

# PERCEPTION AND AWARENESS OF THE EUROPEAN UNION FOOD SAFETY FRAMEWORK

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## ABSTRACT

A survey was conducted on a Turkish Educated Group (TG), European Educated Group (EG) and a Turkish Public Group (TPG), to reveal possible differences in the perception and awareness of the EU Food Safety policy. The majority was aware which authority is responsible for food safety at national level but did not clearly understand how to make food complains (mostly made to food companies instead of public institutions). The manufacturer name and price were important for the Turks, the food label for EG. "Food safety" was associated to "quality control" and "healthy life" by the TG and EG groups; however, the TPG understood it as "healthy life" and "food terror". Individuals with higher education showed a high interest in the food package. Halal certification was highly appreciated by TG and TPG.

- Keywords: food safety, public perception and awareness, Turkey, EU accession -

## INTRODUCTION

Turkey is a developing country and a recent official report on the growth rate in the agricultural and food sector has clearly demonstrated that Turkey has gradually increased its yearly food production (MFAL, 2012). In 2013 in Turkey, cheese production is set to register 9% retail value growth and drinking milk products will likely register a growth of 6%. The market of both meat and meat products and of fish and fish products has recorded an average annual growth of 11% and 13% over 2007-2012, respectively. In the same period, Turkey's market for vegetable, potato and fruit products recorded average growth of 8% (EUROMONITOR, 2014). The issue of quality control and of an efficient quality assurance is essential and inevitable in every single food production line. Any risk, hazard and potentially undesirable substance entering the food chain must be monitored by the authority (YASAR, 2011). Turkey is a candidate country of the European Union (EU) and its progress is very appreciated in terms of implementation and reinforcement of the Common Agricultural Policy (CAP) and of the EU Regulations on food safety since the start of the EU accession negotiation (October 2005). Turkey has now changed its national food safety policy to align with the EU rules. As a consequence, the Turkish public opinion has become more aware on important issues of food safety, such as genetically modified organisms (GMOs), the ban of unofficial food production, food traceability and the rapid alert systems (MFAL, 2012). The effects of such publicity should be monitored in terms of consumer perception, habits and response to these issues in order to take the necessary actions in view of the EU accession.

Public perception and awareness on food safety are not only about human health but also about agricultural diversity, ecology, environmental protection and food culture (HOLM and KILDEVANG, 1999). The effects of the reinforcement of new food safety regulations in the public mind of a given country are under the influence of an efficient publicity by the media as well as by the public authorities. Any innovation and technological change associated with food production (e.g., GMO or residues of pesticides) is perceived as somehow important to food consumers (HOLM and KILDEVANG, 1999). Policy makers are primarily interested in consumers' attitudes towards food safety and their related practices. Moreover, food producers and retailers, public authorities and health educators shall know the reflection of food safety in the public mind not only in Turkey, but also in wider communities, which mainly determine the direction of food production to a better quality of life (FRANCIS, 1979; ROZIN *et al.*, 1999).

The effect of the media in the food risk com-

munication has been widely discussed. It was recently concluded that the mass publicity on food safety risk management may have induced long-lasting effects on the perception by the Europeans, particularly in the case of GMO derived food products (SWINNEN and VANDEMOORTELE, 2010). Therefore, mislead or exaggerated information created by the media in the risk communication between the authority and public can be corrected by the evidences based on scientific data. The authority should pay more attention to publish the information supported by scientific data and literature, since such scientific evidences are much more appreciated by the consumer and are seriously taken into account, as already reported (FREWER *et al.*, 1997). This attitude leads to an efficient risk communication. Similar implications were reported earlier from a study conducted on Turkish subjects (AYGEN *et al.*, 2012). On the other hand, earlier reports, for instances, on the cases of dioxin, BSE or foot and mouth disease, were published more extensively than the corrective scientific actions adopted later (SWINNEN *et al.*, 2005). This indicated that the policy makers should communicate with the public to measure their level of understanding of any modifications and changes in the risk management and how the quality of life would have been enhanced by implementing the new changes.

The way in which information is received possibly determines the perception by the public on the food risks. It was reported that most of consumers are rationally ignorant at first glance (MCCLUSKEY and SWINNEN, 2004). For instance, the public opinion think that organically grown products which naturally could bear a high risk of mycotoxins are safer than conventional food products where such risks are easily manageable (LOUREIRO *et al.*, 2001). Gender and education are consistent demographic predictors of food-risk perceptions. Furthermore, non-demographic predictors are also important, and these include the nature of the perceived threat, the public's trust in regulatory authorities, the source of the information and the way in which it is distributed, and health and environmental concerns (ELLIS and TUCKER, 2009).

There are some studies undertaken in Turkey which partially determined the degree of perception and awareness of food safety in the country (SANLIER and KONAKLIOGLU, 2012; BEKTAS *et al.*, 2011; DEMIRBAS *et al.*, 2012; AYGEN, 2012; UNUSAN, 2007; CELILE, 2012). The credibility of the source of information was shown to highly influence the attitude-formation condition, but its impact on changing the present attitude is low (KUMKALE *et al.*, 2010). Strong correlation was reported between the food safety knowledge, attitude and practices (SANLIER and KONAKLIOGLU, 2012). The females were found to be more knowledgeable than males, in particular for household safety (CELILE *et al.*, 2012).

A high income and education level as well as the increased age increases the probability of having knowledge on food safety (BEKTAS *et al.*, 2011). Male consumers are more attached to the attribute “safety” compared to female consumers (VERBEKE and VIAENE, 1999). Furthermore, males below the age of 30 attached significantly less to the absence of hormones and harmful substances in food than did older consumer categories (VERBEKE and VIAENE, 1999; CELILE *et al.*, 2012). Total food safety knowledge was also found to be statistically higher in female than male students (SANLIER and KONAKLIOGLU, 2012; AYGEN, 2012; UNUSAN, 2007). Previous technical knowledge on a given food production line inevitably affects the awareness of food safety, particularly in the house members in Turkey (CELILE *et al.*, 2012). However, DEBIRMAS *et al.* (2012) indicated that the milk producers did not demonstrate a good level of food safety awareness. Moreover, two surveys regarding the awareness of household food safety (UNUSAN, 2007; CELILE, 2012) revealed that the gender, age and education level are important attributes for such awareness.

In the present survey, we measured the response of different social groups of the Turkish public opinion to specific parameters of food safety issues and we compared them with the response of a group of EU citizens. The aim of the study was to register the diversity of the consumer attitudes towards the safety of food and to establish a relationship between consumer attitudes, knowledge and behaviour of the different groups regarding food safety. Thus, this will be the first study to extensively reveal the degree of perception and awareness of consumers on recently introduced aspects of food safety during the EU accession negotiation of Turkey.

## MATERIALS AND METHODS

### Selection and participation of the subjects

A questionnaire consisting of ten specific questions related to the perception and awareness of food safety was developed (Table 1). Three consecutive surveys, each carried out on a socio-demographically different group were carried out using the questionnaire of Table 1.

Three groups of subjects were interviewed.

The first group was from national academic and administrative staff employed at the Suleyman Demirel University (SDU) located in Isparta (Turkey). This group (identified in the manuscript as Turkish Educated Group - TG) consisted of 242 persons who answered the online available questionnaire.

The Europeans attending an Erasmus Intensive Programme on Food and Feed Safety (IP-RASAFF, 2012) formed the second group. The number of subjects (university students and professors) in the second group (identified as European Educated Class - EG) was 73 and was also asked to answer the online survey too. The number of respondents was 47.

The third group consisted of randomly selected subjects living all over Turkey. The total number of participants in the third group was 250; the persons were randomly selected on the street in several towns in Turkey. This group was identified as “Turkish Public Group - TPG”.

### Preparation of the questionnaire

The survey team prepared several questions during the lecture courses of the third year class of undergraduate students at SDU. The academic lecturers who were specialised

Table 1 - Questionnaire on the perception and awareness of food safety.

No. Question (with options)	Possible answers
1 Your age	15-20 20-30 30-50 Over 50
2 Education level	Primary Secondary University
3 Country of origin	Turkey Poland Non-European Belgium The Netherlands Italy

Continued table 1.

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No. Question (with options)	Possible answers
4 Gender	Female Male
5 Which Ministry regulates food safety	Health Environment Agriculture/Food Energy Tourism
6 What is the degree of importance of the following item when you buy a product? (No, Low, Medium, High)	Producer Name  Price Food Label Price and Producer
7 What is the degree of importance of the following item in respect of Food Safety? (No, Low, Medium, High)	Quality control Healthy Life and Nutrition GMO-Food Terror etc. Natural/Organic Foods High cost of living
8 How do you regulate your daily life according the concept of food safety (No, very low, low, normal, high, very high)	Consumption of foods sold in open-air market Sensitive to Food-Packing materials Sensitive to "expiring date" Complaining on "food-fraud" Buying foods packed in syntetic-plastic material Eating in the restaurants/places you have no idea of Eating Ready-made foods Preference for Organic/Natural foods Do you trace the origin of the food you buy? Buying foods containing additives Eating "Fast-foods"
9 How often and where do you call when you have serious complaints on the foods you buy? (No, seldom, normally, always)	Call emergency (e.g., 112) Call police number Call a specific number (such as 174 ALOO Food in Turkey) Call Food Inspector Warning the seller Search the Internet Tell friends
10 If you think the publicity on food safety is not sufficient, what do you recommend to be done by the Authority?	What needed to be improved The label shall contain "GMO" or "GMO-free" "Public awareness" shall be improved by the ministry The names of the food firms making frauds shall be made "public" "Unofficial" food production shall be banned The results of "official controls and food analysis" shall be made "public" All the food-producing-locations shall be certified All kind of un-official animal slaughtering and marketting of such meat shall be banned Animal farms shall be "officially controlled" The food label shall contain "the information on undesirable substances and their legal limits" The label shall contain "the names of allergenes" Synthetic food additives should be indicated on the label Food traceability should be extended The open-air market shall be "officially controlled" Green-houses and fields of plant production shall be "officially controlled" Fresh vegetable and fruit wholesalers and retailers shall be "officially controlled" The imported food shall be known by the consumer The food with no label shall be banned "Food terror law" must be reinforced Halal Certificate shall be issued for "suspicious foods" for muslims

in food safety filtered the questions. The criteria for the final selection of the questions were as follows: simple to answer; demographically representative; relevance to daily life and nutrition; must test the general knowledge on food safety, food authority and current food safety issues and finally they should reveal the public concerns on the up-to-date problems and solutions. Ten questions were selected and categorized. The questions were created and published online, and a direct link was sent to the TG and EG participants by email. The subjects of TPG were face-to-face interviewed by the survey team of students during the holiday at their hometown.

### Data analysis

Data from the groups of TG and EG was collected, stored and statistically analysed by using a commercial survey website where the questionnaire was posted (SURVEYMONKEY, 2014). A cross-check for the compliance of analysed data was carried out through MINITAB statistical package programme (Minitab Inc., Coventry, UK). All the results were then presented for each of the survey groups. The number of responses by the participants to the questions in the form of YES/NO was subjected to the estimation of frequency. This was calculated by dividing the number of positive/negative responses by the number of participants who answered the questions. In the multiple choice questions, the percentage or frequency of participants who ticked each of choices was similarly calculated as mentioned above. Thus, the number of non-respondents was excluded from the frequency calculation within each question. Additional descriptive statistical elaboration of data was achieved by using InStat software ver. 3.05 (GraphPad Software Inc., La Jolla, USA).

## RESULTS AND DISCUSSIONS

### Socio-demographical parameters (Q1 to Q4)

In Table 2, the socio-demographic data of the participants are reported. The frequency of age, gender, education level and type of occupation is reported as percentage for the groups of TG, EG and TPG, respectively. The participating subjects have similar age profile irrespective of various social-demographical groups in the present research; in fact the age composition did not differ statistically among the three groups according to the Non Parametric Repeated Measures ANOVA (Friedman test) performed with InStat software ( $P=0.6271$ ). The percentage of subjects aged between 15 and 20 years was around 6%; the percentage of subjects aged between 21 and 50 years was around 85% and

Table 2 - Socio-demographic data of the participants.

Age	TG % <sup>1</sup>	EG %	TPG %
15-20	5	6	6
21-30	37	72	31
31-50	49	17	50
Over 50	9	4	12
N <sup>2</sup>	242	47	250
Gender	TG %	EG %	TPG %
Male	66	32	70
Female	34	68	30
N	240	47	250
Education	TG %	EG %	TPG %
Primary	0	0	20
High School	4	0	20
University	60	64	60
Msc or PhD diploma	36	36	0
N	242	47	249
Occupation	TG %	EG %	TPG %
Students	28	64	14
Academics	41	36	0
Administrators	42	0	0
Contractual staffs	2	0	0
Public servants	0	0	42
Drivers	0	0	2
Farmers	0	0	10
Running Own Business	0	0	32
N	238	47	246

<sup>1</sup>TG: Turkish Educated Group; EG: European Educated Group; TPG: Turkish Public Group.  
<sup>2</sup>N is the number of participants who answered to the question. The frequency (%) is calculated from the total number of participants who provided an answer.

those aged over 51 years was only 7%. So, the majority of the participants in the survey aged from 20 to 50 (statistically higher number of persons with an age ranging 21-50 years with respect to the other age groups, according to the Friedman test,  $P=0.0330$ ). The gender ratio (M:F) was 65 or 70 male versus 35 or 30 females for TG and TPG groups, respectively as compared to M:F ratio of 32:68 in the international group of EG.

The level of education differed significantly between the studied groups: TPG had 20% subjects with no higher education while the majority (100%) in TG and EG groups was graduated from higher education institutions (TPG was statistically different with two-tailed  $P=0.0215$ ). The same pattern well reflected the type of occupation in the groups: the majority of TG and EG groups were students and lecturers with less number of administration staff, while the majority in the TPG group was either of public servants or persons engaged in private business.

### Awareness on food safety management authority (Q5)

It is very important for the public opinion to be aware of the public authority regulating the food safety aspects in a given country. The majority (over 80%) of the participants irrespective to the national and international group indicated that food safety management is regulated by the Ministry of Agriculture, Food and Livestock (Table 3). In second place, the participants chose the Ministry of Health. The Friedman Test showed no significant differences ( $P=0.7613$ ) among the three groups of participants. This is, in fact, a good result, indicating that the public is highly aware of the activities of the authority.

Food safety is mostly perceived by the public as health-related issue. However it is well known that food safety is an integrated issue which covers not only the health of human subjects, but also the health of animal and plants as well as

Table 3 - The level of awareness by the participants on the ministerial authority of food safety in their respective countries.

Ministry	TG %	EG %	TPG %
Health	18	21	15
Environment and Forestry	1	0	0
Energy and Natural Sources	0	0	0
Food, Agricultural and Livestock	81	79	85

the protection of the environment. Therefore, an authority which deals with a wide range of aspects related to food safety should be extremely efficient and collaborate quickly with all the involved stakeholders (private companies and/or other public bodies).

It should be also mentioned that in most cases food safety may be managed by different public bodies in different countries, however the answer of all the groups participating to the survey was the same. In Italy for example (unlike Turkey), food safety is jointly administered by the Ministry of Health and by the Ministry of Agriculture, Food and Forestry; the latest is responsible for the food policies. Also other Ministries can be involved in specific aspects of food safety, such as the prevention of food frauds (e.g., Defense in Italy) and financial irregularities related to the food sector (Economy).

### Consumer buying behaviour (Q6)

When buying a food product there are many criteria taken into account by the consumers. Of the eligible answers proposed in the survey (Table 1, question 6) the combination of trade

mark and price of food products are of high importance for all the subjects (70%), especially to the subjects of TG and TPG (97%), whereas the food label became another important parameter (53% of all the subjects) in addition to the producer's name and price of the food product especially in the EG group. The price *per se* was not very important to any of the groups (32% of all the subjects).

### Perception of the food safety (Q7)

Considering the totality of the subjects answering question no. 7 (Table 1) (456 persons), the highest level of perception was assigned to "healthy life and nutrition" (81.5%), "quality control" (77%), "GMO-food terror etc" (63.5%) and "Natural/organic foods" (54.5%). Less importance was given to the "High cost of living" (21.2%), thus to the economic cost of high quality food products.

Considering each group of subjects (Table 4), TG had a high level of perception for "quality control", "healthy life and nutrition", "GMO etc.," and "Natural/organic foods" in regard to food safety. The subjects of EG have a high level of perception for "quality control", "healthy life and nutrition" and "high cost of living" regarding food safety. GMO issue for this international group was not of high importance as compared to TPG. Highly perceived parameters of food safety in the TPG were the GMO issue and "Natural Food", lastly "healthy life and nutrition". This may be due to the fact that the GMO issue is very well regulated by the European Union compared to the actual Turkish legislation. It is easy to understand that the Turkish public opinion could be highly manipulated by the media on the issue of GMO, since this matter has not been yet fully addressed by the national authority.

### Application of the concept of food safety into daily life (Q8)

The public opinion can only make changes in the daily life style upon the scientific evidences and information found in the media (MCCLUSKEY and SWINNEN, 2011). We determined what these changes are like (Table 5) in the three social groups. The international group (EG) felt safe enough towards the food products sold in open markets (49% in EG versus 25% in TG and 22% in TPG). This is simply due to routinely controls operated in open markets in the EU. Sensitivity to food packing materials received 91% preference of TG, 70% of EG and only 52% of TPG. This was found highly related with the education level. Similar trend between the subject groups was found for the sensitivity to "expiring date" of the food products. In all groups, the "food complaints",

Table 4 - Perception level of “food safety” by the consumers of different socio-demographic classes (N= 242, 47, 250 in TG, EG and TPG, respectively).

Degree of importance (in %)	TG				
	Quality control	Healthy Life and Nutrition	GMO-Food Terror etc.	Natural/Organic Foods	High cost of living
None	2	2	3	3	9
Low	3	3	10	9	23
Medium	17	16	17	28	43
High	78	79	71	60	25
Total1	100	100	100	100	100
EG					
None	5	0	11	9	13
Low	0	11	30	28	33
Medium	27	34	34	28	42
High	73	55	26	35	11
Total	100	100	100	100	100
TPG					
None	0	0	2	6	8
Low	4	1	2	8	12
Medium	47	44	59	57	40
High	49	55	37	30	40
Total	100	100	100	100	100

<sup>1</sup>The total percentage is referred to the total number of participants (N) who answered the questions.

“buying food in synthetic materials”, “eating at the places having no idea before”, “tracing the origin of foods”, “buying food containing additives” and “eating fast foods” received less frequency, while the preferences towards organic or natural food received moderate frequency by all the groups. The Friedman test did not evidence statistical differences among the three groups of subjects (P=0.2557) due to the high standard deviation of the answers. This aspect can be encouraging because it shows that the perception of food safety into daily life is very similar in European and Turkish citizens of different extraction.

#### Reactions to food complaints (Q9)

Subjects were asked to indicate how they react against any food complaint they face to in their daily life (Table 1, question 9). In all groups, the frequency of calling a specific number for help or calling for a police was low (72.9% of the participants has never called any emergency, police, or specific phone number to complain). Twenty percents of Turkish participants indicated that they called “the national food line”, ALO 174. This is a very promising result because this specific public phone line has been activated only recently and is already quite well-known by the

Table 5 - Application of the concept of food safety into daily life (N= 242, 47, 250 in TG, EG and TPG, respectively).

Preventive reactions	TG Frequency <sup>1</sup> %	EG Frequency %	TPG Frequency%
Consumption of foods sold in open-air market	25	49	22
Complaining on “food-fraud”	55	79	41
Buying “foods packed in synthetic-plastic material	50	60	49
Eating in the restaurants/places you have no idea on	26	46	21
Eating “Ready-made foods”	50	65	68
Positive reactions			
Sensitive to Food-Packing materials	91	70	52
Sensitive to “expiring date”	95	87	63
Preference towards “Organic/Natural” foods	79	68	77
Do you trace the origin of the food you buy?	59	64	60
Buying “foods” containing additives	29	62	38
Eating “fast foods”	34	30	60

<sup>1</sup>The total number of participants (N) who answered the questions was reported as “total percentage”. Note that the answers were pooled from upper degree of satisfaction (high, very high answers of Table 1, question 8).

Table 6 - Consumer priorities on the actions requested to the authority (N= 242, 47, 250 in TG, EG and TPG, respectively).

National and international social groups <sup>1</sup> Priority list of food issues	TG group %	EG group %	TPG Group %
The label shall contain "GMO" or "GMO-free"	79	46	92
"Public awareness" shall be improved by the ministry	78	56	91
The names of the food firms making frauds shall be made "public"	78	1	94
"Under the cover" food production shall be banned	77	1	93
The results of "official controls and food analysis" shall be made "public"	73	52	90
All the food-producing-locations shall be certified	72	41	92
All kind of un-official animal slaughtering and marketing of such meat shall be banned	69	35	94
Animal farms shall be "officially controlled"	69	43	91
The food label shall contain "the information on undesirable substances and their legal limits"	67	33	92
The label shall contain "the names of allergens"	67	57	91
Synthetic food additives should be indicated on the label	66	48	92
Food Traceability should be extended	66	43	92
The open-air market shall be "officially controlled"	65	37	83
Green-houses and fields of plant production shall be "officially controlled"	65	30	91
Fresh vegetable and fruit wholesalers and trailers shall be "officially controlled"	63	41	92
The imported food shall be known by the consumer	61	46	92
The food with no label shall be banned	61	54	93
"Food terror law" must be reinforced	55	30	87
Halal Certificate shall be issued for "suspicious foods" for Muslims	53	28	76

<sup>1</sup>The results are the percentage of consumers (N) who are in favour of the requests.

participating subjects. The most frequently actions amongst all groups were "warning the seller" (34.3%) and "tell the friends" (30.7%). The answers "search on the net" (28.7%) and "call for a food inspector" (21.2%) occurred with moderate frequency.

#### Priority list of the subjects for possible changes in food safety management (Q10)

Question 10 of the survey had the aim to establish a list of priorities stated by the public opinion regarding the policy of the public authority on the issue of food safety. The results are reported in Table 6.

The Turkish educated class (TG) highly demanded for the following aspects to be improved: "The food should be labelled if GMO is included", "The ministry should improve public awareness on food safety" and "the names of firms involved in frauds should be made public and falsified foods should be banned".

The Turkish Public Group (TPG) found the latter two options very important as well. TPG group would also like to see: "the food with no label being banned", "all kind of unofficial animal slaughtering and marketing of such meat shall be banned".

However, these options were not very prioritized by the international group (EG). What the EG group mostly preferred were: "public awareness be improved"; "more official controls of foods"; "food labelling for allergens" and "banning food with no label".

These differences between national and international social classes were inevitable because Europeans have new priorities such as the issue

of allergens and more official control than Turkish citizens who are still facing problems which have been already solved in Europe, such as "illegal food production" and "GMO containing foods".

Halal food aspects received 50-80% attention by Turkish subjects, unlike EG.

#### CONCLUSIONS

The results of this survey revealed important information which is very valuable not only for food researchers, but also for policy makers. The majority of the respondents was aware which authority is responsible for food safety at national level but did not clearly understand how to make food complains (mostly made to food companies instead of public institutions). In addition, the concept of food safety and subsequent behaviours were greatly different among social-demographically different classes at both national and international level (Question 7 to 10). AL-TEKRAUSE *et al.* (1999) found that men are more likely to report risky practices than women. In our survey, the TPG was mostly formed by males belonging to the working class. They showed a higher concern (compared to the students of the TG and EG groups) towards the intrinsic safety of the food products and probably to the family safety (i.e., food terror law, ban of unauthorized slaughters, less trust in open-air markets, severe control of wholesalers, publication of the producers implicated in frauds, publication of the results of the public controls).

Social and individual factors could dampen the perception of the risks (FLYNN *et al.*, 1998). The risk perception was reported to be influ-



enced by two factors: the dread or the unknown risks (SLOVIC, 1987). Food scares are highly considered as the dread risks, whereas GMOs, due to their unknown consequences, are rated as highly unknown risks despite the fact that the educated consumers do not think that GMOs are risky (SLOVIC, 1987; SANLIER and KONAKLIOGLU, 2012; AYGEN, 2012; UNUSAN, 2007). This evidence was also validated by the present study; in fact, both Turkish educated and public group highly rated the GMOs as risky, while the European educated group did not. On the other hand, initial perception is also important to determine the current perception of public (AYGEN, 2012). For instance, the intensive publicity on GMOs could also affect the present perception (FREWER *et al.*, 1997), and the consumers sometimes give more weights to the negative than the positive information (SWINNEN *et al.*, 2005; MCCLUSKEY and SWINNEN, 2004). This proves that the perception is a complex issue mediated by individual and social factors.

Thus, the public awareness of Turkish public about recently introduced aspects of food safety related to the EU accession negotiation must be improved. We propose the public authority to validate our data and previously data reported for Turkey from a nation-wide survey (SANLIER and KONAKLIOGLU, 2012; BEKTAS *et al.*, 2011; DEMIRBAS *et al.*, 2012; AYGEN, 2012; UNUSAN, 2007).

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