

MEASURING THE LEVEL OF KNOWLEDGE OF CONSUMERS ABOUT FOOD SAFETY

ABSTRACT

The aim of this study is to determine the level of knowledge of consumers about food safety and their purchasing behaviour of food products. For this purpose, a face-to-face survey was carried out with 400 consumers determined according to the Simple Random Probability Sampling method. About 76% of the consumers participating in the research have heard the concept of food safety. It has been determined that consumers mostly look at the safety in terms of health, expiry date and cleanliness of the place of purchase when purchasing food products. It has been determined that they prefer the products they consume to be fresh and that they mostly use supermarkets and hypermarkets for the place of purchase. It has been determined that 53,8% of the consumers pay partial attention to human health in the places where food is produced and 69% of them are willing to pay more for packaged foods.

KEY WORDS: Food safety, purchasing behaviour, level of knowledge, packaged food

1. INTRODUCTION

In order for living things to continue their lives, the need for nutrition, which is among the compulsory needs, must be met. It is possible for people to be healthy with adequate and balanced nutrition during their lives. In order for people to maintain their health, it is not only sufficient for them to have adequate and balanced nutrition, but the foods taken should not threaten human health and should be safe (Özkaya & Akbulut, 2016). At this point, the issue of people's access to healthy and safe food emerges. Food security is the right to always have access to physically and economically necessary food for human beings to continue their existence and live healthy lives (Söğüt et al., 2020). Safe food can be defined as food that has been made suitable for consumption by removing all kinds of spoilage and contamination factors (Yüksel & Karagözlü, 2022). Food legislation defines foods that are harmless to health and carry an acceptable level of risk as 'safe food' (Madenci et al. 2019).

Increasing world population, global trade and industrialisation lead to the emergence of various risks in the production and distribution processes of food products. In addition to risks that may adversely affect human health such as infectious diseases, chemical contamination, improper storage and transport, hygiene deficiencies, food imitation and counterfeiting, antibiotic and hormone use, risks that adversely affect the yield in agriculture and food production such as climate change may have a negative impact on food supply. Managing and mitigating these risks plays a critical role in ensuring food safety. Ensuring food safety is of great importance for the consumption of food without harming human health. Food safety is defined by the World Health Organisation as the conditions or measures required for food to be safe, healthy and suitable for human consumption during production, processing, storage, distribution and preparation stages (Çelik & Çelik, 2020). The Food and Agriculture Organisation of the United Nations (FAO) defines food security as the physical, social and economic access of all people to sufficient, healthy and safe food to meet their nutritional needs for an active and healthy life (Kırmacı & Özçelik, 2021). In order to prevent food safety problems and reduce economic losses, a number of international practices related to food safety have been initiated. These consist of quality assurance systems such as HACCP, GMP,

GHP, ISO 9000:2000, ISO 22000, IFC, BRC, EUREPGAP (Onurlubaş and Gürler, 2016; Çelik and Çelik, 2020). Quality assurance systems are mostly encountered in developed countries and in recent years, it is seen that the participation in developing countries has also increased (Dölekoğlu, 2003; Onurlubaş & Gürler, 2016).

As a result of the consumption of food that does not meet food safety criteria, various food-borne diseases may occur and societies are affected economically, socially and politically as well as health (Çelik and Çelik, 2020). Prevention of foodborne diseases, protection of food quality and creation of sustainable food systems are among the main objectives of food safety. In addition, food security is closely related to economic stability, agricultural sustainability and environmental protection. Therefore, ensuring food security for both individuals and societies is indispensable not only for a healthy life but also for social and economic development. Understanding the importance of food security, raising awareness in this field and taking the necessary measures is a great responsibility for our future.

There are many studies conducted to measure the knowledge levels and perceptions of individuals about food safety. Studies investigating the food safety knowledge and awareness levels of consumers in different provinces of Turkey (Gülse Bal et al., 2006; Uzunöz et al., 2008; Yılmaz, 2008; Gözener et al., 2009; Şanlıer, 2009; Güven, 2010; Ocak and Önder, 2014; Onurlubaş, 2015; Onurlubaş and Gürler, 2016; Özkaya and Akbulut, 2016; Gürer and Akyol, 2018; İncedal-Sonkaya et al, 2018; Durmaz Dayılar, 2018; Açıklın, 2019; Çelik and Çelik, 2020; Bolek, 2020; Palamutoğlu et al., 2021; Kırmacı and Özçelik, 2021; Yanğış Yüksel and Karagözlü, 2022). In addition to studies aiming to determine consumer attitudes and behaviours towards food safety (Mutlu and Yurdakul, 2008; Bekar, 2013; Yüzbaşıoğlu et al., 2018; Söğüt et al., 2020; Aydın Eryılmaz and Kılıç, 2020), studies investigating food safety perception (Kılıçalp, 2011; Zorba and Kaptan, 2011; Taşdan et al, 2014; Niyaz and Demirbaş, 2018; Madenci et al., 2019; Ayaz and Türkmen, 2019; Okat, 2019; Can, 2020; Çelik, 2021; Aytıp et al., 2021; Kayacan and Demirbaş, 2021; Kayacan and Demirbaş, 2023; Aykaç and Doğan, 2023; Künili et al., 2024; Koç and Yıldırım, 2024). Arıkan and Tozkoparan (2022) conducted a study on food security in Turkey in the process of globalisation. Koç and Uzmay (2015) conducted a conceptual study on food safety. Tayar (2020), Akın and Akın (2020) conducted a study on covid 19 and food safety. Angulo et al. (2005) investigated food safety and willingness to pay for labelled products, while Kılıç and Eryılmaz (2015), Gündüz and Aydoğan (2015), Başer et al. (2022) investigated the level of food safety awareness.

In this study, it was aimed to determine the level of knowledge of consumers about food safety and their purchasing behaviour of food products.

2. MATERIAL AND METHODS

In this study, which aims to investigate the level of knowledge of consumers on food safety, primary data collected from individuals through questionnaires constitute the main material of the research. In this context, a face-to-face survey was conducted with individuals residing in residential areas with different economic and sociocultural structures in Adana, Adıyaman, Ankara, Aydın, Çanakkale, Diyarbakır, Kahramanmaraş, Muğla and Osmaniye provinces. The survey questions prepared for the research were developed by taking into account the purpose of the research, the content of the subject and the characteristics of the main mass to which the survey will be applied. In this study, similar studies in the literature were also utilised. The sample size of this study was determined according to the Simple Random Probability Sampling method. The formula is as follows.

$$n = Z^2 \left(\frac{p \cdot q}{d^2} \right)$$

n: sample volume

z: 1.96 (standard z value corresponding to 95% confidence level)

p: Probability that the sample is representative of the main population

q: (1-p) Proportion of the main population that does not have the relevant characteristic

d: Accepted error tolerance level (assumed to be $\pm 5\%$).

The sample size was calculated as 384, and a survey was carried out with 400 consumers in case of faulty and missing questionnaires. The data obtained as a result of the survey were evaluated through package programmes and presented in the form of frequency distributions and percentages. Various comparisons were made through comparative tables according to demographic characteristics and provinces.

3. RESEARCH FINDINGS AND DISCUSSION

Demographic characteristics are important determinants of the purchasing decisions of individual consumers and households. Many product markets are directly affected by the demographic characteristics of consumers and each of these characteristics is used to determine the target market (Asseal, 1992). For this reason, production planning of enterprises is carried out by taking into account the demographic characteristics of consumers and the age, gender, income, occupation, education, marital status of consumers are tried to be determined (Onurlubaş, 2015,51).

In this study, demographic characteristics of the individuals were firstly analysed (Table 1). Of the individuals participating in the study, 55% were female and 45% were male. The individuals who participated in the study are predominantly in the age range of 18-31 years and are predominantly high school graduates. 56% of the individuals were married and 44% were single. The average number of individuals in the family is 4. Individuals in Aydın participated more in the research.

Table 1- Demographic characteristics of the individuals participating in the study

Gender	f	%	Provincial	f	%
Female	220	55	Aydın	120	30
Male	180	45	Ankara	68	17
Total	400		Osmaniye	56	14
Age	f	%	Çanakkale	44	11
18-24	116	29	Adana	28	7
25-31	98	24,5	Diyarbakır	28	7
32-38	77,2	19,3	Kahramanmaraş	24	6
39-45	60	15	Adıyaman	20	5
46-52	28	7	Muğla	12	3
53 and above	21,2	5,3	Total	400	100
Total	400	100	Marital status	f	%
Education	f	%	Married	224	56
Primary education	72	18	Single	176	44
High school	150	37,5	Total	400	

Associate degree	79	19,75	Number of family members	f	%
Licence	92	23	1-3 people	131,2	32,8
Postgraduate	7	1,75	4-6 people	248,4	62,1
Total	400	100	7 and above	21,2	5,3
			Total	400	100

When the people who do the food shopping in the family are evaluated, it is revealed that 40.5% of the respondents do the food shopping themselves, 20.7% of the respondents do it together with their parents and children, 18.8% of the respondents do it together with their parents, 14.5% of the respondents do it with their mothers and 5.5% of the respondents do it with their fathers. When analysed in terms of provinces, it is observed that shopping is mainly done by the individuals participating in the research in provinces other than Kahramanmaraş and Muğla. While in Kahramanmaraş, mainly parents shop together (40%), in Muğla, 70% of the shopping is done by parents and children together. Söğüt et al. (2020) found that 31.1% of the families of the surveyed consumers usually shop together, 28.4% by the whole family, 20.6% by the father, 14.4% by adult children and 5.4% by the mother.

When consumers were asked how often they shop for food, 39% of them shop for food once a week, 36% shop 2-3 times a week, 14% shop monthly and 11% shop daily. It was observed that crowded families do food shopping more frequently.

The places where the consumers participating in the research do their food shopping are given in Table 2. While the grocery store is occasionally the preferred point of purchase for food shopping, the neighbourhood market is the most preferred point of purchase. On the other hand, it is seen that mobile vendors are never preferred by the majority of individuals. Super-hypermarkets, on the other hand, are the most preferred purchasing point for food shopping.

Table 2. Place of Food Shopping

Food Shopping Centre	Always		Occasionally		Never		Total	
	f	%	f	%	f	%	f	%
Grocery Store	82	20,5	261	65,25	57	14,25	400	100
Neighbourhood market	197	49,25	171	42,75	32	8	400	100
Manav	99	24,75	146	36,5	155	38,75	400	100
Peddler	18	4,5	103	25,75	279	69,75	400	100
Super-hypermarket	248	62	132	33	20	5	400	100

The characteristics that consumers pay attention to when shopping for food are given in Table 3. The most important features are the safety in terms of health, expiry date, freshness, cleanliness of the place of purchase and content, while the least important features are brand, packaging and price. It is noteworthy that health is more important for consumers in food shopping and price is a factor that is taken into consideration after other factors. It has been determined that the characteristics considered while food shopping do not differ according to the education level of the consumers. Gözener et al. (2009) stated that the most important issue for students in food purchasing is the ability to trust the product in terms of health, followed by factors such as brand, price, flavour, durability and the availability of promotions. Özkaya and Akbulut (2016) found that the features that gastronomy students pay attention to when purchasing foods are expiry date (83.1%), brand (53.4%), price (44.3%), ingredients

(42.5%), TSE stamp (42.0), strength of the packaging (38.8%), ministry approval (16%), production method (6.4%), product weight/programme (5.0%), recycling mark of the packaging (3.7%), place of production (1.8%). Madenci et al. (2019) listed the most important issues in terms of food safety when buying food products as the effect on nature, not containing additives, origin, cooking in accordance with the instructions, low price, hygiene of the place of production, packaging not harmful to health, health, strength of the packaging. Söğüt et al. (2020) determined that consumers consider features such as price, appearance, traditional production and expert recommendations important when purchasing food products, while features such as brand, quality, health and freshness are very important.

Table 3. Factors that are important when shopping for food

Factors	Not at all important		Partly important		Very important		Total		Mean
	f	%	f	%	f	%	f	%	
Price	58	14,5	155	38,75	187	46,75	400	100	2,32
Freshness	5	1,25	25	6,25	370	92,5	400	100	2,91
Brand	42	10,5	134	33,5	224	56	400	100	2,46
Content	7	1,75	64	16	329	82,25	400	100	2,81
Packaging	68	17	106	26,5	226	56,5	400	100	2,40
Expiry date	6	1,5	17	4,25	377	94,25	400	100	2,93
Reliable in terms of health	5	1,25	14	3,5	381	95,25	400	100	2,94
Cleanliness of the place of purchase	5	1,25	27	6,75	368	92	400	100	2,91

Consumers were asked to evaluate the changes in food products over time in terms of price, quality, freshness, taste and reliability. Regarding price, 74,25% of the consumers stated that it was better in the past, 13% said it was the same, 12,75% said it was better now. In terms of quality, 61,75% said it was better in the past, 28,25% said it was better now. In terms of freshness, 55% stated that it was better in the past, while 30% stated that it is better now. The rate of those who stated that the taste was better in the past is 70,5% and the rate of those who stated that it is better now is 19,75%. While 63,75% of the consumers think that food products were more reliable in the past, the rate of those who think that they are more reliable now is 25,5% and the rate of those who think that they are the same is 10,75%.

While 89% of consumers prefer to consume their products fresh, 4% consume dried, 4% canned and 3% frozen foods. When a comparison is made on the basis of provinces, it is seen that fresh consumption is preferred in all provinces. However, compared to other provinces, 25% of the consumers in Diyarbakır prefer dried and 15% of the consumers in Çanakkale prefer canned.

While 53% of the consumers state that unpackaged products are harmful to health, 43.3% of them find unpackaged products partially healthy and 3.7% of them find them healthy. While 69% of consumers are willing to pay more for packaged products, 31% are not willing to pay extra. The reasons for consumers willing to pay more for packaged foods are given in Figure 1. The most important reasons for paying more for packaged products are that they are healthier, more reliable and have ingredient information.

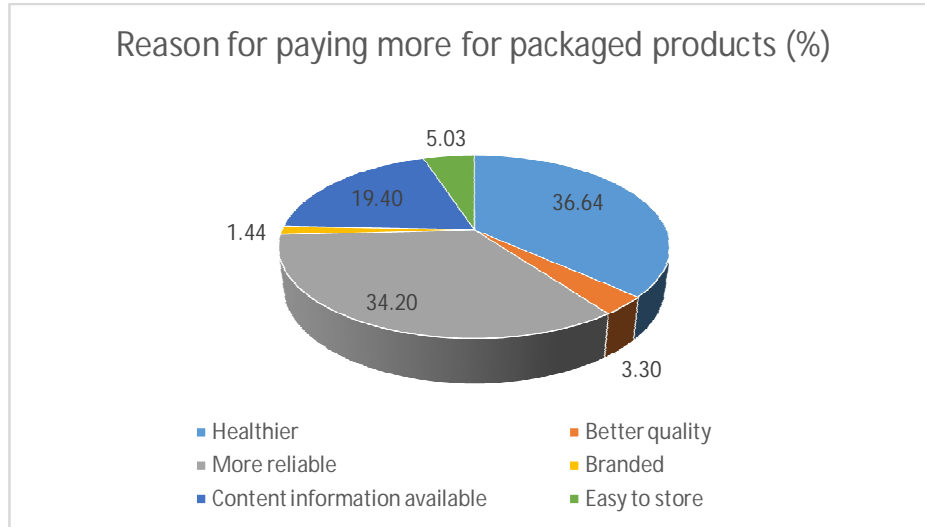


Figure 1. Reason for paying more for packaged products

While 76% of consumers have knowledge about the concept of food safety, 24% stated that they have not heard of the concept of food safety. Being aware of food safety does not differ much according to educational status. However, it is seen that those who are not aware of food safety are mainly primary school graduates. It is seen that consumers in Ankara and Kahramanmaraş are more aware of the concept of food safety, while consumers who are not aware of the concept of food safety live mostly in Diyarbakır. Onurlubaş and Gürlü (2016) stated that 68.6% of consumers have heard of the concept of food safety and 31.4% have not heard of the concept of food safety. Taşdan et al. (2014) stated in their study that 80% of consumers in the central districts of Ankara have heard of the concept of food safety.

Consumers' definitions of the concept of food safety are given in Figure 2. When food safety is mentioned, consumers predominantly define it as the production of products in a regulated, healthy and beneficial to health. Onurlubaş and Gürlü (2016) stated that 68.7% of those who heard the concept of food safety correctly defined the concept of food safety, while 31.3% defined it incorrectly. Kırmacı and Özçelik (2021) also stated that 65.8% of the participants defined food safety correctly, and 7.3% of them used the expression 'It is to ensure that consumers have access to enough food' as the definition of food safety.

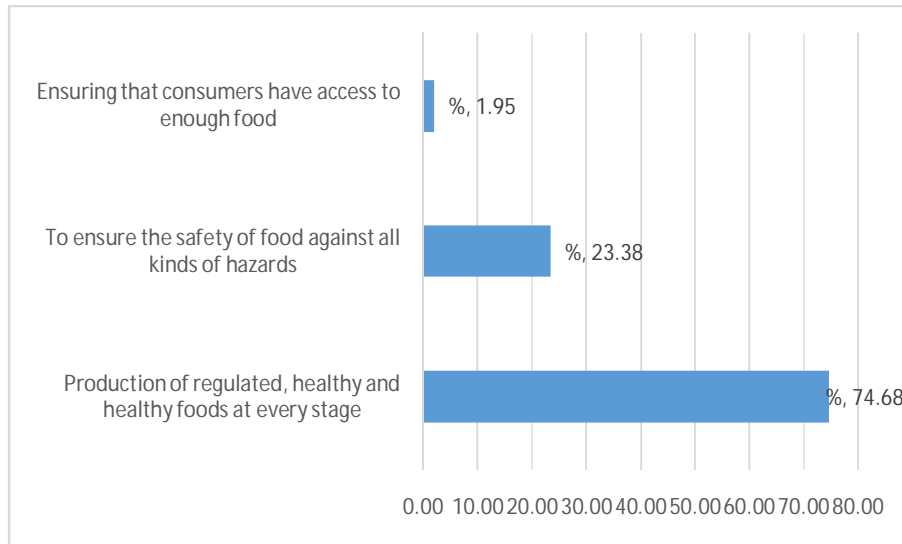


Figure 2. Definition of Food Safety Concept

The information sources of consumers on food safety are 56.3% radio and TV programmes, 12% subject matter experts, 11.8% other sources (public education centre and internet), 8.8% scientific articles, books, 7.5% newspapers, magazines, etc., and 3.8% friends, spouses and acquaintances. Onurlubaş and Gürler (2016) stated that the people participating in the study followed information on food safety from radio and television (78.9%), newspapers and magazines (33.2%), recommendations of friends, spouses and friends (29.9%), subject experts (28.7%), scientific articles (18.7%), respectively. Kırmacı and Özçelik (2021) stated that 32.1% of the participants stated that 'internet' and 28.7% stated that 'Radio, TV Programmes' were the sources from which they obtained the most information on food safety. Uzunöz et al. (2008) reported that the majority of rural women use television, and Gözener et al. (2009) reported that 58.47% of agricultural faculty students used newspapers and television as sources of information on food safety. Madenci et al. (2019) found that 33% of consumers obtained information on food safety from television advertisements, 26% from internet advertisements, and 17% from friends, relatives and neighbours.

Only 15% of the consumers think that the foods they consume are healthy (Figure 3). When consumers were asked about the reasons why foods are not healthy; 25.65% of them answered as containing chemicals, 2.12% as microbiological development, 37.06% as being hormonal, 31.18% as containing additives, 21.65% as having G.D.O. Madenci et al (2019) stated that 43% of consumers find food moderately safe among the products in Turkey, 37% think that food is not safe, and 18% think that there is food safety in products in Turkey. In the study conducted by Çelik and Çelik (2020), 45.77% of the respondents stated that 'Containing food additives' is important, 63.68% of the respondents stated that 'Containing disease-causing microorganism contamination' is very important, 53.23% of the respondents stated that 'Containing GMO origin' is very important, 36.82% of the respondents had no idea, 36.82% of the respondents stated that 'Irradiation process has been applied'. 82% have no idea, 'The fact that the cold chain of frozen products is broken' is 44.03% important, 'Cholesterol level' is 38.31% important, 'The possibility of drug residues' is 26.87% important.

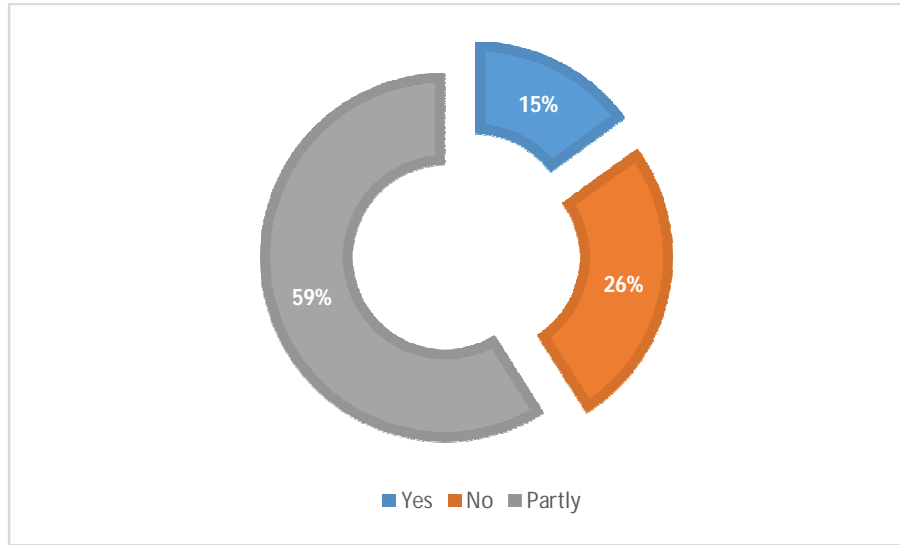


Figure 3. Consumers' opinions on whether the foods they buy are healthy or not

Consumers think that the Ministry of Agriculture and Forestry (69%), business owners (14%), municipalities (10%) and consumers (7%) have the biggest role in ensuring food safety, respectively. According to the research conducted by Madenci et al. (2019), the opinions of consumers about the supervision of food safety were revealed and it was determined that 72% of consumers think that the supervision of food safety in Turkey is carried out by the state.

While the rate of those who think that attention is paid to human health in the places where food is produced is 7.5%, the rate of those who think that partial attention is paid is 53.8% and the rate of those who think that no attention is paid is 38.8%. Consumers largely think that food inspections are inadequate (61.3%). There is a very small group of consumers who find food inspections sufficient (5.5%). The remaining consumers find food inspections partially sufficient (33.3%). Gözener et al. (2009) stated that only 14.42% of the students defended the idea that 'companies producing food sold to the market are sufficiently controlled by supervisory institutions (such as the Ministry of Agriculture, Ministry of Health, Municipality)', whereas 85.58% of them thought the opposite.

While 49.8% of consumers are aware of the Alo 174 food hotline, 50.2% are not. It was determined that those who were not aware were mostly primary school graduates (75%). It was determined that individuals at other education levels were mainly aware of the Alo 174 food hotline. Yanğıç Yüksel and Karagözlü (2022) found that only 18.18% of the participants in Etimesgut, Ankara knew the telephone number of the Alo Food Line and 20.21% of those who knew it called the Alo Food Line at least once. Kırmacı and Özçelik (2021) stated that 24% of the participants were not aware of the existence of this line.

Of those who are aware, 97.54% state that all kinds of complaints and demands of consumers about food are evaluated, 0.99% state that it is a place where consumers call to learn about the quality of food products, and 1.58% state that it is a line called to find out which food brand is better. Kırmacı and Özçelik (2021) stated that 61.3% of the participants gave the definition of ALO 174 food hotline as 'It is the evaluation of all kinds of complaints and demands of consumers about food' and 5.9% of them gave the answer 'It is a line called to find out which of the food brands is better'.

The most preferred places for consumers to complain about unsuitable foods are the places where they purchased the product, the Ministry of Agriculture and Forestry and Alo 174 Food

Line (Figure 4). 16% of consumers do not complain about non-conforming food products and production.

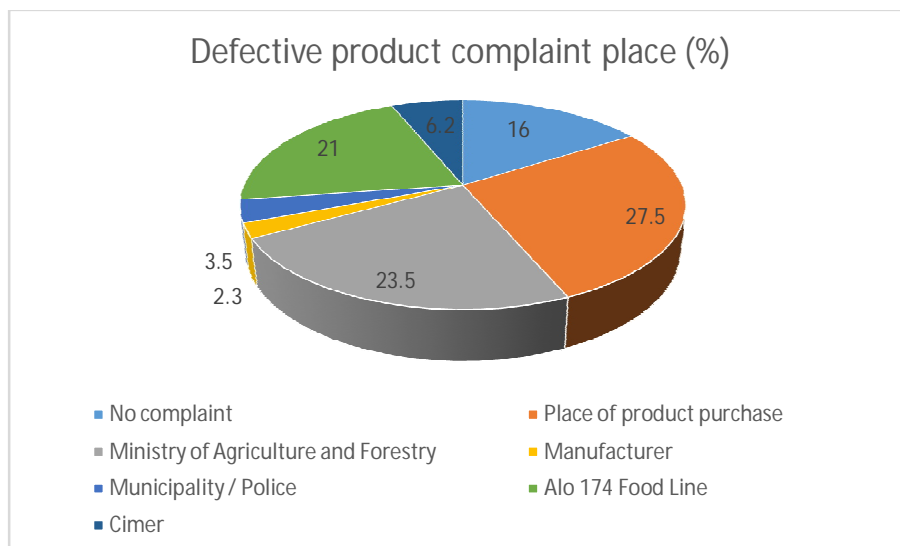


Figure 4. Places to Complain about Non-Compliant Food Products and Production

Consumers participating in the research made various suggestions to increase their level of knowledge on safe food consumption and food safety and to ensure sufficient confidence. These suggestions are listed as follows; 'packaged products should be consumed, fines should have a sanction, sufficient inspections should be carried out, raw materials that have not been genetically modified should not be used, reliable seeds should be used, human health should be at the forefront, the public should be informed, additives should be reduced, if necessary, they should not be used at all, attention should be paid to cleanliness, our own products should be produced instead of imported products and organic products should be prioritised, products should be approved by the Ministry of Agriculture'. These suggestions of consumers should be taken into consideration in the production and marketing of food products and necessary sanctions should be applied for unsuitable conditions.

4. CONCLUSIONS AND RECOMMENDATIONS

The research shows that consumers prioritise factors such as health safety, expiry date and freshness in food shopping. Consumers' past evaluations of food products reveal that there has been a negative change over time in terms of price, quality, freshness, taste and reliability. This situation increases concerns about food safety and causes consumers to turn towards healthier, reliable and high quality foods.

A large proportion of consumers think that packaged products are more reliable in terms of health and are therefore willing to pay more for packaged products. However, it has been observed that concerns about unpackaged products are also quite high. It is pleasing to see that 76% of the respondents are aware of the concept of food safety, but when the effect of educational level is taken into consideration, the need for information is more prominent among primary school graduates. In order to raise awareness on food safety, training programmes should be organised especially at the primary education level and awareness-raising campaigns should be conducted for all segments of the society. To encourage the consumption of packaged products, campaigns should be organised to emphasise the advantages in terms of health and safety.

The results of the research show that the Ministry of Agriculture and Forestry has the greatest responsibility in ensuring food safety, while business owners and municipalities should also play important roles. The opinions that food inspections are insufficient reveal that the existing system should be strengthened. Food inspections should be carried out more frequently and effectively, and the transparency of these inspections should be increased. Moreover, the results of inspection processes should be shared with the public. An effective complaint mechanism should be established to enable consumers to communicate their complaints about food products more easily. This mechanism should be supported with feedback and solution suggestions. In order to increase the safety of food products, regulations limiting the use of genetically modified organisms (G.D.O) and harmful additives should be introduced. Production of domestic products should be encouraged instead of imported products, and organic and sustainable agricultural practices should be prioritised. Programmes should be developed to raise public awareness on healthy food consumption. These programmes should encourage healthy eating habits. Implementation of these recommendations is critical for increasing food safety and protecting consumer health. Ensuring consumers' access to healthy food is essential for improving public health.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

REFERENCES

- Açıklan, B. (2019). Knowledge, attitude and behavior of university students about food safety. (Master's thesis, Biruni Üniversitesi Sağlık Bilimleri Enstitüsü). s.93 İstanbul.
- Akın, M. B., & Akın M.S. (2020). Food safety and COVID-19. *Harran University Journal of Engineering*, 5(3), 268-277. <https://doi.org/10.46578/humder.727194>
- Angulo, A. M., Gil, J. M., & Tamburo, L. (2005). Food safety and consumers' willingness to pay for labelled beef in Spain. *Journal of Food Products Marketing*, 11(3), 89-105.
- Arıkan, Y., & Tozkoparan, İ. B. (2022). Food security in Turkey in the process of globalization. *International Journal of Social Sciences Academy*, 4(9), 458-480.
- Ayaz, N., & Türkmen, B. M. (2019). The perception of food safety towards local foods: The case of Mersin Tantuni. *Journal of Turkish Tourism Research*, 3(3): 199-219.
- Aydın Eryılmaz, G., & Kılıç, O. (2020). Food safety attitudes and behaviors of consumers in Turkey and the European Union. *Food and Health*, 6(1), 57-66.
- Aytop, Y., Dağ, M. M., & Çetinkaya, S. (2021). Food safety perception of consumers during the Covid-19 pandemic. *Turkish Journal of Agriculture and Natural Sciences*, 8(4), 1084-1093. <https://doi.org/10.30910/turkjans.955213>
- Başer, O., Kılıç, O., & Eryılmaz, G. A. (2022). Factors affecting consumers' food safety awareness levels: The case of Samsun Province, Türkiye. *Turk J Agric Res*, 9(2), 239-244. <https://doi.org/10.19159/tutad.1102254>.
- Bekar, A. (2013). Attitudes of consumers towards food safety. *YYU J AGR SCI*, 23(2): 90-101.
- Bolek, S. (2020). Consumer knowledge, attitudes, and judgments about food safety: A consumer analysis. *Trends in Food Science & Technology*, 102, 242-248. <https://doi.org/10.1016/j.tifs.2020.03.009>
- Can, E. (2020). Analysis of consumer tendencies and food safety perception of local branded milk and dairy products: The example of Tekirdağ. T.C. Tekirdağ Namık Kemal

- Üniversitesi Fen Bilimleri Enstitüsü Tarım Ekonomisi Anabilim Dalı Yüksek Lisans Tezi. s. 117 Tekirdağ
- Çelik, A. (2021). Risk perceptions and behaviours of food engineering students about food safety: The case study of Hatay Mustafa Kemal University. *Turkish Journal of Agriculture - Food Science and Technology*, 9(7), 1237-1241.
- Çelik, İ., & Çelik, T. (2020). Determination levels of consumers' consciousness and behavior on food safety: The case of Denizli Province. *The Black Sea Journal of Sciences*, 10(1), 48-59.
- Dölekoğlu, C. (2003). Tüketicilerin işlenmiş gıda ürünlerinde kalite tercihleri, sağlık riskine karşı tutumları ve besin bileşimi konusunda bilgi düzeyleri (Adana Örneği). [Doktora tezi]. Çukurova Üniversitesi.
- Durmaz Dayılar, Ö. (2018). Determination of food safety concept consciousness level. Selcuk University Health Sciences Institute, Veterinary Department of Food Hygiene and Technology, Master's Thesis / Konya.
- Gülse Bal, H.S., Göktolga, Z.G. & Karkacier, O., (2006). The examination of consciousness level of consumers about food safety (A case of Tokat Province), *Tarım Ekonomisi Dergisi*, 12(1): 9-18.
- Gündüz, O., & Aydoğan, C. (2015). A research on awareness level of food safety of vocational school students. *Journal of Academic Approaches*, 6(1), 34-44.
- Gürer, B., & Akyol, E. (2018). An investigation of consumers' consciousness level about food safety in honey consumption: The case of Niğde Province. *Turkish Journal of Agriculture - Food Science and Technology*, 6(10): 1303-1310.
- Güven, E. (2010). A study on the determination of the nutrition habits and food safety knowledge of individuals from different education and income levels living in Yalova Province. Namık Kemal University Graduate School of Natural and Applied Sciences Department of Food Engineering Master Thesis. s. 144 Tekirdağ
- Gözener, B., Oruç Büyükbay, E., & Sayılı, M. (2009). Investigating knowledge level of students about the term of food safety. *GOÜ. Ziraat Fakültesi Dergisi*, 2009, 26(2), 45-53.
- İncedal-Sonkaya, Z., Balcı, E., & Ayar, A. (2018). University students food literacy and food safety knowledge, attitudes and behaviors "Example of Amasya University Sabuncuoğlu Şerefeddin Health Services Vocational School". *Türk Hijyen ve Deneysel Biyoloji Dergisi*, 2018; 75(1): 53-64.
- Kayacan, H. C., & Demirbaş, N. (2021). Consumers' perception of food safety for local foods: A literature research, XV. XV. IBANESS Congress Series on Economics, Business and Management – Plovdiv / Bulgaria, 29-30.
- Kayacan, H. C., & Demirbaş, N. (2023). Determining the factors affecting the perception of food safety towards local foods of consumers living in İzmir Province. *Balkan & Near Eastern Journal of Social Sciences (BNEJSS)*, 9(1).
- Kılıç, O., & Eryılmaz, G.A. (2015). Factors affecting consumers' awareness of food safety. *Agro Food Industry Hi Tech*, 26(3), 43-46.
- Kırmacı, H. A., & Özçelik, H. (2021). Knowledge levels and attitudes of consumers about food safety (Ankara Province Example). *Saffron Journal of Culture and Tourism Researches*, 4(2): 258-273.
- Koç, G., & Uzmay A., (2015). Food security and food safety: conceptual framework, developments and Turkey, *Tarım Ekonomisi Dergisi*, 21(1): 39-48.
- Koç, H., & Yıldırım, Ç. (2024). Consumers' perception of food security and willingness to pay for safe food after the covid-19 pandemic: the case of Samsun Province. *Eurasian Journal of Agricultural Economics*, 4(1): 022-033.

- Künili, İ.E., Çolakoğlu, F., Ormancı, H.B., Güngör Ertuğral, T., Çolakoğlu, S., & Dinç, S.Ö. (2024). Investigating the effects of climate change on the perception of safe food and consumption behaviors in Turkey. *Mustafa Kemal University Journal of Agricultural Sciences*, 29 (1), 71-83. <https://doi.org/10.37908/mkutbd.1352185>
- Madenci, A.B., Türker, S., Bayramoğlu, Z., & Eyiz, V. (2019). Tüketicilerin gıda güvenliğine yönelik tutum ve algılarını etkileyen sosyo-ekonomik faktörler: Konya İli Örneği. *J. Halal & Ethical Res.* 1 (1): 48-59.
- Mutlu, S., & Yurdakul, O. (2008). Consumer behaviors on food safety (a case study on red meat consumption in urban areas of Adana). *Ç.Ü Fen Bilimleri Enstitüsü Cilt:*17-4.
- Niyaz, Ö. C., & Demirbaş, N. (2018). Food safety perceptions of fresh fruits and vegetables consumers. *Tekirdağ Ziraat Fakültesi Dergisi*, 15(2), 36-44.
- Ocak, S., & Önder, H. (2014). Factors affecting consumer preferences of dairy products and food safety knowledge, *Hayvansal Üretim*, 55(2):9-15.
- Okat, Ç. (2019). A research on determination of factors affecting perceived food safety in food and beverage enterprises. *International Journal of Contemporary Tourism Research*, 2, 164 – 176.
- Onurlubaş, E. (2015). Measurement of consumers knowledge level on food safety: A case study in Tokat. *Gaziosmanpaşa Üniversitesi Fen Bilimleri Enstitüsü Tarım Ekonomisi Anabilim Dalı Doktora Tezi* s. 133, Ankara.
- Onurlubaş, E., & Gürler, A.Z. (2016). The factors affecting level of consumers about food safety. *JAFAG*, 33 (1), 132-141.
- Özkaya, F. D., & Akbulut, B. A. (2016). Food safety knowledge and attitudes of Gastronomy and Culinary Arts students. *Journal of Bitlis Eren University Institute of Social Sciences*, 5(2), 121-132.
- Palamutoğlu, M. İ., Palamutoğlu, R., & Kasnak, C. (2021). Determining the food literacy and food safety knowledge, attitudes, and behaviors of Faculty of Health Sciences students. In *International Congress on Scientific Advances (ICONSAD'21)* (pp. 43-53).
- Söğüt, B., Hakan, İ., Taysı, M. R., & Karakaya, E. (2020). Determining consumer behaviors about food safety (Bingöl City Center example). *Euroasia Journal of Mathematics, Engineering, Natural & Medical Sciences*, 7(13), 155-168.
- Şanlıer, N. (2009). The knowledge and practice of food safety by young and adult consumers. *Food Control*, 20, 538-542. <https://doi.org/10.1016/j.foodcont.2008.08.006>
- Taşdan, K., Albayrak, M., Gürer, B., Özer, O.O., Albayrak, K., & Güldal, H.T. (2014). The perception of food safety of consumers on traditional foods: The case of Ankara. *Uluslararası Davraz Sempozyumu, Süleyman Demirel Üniversitesi*, 29, 2014-31.
- Tayar, M. (2020). Food safety and a Covid-19. *Bulletin of Veterinary Pharmacology and Toxicology Association*, e-ISSN 2667-8381, 11 (2): 61-71, 2020.
- Uzunöz, M., Büyükbay, E. O., & Gülse Bal, H. S. (2008). Conscious levels of rural woman in the subject of food safety (Case of Tokat Province). *Journal of Agricultural Faculty of Uludağ University*, 22(2), 35-46.
- Yanğış Yüksel, Ç. & Karagözlü, N. (2022). Determination of consumers' food safety knowledge and awareness: The case of Ankara, *Etimesgut. Ege Univ. Ziraat Fak. Derg.*, 59 (4):645-659, <https://doi.org/10.20289/zfdergi.1121972>
- Yılmaz, E. (2008). Determination of the food consumption behaviors and the food safety knowledge level of the consumers living in rural and urban areas in Thrace Region. *Namık Kemal University Graduate School of Natural and Applied Sciences Main Science Division of Agricultural Economy*, Ph.D. Thesis, Tekirdağ.
- Yüzbaşıoğlu, R., Kızılaslan, H., Kızılaslan, N., & Kurt, E. (2018). Consumer behaviors on food safety (a case study on red meat consumption in urban and rural areas of Sivas). *Gaziosmanpaşa Journal of Scientific Research*, 7(3), 49-60.

Zorba, N. N. D., & Kaptan, M. (2011). Consumer food safety perceptions and practices in a turkish community. *Journal of Food Protection*, 74(11), 1922-1929. <https://doi.org/10.4315/0362-028X.JFP-11-126>

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