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Original article

Consumers' willingness to pay for geographical origin labels: evidence from the Turkish table olive

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Abstract. *Background and aim:* A geographical indication (GI) confirms the products' geographical origin. GI products derive their quality and reputation from this origin. Protected Designation of Origin (PDO) labelling guarantees that the product is produced, processed and prepared in a specific geographical area. PDO labelling helps sustain the product's naturalness and quality by preserving local identity and culture. Therefore, consumers are willing to pay (WTP) more for such products. PDO labelling elevates brand building and supports rural tourism and rural development. Olive producers can reach a high-profit margin by obtaining PDO labels. Despite the benefits, PDO labelling offers PDO-labelled table olive consumption below desired levels. This shows that consumers still need to understand PDO labelling fully. This research aims to reveal consumers' GI knowledge of the Gemlik table olive and how their knowledge affects consumption levels and WTP. *Methods:* Data was collected from 648 residents in Bursa, Turkey using a public-intercept survey. The study used descriptive analysis and used SPSS 22 software package to analyse the data. *Results:* The result showed that 59.6% of participants were knowledgeable about GIs, and 56.3% were knowledgeable about PDO labelled Gemlik olive. Only 37.5% of respondents consumed PDO labelled food products, and 32.7% consumed PDO labelled Gemlik olive. Over half (51.4%) of the participants see themselves as average, 31.8% moderately, and 16.8% very knowledgeable about olives. While 79% of the consumers indicated WTP for the PDO label, half could pay 10% or less. The proportion of those who said they could spend more than 25% remained at 11%. *Conclusion:* Consumers are willing to pay more for PDO labelled Gemlik olives as their knowledge increases.

Key words: Consumer intentions, geographical indication, marketing orientation, eco-labels, consumers' knowledge

Introduction

Natural and traditional products are essential in consumer preferences and are sensory quality. As a result of the social, economic and cultural changes experienced in recent years, consumers are looking for more natural, fresh, organic and regional origin products in their food consumption. Therefore, there are increasing consumption trends toward agricultural products of regional origin and traditional characteristics (1).

Many products worldwide are known and marketed by the name of the region in which they are produced. There is a strong bond between products and their region (2). GI registration preserves the quality, traditionalism, and raw material derived from the region and ensures that the product retains the reputation gained from its local roots. GI products are produced according to specific rules and are offered to the market with a designated label (2).

Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) registration has a good protection system and can turn into a tremendous economic value (2) and an efficient marketing tool potential if used for appropriate purposes (3). The

PDO and PGI designation reflects quality, taste, trust and naturalness in the consumer mind and affects local product preferences (4). It provides differentiation and a competitive advantage in terms of marketing. Thus, the enriched product image increases willingness to pay (7,8).

Marketing and profitability of GI products

Determining the distinctness of local production subject to the GI registration of mass output is vital to revealing the economic advantages of producing a PDO/PGI product. For a standard product, a marketing mix is usually created as product, price, promotion and positioning, whereas for traditional products, this order follows product, positioning, promotion and price. In other words, price is the last marketing mix factor to consider. Eurobarometer surveys conducted in the European Union (EU) concluded that about half (43%) of European consumers are ready to pay more for PDO-labelled products where the origin and method of production are guaranteed (9).

Experts note that GI-designated production can be more profitable than standard agricultural production (10). This can be attributed to two reasons: First, differentiation increases producers' market power. Second, these products may have unique features likely to appeal to consumers. The food products to be sold to consumers with the PDO and PGI labels reflect the image of the taste created by that region's natural and cultural heritage (11).

GI also enable market differentiation for the local product. GI allows the product to be marketed in broader markets because it is also in demand outside the production place (12). This feature contributes significantly to tourism revenues (13). GI labelled products can meet the requirements of "niche markets". Customers of the niche markets have the financial means to pay a price premium for the product that best meets their needs. Small businesses practise niche marketing with greater flexibility. A company that practices niche marketing can put a significant dividend on top of its costs. Companies engaged in mass marketing achieve a large volume of sales in the market, while companies involved in niche marketing achieve a high share of profits. Producing GI products that provide price premium, producers enjoy the high-profit rates offered by niche marketing (14).

Geographically indications and willingness to pay

Six factors affect consumers' willingness to pay: awareness, quality, uniqueness, social image, origin and corporate social responsibility (15). Judging by these criteria, GI labelled products belong to a particular geography and, therefore, are different from their counterparts; they are reliable and of high quality. Besides, it has a high social image and fulfils its social responsibility as it directly supports the producer and local economy. Hence consumers are willing to pay (WTP) more for such products. (16,17).

A wide range of studies in various countries proves that consumers WTP for GI designated products than products that do not have GI designation. This ratio starts at 15-20%, depending on the product category (18). The price of Italy's famous Toscana olive oil has increased by 20% compared to others after receiving geographical indication (19). In the US, Ohio consumers are WTP at least 30%, more likely to buy local products and even reach 200% for French wines. For Austrian consumers, the geography in which wine is obtained is essential; hence they pay more (20). Greek customers are WTP more for various PDO labelled organic products (olive oil, raisins, bread, oranges and wine from organic grapes) (17). Research has shown that half of the people across the EU are prepared to pay a price premium. The WTP for geographically labelled products is high for products sold locally and within exported products (21). The effect is much more significant when GIs are used with a particular brand. Consumers in the young, educated, and high-income groups have been found to appreciate the PDO label more (22). Besides, a higher level of consumer loyalty in GI is reported (23).

Scope and purpose of the research

There is a growing literature on the country of origin products and consumers' WTP for such products (6-17,20-24,28,29,31-33,35,43,45,49-51,53), In the same line, the literature on GI is developing in Turkey (5,25-27,30,36-42,44,46). Current research primarily

focuses on consumers' perception of GI products, GI products' effect on rural development (9,24), rural tourism (12,25-26) and gastronomy tourism (27,28). A small number of studies have evaluated GI products within the scope of destination marketing (25), branding (28), value creation (29) and export marketing (12). In light of the numerous available research on consumers' perception of GI products, studies on their WTP for GI products are limited (30). Given the number of GI-registered olive and olive oil products, research on GI-designated olives is scarce. A small number of these studies have reached contradictory conclusions. They reported a vast difference between consumers' understanding and consumption of GI-labelled products and their WTP. Research on the WTP for organic (31,32) or eco-labelled olive oil (33) is also somewhat available in the world literature; research on GI-labelled olive is very scarce (21). A study of the WTP for GI-labelled olives and the relationship of this willingness with consumer knowledge could not be reached within the scope of the researchers' ability.

This study aims to determine consumers' knowledge level about the PDO labelled Gemlik olive and see if their knowledge level affected their WTP for PDO-labelled Gemlik olive. In this context, the study will investigate the following hypothesises.

The level of knowledge of consumers about GI-labelled products.

The consumption level of GI-labelled products.

The level of knowledge of consumers about PDO labelled Gemlik olives.

The consumption level of PDO-labelled Gemlik olives.

The willingness to pay for PDO-labelled Gemlik olive.

The effect of knowledge level on their willingness to pay for PDO-labelled Gemlik olive.

The relationship between knowledge level and willingness to pay for PDO-labelled Gemlik olive in GI components.

Material and methods

Voluntary participation surveys obtained the study's data from consumers living within Bursa Metropolitan Municipality's boundaries in the Southern Marmara region by easy sampling method. Olive cultivation is carried out in Mudanya, Gemlik, Orhangazi and Iznik districts. About 342 342 000 hectares (ha) of agricultural land is available in the Bursa region, and its share allocated to olive groves is 12%. Bursa provides 16.1% of Turkey's table olive production. The number of bearer olive trees in Bursa was 11 437 422, and the olive canceet per tree was around 13 kg. 104 081tons in the tables olives and 44 606 tons of oil olives were obtained in the 2018-2019 Production Season (34).

The questionnaire form was prepared online, considering the social distance requirements and travel restrictions applied due to the Covid-19 pandemic. The questionnaire form was listed on social media such as Facebook, Twitter, and platforms related to olive, cooking, food and food shopping, Bursa and geographical indication. Besides, we requested participants to share it in network groups such as WhatsApp and Snapchat. Finally, we asked companies to produce or sell olives and olive products to list the survey on their websites and social media pages and share it with customer groups. The questionnaire has been accessible from September to December 2020.

In cases where the population size cannot be estimated, the sample size can be derived by computing the minimum sample size required for accuracy in estimating proportions by considering the standard deviation set at a 95% confidence level (1.96), percentage picking a choice or response (50% = 0.5) and the confidence interval (0.05 = ±5). The formula is:

$$n = \frac{(Z)^2 + (p) + (1-p)}{(c)^2} = 385$$

$$n = \frac{(1.96)^2 + 0.5 + (1-0.5)}{(005)^2} = 385$$

n = minimum sample size
z = standard normal deviation set at 95% confidence level (1.96)
p = percentage picking a choice or response (50%)
c = confidence interval (0.05 = ±5).

The minimum required sample size was 385. We obtained 670 questionnaires from the participants. 648 of these questionnaires were included in the analysis after eliminating incomplete or illogical submissions. The variables used in the questionnaire are obtained from Teuber (16), Bardají *et al*. (35), Meral and Şahin (39) and Onurlubaş and Taşdan (36). The survey consisted of two parts. The first part obtained demographic information; the second section contained 25 statements about GI and willingness to pay. Six were Yes No, three were self-rating, and 16 were 5-point Likert scale (1-Definitely disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Definitely agree).

Results

Descriptive results

Table 1 lists the demographic characteristics of the participants. Accordingly, the participants were primarily female (55.4%), university graduates (40.7%), and individuals between the ages of 20-40 (70.4%). They were generally wage earners (57.1%), and their average income was between 4649-6000. As in all online research, this study's education and income levels were above the national level.

Participants' knowledge and consumption of GI food products

The first issue that almost any research involving geographic indication wants to put on solid ground is the GI knowledge of the target audience and their GI food usage. For this purpose, statements such as 'Have you heard of GI?', 'Do you know about GI?', and 'Do you consume PDO labelled products?' were included in the questionnaires.

Previous research emphasises that consumers perceive GI products to be better quality and reliable. Research also underlined that those quality obligations and legal processes to be complied with in the GI process create consumer confidence in these products. However, research failed to emphasise that GI products must have a legally binding logo, as in organic products. Consumers should seek this logo, along with the brand's logo when buying these products. Mostly this emphasis remains weak. Without this logo, the

Table 1. Socio-demographic profile of the participants.

Variable		Percentage	Variable		Percentage
Gender	Male	55.4	Education level	Primary	25.9
	Female	44.6		Secondary	33.4
				University	40.7
Age	20-30	30.4	Household Size	0-2	26.0
	31-40	40.0		3-5	59.1
	41-50	14.7		5+	14.9
	51-60	9.8			
	60+	5.1			
Income*	>2 324 TL	12.0	Professional activity	Housewife	8.3
	2 324 -3 500	17.2		Retired	14.5
	3 501- 4 500	28.4		Public worker	22.9
	4 501- 5 500	31.3		Labour	34.2
	5 501- 6 500	9.1		Self Employed	14.4
	6 500+	2.0		Student	3.7

*The minimum Legal Basic Salary in Turkey was gross of 2 943 Turkish Lira (TL) and net 2 324 TL in 2020
N=648

product cannot be distinguished whether it is a 'geographically indicated product' or a 'well-known local product'. Aytop and Şahin (37) note that Gemlik olive is PDO designated; this is well-published and well-known. However, consumers falsely believe that all Gemlik olives are PDO designated, specifically when the olive is sold loose. The authors further add that consumers guess whether the olive has a PDO designation by checking the place of production.

Consumers are more aware of and consume products specific to a particular region. As a result, they believe that products are known by the name of a distinct locality and 'widely consumed" are geographically indicated. The emphasis on locality, culture, and tradition is found in the definition of a geographical indication, but failure to emphasise 'certification' causes this misconception.

In most research in Turkey, researchers provide the definition of GI and PDO. They do this to distinguish 'PDO labelled products from 'local' or 'organic' in consumers' eyes. Nevertheless, giving the explanation further confuses the participants. Researchers highlight the locality but place less emphasis on the registration process (such as a logo). Such research does not reveal whether the participants were truly knowledgeable about GI products. To avoid such confusion, we emphasised PDO labelling thought the research; therefore, our findings revealed that 59.4% of the participants 'knew' what GI is, and 37.7% consumed PDO labelled olives (Table 2). Previous research has shown that 55.3% of tourists visiting Siirt province (38), 76.3% (39) and 26.5% (40) of consumers living in Kahramanmaraş, 36.8% of consumers from Balıkesir (25), and 40% from Antalya (41) did not know the GI. As it is seen, GI knowledge varies vastly between studies. These inconsistent findings confirm the above argument that consumers were not fully clear about the meaning of geographical indication.

This ambiguity is better seen in the answers given to whether they consume GI-labelled products and whether they know that their products are GI designated. Zuluğ et al. (42) note that the consumption rate was 53% before consumers were explained what PDO-labelled products were. This rate increased to 68% after they were briefed about GI products. Toprak and Oğuz's (38) study stated that 87.3% of Siirt province consumers purchased GI products. However, in the same survey, only half of the consumers indicated that they did not know about GI products. In Sancak's (40) research, 73.5% consumers declared that they 'knew' GI products belonging to Ankara province. However, when given a product list and asked consumers to select the GI products, 57.1% of the consumers who initially claimed to know GI products had picked up non-GI products. This result shows that more than half of consumers who claimed they knew the GI products in the research region did not know.

Table 2. Knowledge of GI and consumption of GI products.

	Yes	No
Have you heard of a geographical indication?	59.4	40.6
Do you consume GI labelled food products	37.2	62.8
Did you know that Gemlik olives are a PDO labelled product?	56.3	43.7
Have you tried PDO labelled Gemlik olives?	32.7	67.3

Similar studies raised concern that when the participants were given a mixed list of popular and GI products of a particular region and asked to select them, they marked mainly popular local products (25,38,42). The consumer perceives the GI-labelled product as well known and high-quality local product' but seems unaware that GIs have to carry a unique GI logo. Tregear et al. (43) raised the same concern. The author noted that an overwhelming number of Hungarian consumers were unfamiliar with the EU agro-food quality schemes of their famous Mako' onions. They were even approaching such labelling with suspicion.

PDO knowledge of Gemlik olives and consumption of PDO Gemlik olives

Gemlik olive is the most consumed table olive (39) and the first PDO-designated olive in Turkey. The PDO application was made in 2003 and was approved in 2005. Although the rate of knowing that Gemlik olives are PDO designated was 56.3%, this amount constitutes 77.3% of those knowledgeable about the GIs (Table 2). In Aytop and Şahin's (37) research, 62.8% of consumers knew that Gemlik olive has a PDO

designation. Atalay Oral and Kılıç (41) surveyed 630 consumers residing in Antalya and asked if they 'heard of' and used 52 geographically indicated agricultural products. The list included four PDO-designated olives, the most widely grown in the country. Gemlik olive, with 77.9%, was the best-known among them. Simultaneously, 86.6% of those who said they had heard of PDO Gemlik olives said they consumed this product.

Current research concludes that Bursa consumers are less aware that Gemlik olives are PDO labelled. They consumed PDO labelled olive less than other provinces. The reason for this is believed to be the ambiguity about the definition of GI products mentioned above. Previous research has not made it clear that consumers have consumed the Gemlik olive with the GI logo on the packaging or Gemlik olive is known to have a GI designation. Participants' GI knowledge falls within the previous research findings. In contrast, their use of GI-labelled products was lower because of the 'logo'. Those who knew that Gemlik olive has a PDO designation made up 95% of those who knew about GI designation. Almost all of those who consumed GI-labelled products consumed PDO-labelled Gemlik olives. However, those who consumed olives with the PDO label remained a third (32.7%) of all participants. Furthermore, 63% of those with GI knowledge and 58% who knew Gemlik olive has a PDO designation consumed this product (Table 2).

Knowledge level of Gemlik olive

Knowing more about a product forms a more positive PDO perception and better shapes consumers' demand. Knowing that the product is safe, healthy and high quality and sealed with a certification affects consumer demand and their product preference over others. It also affects their choices in the price they are willing to pay.

We asked the participants to self-evaluate their knowledge of Gemlik olives. About one-third of the participants said they were more knowledgeable than the average person; about 17% said they were very knowledgeable (Table 3).

We aimed to see whether higher olive knowledge could lead to more recognition and more GI olive consumption. We also wanted to see if those who knew more about olives used other GI products.

Table 3. Knowledge level of Gemlik olive.

	N	%	
I know as much as the average consumer (AVERAGE)	333	51.4	M= 1.654
I know more about olive than the average consumer (MORE)	206	31.8	SD=0.751
I have a lot of knowledge about olive (ALOT)	109	16.8	

The current research has revealed a significant relationship between the consumers' knowledge of Gemlik olives and their knowledge of GI-labelled food products. There was also a trend that as the consumers' knowledge of the product increased, their knowledge of PG food products increased. The same trend and significant relationship were observed between the consumers' GI product purchasing behaviour and purchasing a PDO labelled Gemlik olive. As the consumer olive knowledge increased, the behaviour of purchasing GI food products and PDO-labelled Gemlik olives increased (Table 4).

This finding may not come as a surprise. However, studies are showing otherwise. For example, when asked about the reasons for not consuming PG products, Yılmaz (44) found that the increase in the participants' knowledge level about the product did not affect GI product purchases.

Geographically indications and willingness to pay

Consumers are generally willing to pay a premium for GI-labelled products. There are different findings on how much this premium would be. Loureiro and Umberger's (45) research shows that participants were WTP a premium of only 2.5% to 2.9% from the original market price to obtain certified US chicken breast, pork chops and antricote beef steak.

Çakaloğlu and Çağatay (46) asked Antalya consumers about their WTP extra price if Tavşan Yüreği olive gets a PDO designation, and 70% of respondents answered 'yes'. When asked how much they would be willing to pay more, the rate of those who stated that

Table 4. Knowledge level of olive and GI knowledge and consumption.

Knowledge about Olive	Have you heard of a geographical indication?		Do you use GI labelled food products?		Have you tried a PDO labelled Gemlik olives?	
	Yes	No	Yes	No	Yes	No
AVERAGE	137	196	117	216	102	231
%	41.1	58.9	35.1	64.9	30.6	69.4
MORE	102	104	86	120	65	141
%	49.5	50.5	41.7	58.3	31.6	68.4
ALOT	61	48	52	57	55	54
%	56.0	44.0	47.7	52.3	50.5	49.5
	$X^2(2) = 8.514$ $p= 0.014$. $p< 0.05$ $d = .004$		$X^2(2) = 6.164$ $p= 0.046$. $p< 0.05$ $d = .0013$		$X^2(2) = 15.317$ $p< 0.001$ $d = .001$	

AVERAGE: I am as knowledgeable as the average person. MORE: I know more about olive oil than the average person. ALOT: I know much more about olive oil than the average person. *d*= Cohen's d

Table 5. Willingness to pay (WTP) for PDO labelled Gemlik olives.

WTP for PDO labelled Gemlik olives	Respondents	%	WTP for PDO labelled Gemlik olives	Respondents	%
Yes	512	79	≤10	261	50.9
No	136	21	11-25	152	29.6
			26-50	57	11.1
			51≤	42	8.3
Total	648	100	Total	512	100

they would pay 25% more than the price was approximately 4%. Meral and Şahin (39) found that 42.97% of consumers were willing to pay 20% or less for PDO labelled Gemlik olive, and only 9.4% were willing to pay 51% or more. Aytop and Şahin (37) determined that consumers can pay an average of 29.8% more for the PDO-labelled Gemlik olive. On the contrary, studies show that consumers are unwilling to pay any premium payments for GI products. Çam and Ayaydın (26), in their research of local tourists coming to Gümüşhane, found that tourists were aware that PDO-labelled products contribute to the local economy but were not willing to pay a premium for them. In the study by Sancak (40) in Ankara, consumers stated that they would only prefer PDO-labelled products if they were sold at the same as regular products' prices. When asked whether they would like to pay more for PDO-labelled products than traditional products, 70% of the consumers answered unfavourably.

Studies above again underline that the WTP for PDO designation varies greatly depending on the product, but the WTP for PDO labelled olives and olive oil is high. Our research findings coincide with Çakaloğlu and Çağatay's (46) study. Almost 80% of the participants were WTP for PDO olives. However, half of them were willing to pay 10% or less of the product price (Table 5). However, this research was undertaken during the hardship of the Covid-19 pandemic. Relatively few people have either lost their jobs or reduced their income. Due to stay-at-home orders, household food expenses have increased vastly (47). While Covid-19 has highlighted the importance of a healthy diet, consumers must be more careful with their kitchen expenses than ever (48). Considering that 16.8% of the participants stated they were highly knowledgeable about olives, it seems consistent that 19.4% will be willing to pay more than 25% for the PDO-labelled olive.

Table 6. Relationship between olive knowledge and WTP for Gemlik PDO labelled olive.

	Willingness to pay			
Knowledge of olive	**Yes**	**No**	**Total**	
AVERAGE	388 (306.6)	0 (81.4)	388	$X^2(2) = 318.059$
%	100.0%	0.0%	100.0%	$p < 0.001$
MORE	100 (124.0)	57 (33.0)	157	$d = .701$
%	63.7%	36.3%	100.0%	
ALOT	24 (81.4)	79 (21.6)	106	
%	23.3%	76.7%	100.0%	
TOTAL	136	512	648	
	21.0%	79.0%	100.0%	

The relation between knowledge level and willingness to pay

Research has examined the factors affecting consumers ' willingness to pay for GI-labelled products, and it has been found that the most addressed factor is income. Research generally supports the thesis that consumers' willingness to pay increases as their income increases. Naturally, a consumer whose income increases will be more WTP for a GI-labelled product that they perceive as healthier and better quality.

Another frequently analysed variable is the education level. The research findings largely support that consumers' WTP increases as their level of education increases. As with income, the general thesis is that with the rise in education level, individuals will be more open and willing to try, so they will be more inclined to pay for products they see as more innovative, healthy, high-quality or socially beneficial. However, an increase in education may not lead to knowing or searching for all the varieties of products and services offered. For this reason, the knowledge level about the product rather than the level of education in general will better expresses the willingness to pay.

Turpie (49) showed that interest was correlated with knowledge, and both were positively correlated with willingness to pay (WTP) for South Africans' biodiversity conservation. Mesías Díaz et al. (50) in Spain investigated the relationship between consumers' knowledge and consumption levels of organic tomatoes and their influence on consumers' willingness to pay for such food products. Their relationship underlined a common lack of knowledge of organic products. They observed an undeniable relationship between consumers' knowledge levels and organic foods consumption and their willingness to pay a premium for these products. A recent Tong et al. (51) study showed that increased environmental knowledge increased purchase intentions and willingness to pay for green rice. Therefore we investigated whether consumers self-assessed knowledge increased their willingness to pay for GI products.

Table 6 shows that there is a significant relationship between knowledge level and consumers' willingness to pay for Gemlik olive ($X^2(2)= 318.059$, $p< .001$, $d= 0.701$). The effect size for this analysis ($d= 0.701$) was found to be close to Cohen's (52) convention for a large effect ($d= .80$). These results indicate that knowledgeable consumers show more willingness to pay for PDO labelled Gemlik olive. This finding supports the literature. Similarly, Yangui et al. (53) point out that olive oil is part of Spanish culture. They also stress that this does not mean that consumers have a good knowledge of types of olive oil, quality grades, etc. However, "knowledge" significantly and positively affect consumers' willingness to pay via perceived behavioural control (0.248^{***}, $R^2=.318$). However, here, olive knowledge and WTP are in a reverse trend. Individuals who identify as more knowledgeable are less willing to pay for their PDO labelled Gemlik olive.

Those who consider themselves moderately knowledgeable are willing to pay more, while less than a quarter of those who consider themselves very knowledgeable are WTP. Consumers who stated they

Table 7. Relationship between olive knowledge and reasons for WTP for Gemlik PDO labelled olive.

	I am willing to pay more for PDO labelled Gemlik olive because it is…						
	… more reliable				**… better quality**		
	Willingness to pay						
Knowledge of olive	**Yes**	**No**	**Total**		**Yes**	**No**	**Total**
Average	115 (121.3)	89 (97.0)	184 (169.8)	Average	171 (193.2)	143 (128.8)	74 (65.9)
%	29.60	22.90	47.40	%	44.10	36.90%	19.10%
More	35 (31.3)	34 (25.0)	31 (43.8)	More	65 (49.8)	26 (33.2)	9 (17.0)
%	35.00	34.00	31.00	%	65.00	26.00%	9.00%
Alot	10 (7.5)	5 (6.0)	9 (10.5)	Alot	19 (12.0)	1 (8.0)	4 (4.1)
%	41.70	20.80	37.50	%	79.20	4.20%	16.70%
Total	160	128	224	Total	255	170	87
%	31.30	25.00	43.80	%	49.80%	33.20%	17.00%
	$X^2(4) = 10.798$ $p = 0.029$. $p < 0.05$ $d = .103$				$X^2(4) = 25.315$ $p < 0.001$ $d = .157$		
	support local producer				**contributes to the local economy**		
	Yes	**No**	**Total**		**Yes**	**No**	**Total**
Average	250 (251.6)	44 (47.7)	94 (88.7)	Average	87 (92.5)	55 (59.9)	246 (235.7)
%	64.4	11.3	24.2	%	22.4	14.2	63.4
More	73 (64.8)	16 (12.3)	11 (22.9)	More	29 (23.8)	20 (15.4)	51 (60.7)
%	73.0	16.0	11.0	%	29.0	20.0	51.0
Alot	9 (15.6)	3 (3.0)	12 (5.5)	Alot	6 (5.7)	4 (3.7)	14 (14.6)
%	37.5	12.5	50.0	%	25.0	16.7	58.3
Total	332	63	117	Total	122	79	311
%	64.8	12.3	22.9	%	23.8	15.4	60.7
	$X^2(4) = 19.416$ $p = 0.001$ $d = .138$				$X^2(4) = 5.269$ $p = 0.261$ $d = .072$		

had average knowledge of olives may trust the granting authorities and PDO certification and its claimed benefits to producers and consumers. Therefore, they were WTP.

Consumers who are knowledgeable about olives may believe that they already buy the highest quality and expensive olives that appeal to their high tastes. This may lead them to think that the olive they buy already provides the same benefits that PDO labelled products to offer; hence they may not be WTP for such products. Alternatively, consumers may have false confidence in their knowledge about olives or GI products, as underlined in the research.

Components of WTP for PDO labelled Gemlik olive.

Among the reasons for the willingness to pay more for a GI product, its quality and reliability and its benefits to the producer and the local economy were highlighted. In this part of the study, we investigated whether the GI components affected consumers' WTP and, if they did, whether this effect varied depending on their olive knowledge.

Table 7 shows that there is a significant relationship between knowledge level and quality (X^2 4)= 25.315, p< 0.001), reliability (X^2 (4) = 10.798, p= 0.029, p< 0.05) and support of the local producer (X^2(4)=

19.416, p= 0.001). The effect size for this analysis for quality, reliability and local production (d = 0.157, d= 0.103, d= 0.138) was found to be less than Cohen's (52) convention for a small effect (d=0.20). In addition, no significant relationship between knowledge level and supporting the local economy (X^2(4)= 5.269, p= 0.261) was observed.

There is an observed trend between consumers' willingness to pay and their knowledge of product quality and reliability. As the consumer's olive knowledge increases, they are willing to pay more for Gemlik olives with the PDO label than regular brands selling olives at the regular price. They find them tastier, better quality and more reliable.

Although the relationship between knowledge and WTP significantly contributes to the local economy, no trend is observed. It is continuously emphasised in the media and other platforms that farmers operate in challenging conditions; imports suppress price increases. The producer does not earn enough due to continually increasing input costs and the intermediaries' existence. Consequently, farmers increasingly break away from farming. The same is true for olive groves. Bursa province is one of the four largest provinces of Turkey, with more than 3 million and 1.5 hours away from Istanbul, with about 15 million. Therefore, the olive areas are very close to the residential areas, even in settlements. A farmer who cannot break even withdraws from farming by selling his olive groves for residential development at high prices. As consumers become more knowledgeable about olives, they become more aware of olive cultivation problems. However, this awareness turns into despair, and they are not WTP for the PDO labelled Gemlik olive

Among the reasons consumers at all levels of knowledge are WTP for PDO labelled olive, contributing to the local economy is not present. Following the above argument, Bursa houses Turkey's fourth-largest industrial development. Consumers may not be convinced that GI-labelled olive sales will sufficiently support the local economy in a region with many facilities and ports. Similarly, Meral and Şahin (39) found that the most critical factors in consumers' consumption of PDO labelled products were the taste (M=4.76), quality (M= 4.61) and its contribution to the local economy (M=4.51).

Conclusions

This study examined consumers' knowledge levels, consumption rates and willingness to pay more for Gemlik olives with PDO labels. This research and previous research have confirmed that PDO awareness in Turkey is relatively low. Producers and all other stakeholders must cooperate to increase public awareness from field to table.

The number of olives with the PDO label is increasing rapidly. This increase will intensify the competition in the olive market. Therefore, awareness campaigns should be launched for PDO labelled Gemlik olive as soon as possible. Current research has shown that consumers are willing to pay more for PDO labelled Gemlik olives as their knowledge level increases. However, they are only willing to pay up to 10%. On the contrary, studies outside Turkey emphasise that consumers knowledgeable about these labels are willing to pay from 5% to 200% more, allowing the producer a high-profit margin. Although these effects of GI may vary depending on the product groups they are certainly higher than the rates indicated by the researchers in Turkey. In this regard, Turkish producers should examine EU cases reporting high WTP rates immediately and in detail. Producers should implement pricing policy by conducting market analysis locally and nationally.

European research shows a high correlation between the number of producer organisations and the number of registered geographical indications. The producers' joint action has a compelling impact on the market, both in the product registration phase and in addressing promotional and marketing activities to raise awareness. Therefore, the joint activities of the producer associations on this issue will be vital. Again, manufacturers ' associations should conduct campaigns such as the 'Buy Local GI Products' campaign to spread geographical indications knowledge. These campaigns, must emphasise the product's authentic value and its direct benefit to the producer. Of course, it is only possible to reach consumers with registered labels. Producer associations can start producing and using their PDO hologram logos. Similar examples are already available; for example, the Producers' Associations for Gemlik olive have prepared their logos.

As of 2014, consumers are informed by placing them in the product packaging. As an example, the Gemlik Olive Producers ' Association created their logos. As of 2014, consumers were informed by placing them on their product packaging. However, this research shows that these logos do not find their total value in the customer. These manufacturers' associations need the support of local authorities and large chain markets. Differentiation strategies should be developed to emphasise the original value of the GI product. The link between GI and high quality should be established by managing consumers' perceptions using the right marketing mix. The GI market should be seen as a niche market for SMEs. Finally, manufacturers should not consider GI labels as counterparts to their brands. They should expand their product range by adding GI-labelled branded products and strengthen their brand image and quality.

Limitations of the study

The research was conducted in Bursa province. The research could be expanded to include other provinces of the country, such as Manisa Hayat Antalya Aydın Balıkesir, which have other PDO-designated olive varieties. The research was conducted at the end of 2020 when the Covid 19 pandemic was first seen. The pandemic has significantly changed the purchasing behaviour of consumers, including their purchasing channels. The research has included the preferences of consumers who buy PDG olives, mostly in the shops and from the market. However, with the pandemic, online sales of PDO-registered products have increased, as in other food products. Online environments provide consumers with more information about the product. Consumers can share their experiences with others, recommend the product or leave negative comments. For this reason, it is recommended to repeat the research to include sales in online environments. The research was looked at only from the consumers' perspective. Due to time and financial constraints, it was impossible to have producers and sellers in the study. Research by including these stakeholders will draw a complete picture.

Conflict of Interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

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