall, driven primarily by low response rates in the south and logistical challenges, may reduce the robustness and reliability of the cluster analysis and other inferential statistics. The reduced sample size may increase the margin of error and diminish the precision of estimates, underscoring the need for cautious interpretation of the results. Future studies should prioritize mixed-methods data collection strategies, including in-person surveys and paper-based questionnaires, especially in digitally underserved areas, to improve sample representativeness and statistical validity.

Third, while we initially aimed for random sampling to improve representativeness, practical constraints of data collection, especially in southern Iraq, forced us to rely on convenience sampling methods like personal networks in that region. We understand that convenience sampling can introduce selection bias and limit how well the findings apply to the broader Iraqi olive consumer population. However, due to the difficult political, economic, and technological conditions in southern Iraq, this approach was necessary to ensure enough participation. In other regions, in-person surveys and random sampling at markets were prioritized to enhance representativeness.

Finally, data showed that local olive farmers and marketers were unwilling to participate in academic training programs, whereas participation in NGO-run programs was high. This is primarily because these organizations pay participants for their time, whereas academic institutions or the government do not. The recommendation is to ensure that any program provided by non-governmental organizations cooperates with the government. We recommend that NGO programs partner with government efforts and focus on providing expertise and training rather than just financial incentives.

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