

Identification of Economic Incentives Directed Toward Food Safety Practices: The Case of Turkish Meat Processing Firms ^[1]

Ferit ÇOBANOĞLU * 
Renan TUNALIOĞLU *

Ayşe Demet KARAMAN **
Güliden OVA ***

[1] This study was summarized from the project "Food Safety Practices in Food Businesses in Aydın," ZRF-10012, supported by the Scientific Research Project at Adnan Menderes University (ADU)

* Adnan Menderes Üniversitesi, Ziraat Fakültesi, Tarım Ekonomisi Bölümü, TR-09100 Aydın - TÜRKİYE

** Adnan Menderes Üniversitesi, Ziraat Fakültesi, Gıda Mühendisliği, TR-09100 Aydın - TÜRKİYE

*** Ege Üniversitesi, Mühendislik Fakültesi, Gıda Mühendisliği, TR-35100 Bornova, İzmir - TÜRKİYE

Makale Kodu (Article Code): KVFD-2011-4349

Summary

Food safety concepts have a major impact on food processing at the firm level. This study introduces economic incentives intended for food safety practices in meat processing plants in Aydın, western Turkey. Survey studies were employed using a whole count method with 26 meat processing firms, and questions were prepared for in-depth firm level interviews. The evaluations were accomplished on the basis of meat processing capacities per day: 0.001-0.50, 0.51-1.0 and 1.1-3.0 tones, classified as small, middle and large scale firms, respectively. Although many good practices were carried out in the plants, the "never" responses were found to be more prevalent in small scale enterprises. It was found to be necessary to stress more vigorous enforceable incentives for these businesses.

Keywords: Food safety, Meat processing, Small scale firms, Good practices

Gıda Güvenliği Uygulamalarına Yönelik Olarak Ekonomik Teşvik Edici Unsurların Tanımlanması: Türk Et İşleme Firmaları Örnek Olayı

Özet

Gıda güvenliği konseptleri, firma düzeyinde gıda işlenmesinde önemli bir etkiye sahiptir. Bu çalışma, Türkiye'nin batısında yer alan Aydın ilindeki et işleme firmalarında, gıda güvenliği uygulamalarına yönelik olarak ekonomik teşvik edici unsurları tanımlamaktadır. Survey çalışması, tam sayım yöntemi kullanılarak, 26 et işleme firmasının tamamı ile görüşülerek yapılmış olup, sorular firma düzeyinde belirli bir derinlik ile hazırlanmıştır. Değerlendirmeler, günlük olarak gerçekleştirilen et işleme kapasiteleri esas alınarak yapılmıştır: 0.001-0.50, 0.51-1.0 ve 1.1-3.0 ton işleme kapasitesine sahip işletmeler sırasıyla, küçük, orta ve büyük ölçekli işletmeler olarak değerlendirilmiştir. İşletmelerde birçok iyi uygulama gerçekleştirilmesine rağmen, "asla" cevapları, küçük ölçekli işletmelerde daha yoğun olarak bulunmaktadır. Bu işletmeler için, daha fazla teşvik edici unsurların vurgulanmasının gerektiği tespit edilmiştir.

Anahtar sözcükler: Gıda güvenliği, Et işleme, Küçük ölçekli firmalar, İyi uygulamalar

INTRODUCTION

Modern food safety policies came into being at the turn of the twentieth century in response to scandals in the meat packing and food processing industries ¹. A second generation of policies is emerging now, also driven by scandals and crises of trust, including the early 1990s' *E. coli* O157:H7 outbreak in the United States and the BSE scandal of the late 1990s in the United Kingdom.

Behind the current crises lie economic and technological transformations in both food and the food supply system. Institutions are rushing to catch up with the implications these changes have for public health risks ². On the supply side, food can be modeled as a quality-differentiated product in which safety is only one of several attributes produced ³. Safety, like its counterparts, has a shadow



İletişim (Correspondence)



+90 256 7727023



ferit.cobanoglu@adu.edu.tr

price. The degree to which the cost of producing safety is separable from the cost of producing other product attributes is an empirical question, but as a general rule, suppliers must invest resources to produce safety.

The food economics literature identifies three elements that create incentives for firms to adopt enhanced food safety controls: (a) market forces, (b) food safety laws and regulation, and (c) product liability laws^{4,5}. In practice, all of these broad groups of incentives act to varying degrees to secure a safe food supply, although statutory food safety standards are used most frequently as the principal approach⁶. It provides an excellent overview of theoretical literature on both supply and demand applicable to food safety economics⁷.

Overall, the existing literature suggests that the motivation for food businesses to implement enhanced food safety controls reflects the prior expectations of decision makers regarding the potential benefits and costs associated with adoption of specific practices, such as Hazard Analysis and Critical Control Point (HACCP)⁸. In cases where business decision makers perceive high costs of implementation relative to the expected benefits, and where the hurdles associated with adoption are not easily overcome, there may be less motivation to implement enhanced food safety controls. In such cases, there may be a leading role for regulation. However, where regulatory and market-based inducements for the adoption of enhanced food safety controls are interconnected and operate side-by-side⁹, it is important to understand the nature and magnitude of distinct public and firm-level private incentives and the impact that government regulatory action has on these. More generally, there is a need for greater economic analysis of the entire set of incentives for food suppliers to implement enhanced food safety controls and how these vary, both individually and collectively, across firms and markets¹⁰. There could be seen relatively insufficient research studies in Turkey on this issue. In a study, it was declared that in order to improve rabbit meat safety and prevent harms to public health, the control of contamination routes at production stage of rabbit meat was an important measure. For this purpose, it was recommended that food safety programmes focusing on a farm-to-table approach should be put in to practice in rabbit meat production¹¹. On the other hand, it was stressed that together with the increasing density of slaughter of the industrial meat enterprises in Turkey, it will be implemented more regular economic and hygienic practices¹². In a detailed study, it was indicated that directors and employees often had insufficient knowledge regarding the basics of food hygiene in Turkey. Their results indicated that proper food safety practices and prerequisite food safety programs for the HACCP were often not being followed in many food businesses¹³. In another study, they identified the lack of knowledge about HACCP and other food safety programs

as the main barriers for food safety in food businesses. Training programs, both in basic food safety and HACCP, were suggested to support implementation of prerequisite programs and HACCP in food businesses¹⁴. However, their assessments consisted of hospital food services, catering establishments, hotels, kebab houses, takeaways and restaurants, and did not include meat processing firms. In particular this study explores the lack of sufficient and detailed information of food safety on the part of the meat plants. The purpose of this paper is to investigate the set of economic incentives directed toward the meat processing businesses for food safety practices and the ways in which these vary according to the company implementations. The Turkish meat processing firms served as a case study, because there has been no previous detailed study conducted in this area.

MATERIAL and METHODS

The first group contains the statistics, including the total number, addresses and the relevant documents of chicken and red meat processing firms in the Aydin region, which were obtained from the Aydin Provincial Agricultural Directorate (APAD). The second group is composed of data that was directly collected by surveys from the managers of the meat processing companies. The interviews were performed during April-June in 2010. The third group's data consists of the related published materials on an international level.

In this study the meat and meat product companies located in Aydin were investigated. This province is situated in the western part of Turkey, and it has critical value in both meat and meat product processing. From April to July 2010, 26 meat processing companies, all of the meat product enterprises in Aydin, were visited and data were collected via surveys by the whole count method. The locations of the firms carried out in the survey study in the Aydin region were Center (12), Nazilli (3), Incirlioiva (3), Kuyucak (2), Kusadasi (2), Germencik (1), Soke (1), Cine (1), and Didim (1). Firstly, the grouping of the facilities was based on the real meat processing capacity. The evaluations were established on the basis of meat processing quantities per day: 0.001-0.50, 0.51-1.0 and 1.1-3.0 tones, classified as small, middle and large scale firms, respectively. The study focused on the perceptions and attitudes of managers regarding food safety and key barriers and economic incentives in the preprocessing, processing and after processing stages. The five-point Likert scale was engaged in the determination of frequency and attitudes, and an ordinal measurement system increasing from 1 to 5 was employed. A five-point Likert scale¹⁵, in which "1" was set as "highly inferior" and "5" highly superior" was applied to collect data. An increase in Likert scale averages means that there is greater adherence to sustainability as well as more compatible

attitudes¹⁶. The data was analysed using Predictive Analytics Software (PASW) 19¹⁷. The tests employed in this analysis are discussed below. For the continuous variables, a normal distribution test was applied using the Jarque-Bera test^{18,19}. Because all of the variables did not display normal distribution, the Kruskal-Wallis one-way analysis of variance was engaged. The Kruskal-Wallis test was developed by Kruskal and Wallis jointly and is named after them. It is a nonparametric (distribution free) test, which is used to compare three or more groups of sample data. The test is used when assumptions of ANOVA are not met. ANOVA is a statistical data analysis technique that is used when the independent variable groups are more than two. In ANOVA, it is assumed that the distribution of each group will be normally distributed. In the Kruskal-Wallis test, no assumptions about the distribution are made. In this study, the evaluations were carried out on the basis of the meat processing capacities per day. Using the hypothesis in the Kruskal-Wallis test, a null hypothesis (H_0) assumes that the samples, meat processing firms in the paper, are from identical populations; alternative hypotheses (H_a) assume that the sample comes from different populations. A Chi-square (χ^2) with k-1 (the number of groups-1) degrees of freedom was used to approximate the significance level for the test²⁰.

RESULTS

The key parameters related to the opinions of the managers and their business activities in the preprocessing stage are presented in *Table 1*. The crucial variables shown in *Table 2* are directed toward food safety in processing at the firm level. An investigation of the perceptions of the managers in the meat processing firms with regard to defining key barriers after the processing stage was specified in *Table 3*.

DISCUSSION

The first findings obtained from the study indicated in the preprocessing stage that while the “never” responses were predominantly provided in many circumstances such as “incorporate practices suitable for the Turkish Food Codex”, “take care when cutting and preparing the meat by myself”, “maintain the importance of producers to implement good practices”, the “always” replies were obtained more frequently in statements such as “take care when slaughtering and transporting”, “give importance to sufficient quality and texture of the meat”, “purchase meat from the slaughterhouses”, and “consider purchasing the

Table 1. Distribution of the meat processing firms intended for the key practices directed towards food safety concept in preprocessing stage (n= 26)¹

Table 1. İşleme öncesi aşamada gıda güvenliği konseptlerine yönelik olarak anahtar uygulamalar için et işleme firmalarının dağılımı¹

Statements	Never (n, %)			Seldom (n, %)			Sometimes (n, %)			Generally (n, %)			Always (n, %)			Chi-Square (χ^2)	P Value
	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size		
Take pain over slaughter and transporting	4 (15.4)	1 (3.8)	0 (0.0)	2 (7.7)	0 (0.0)	0 (0.0)	5 (19.3)	0 (0.0)	1 (3.8)	2 (7.7)	1 (3.8)	1 (3.8)	6 (23.2)	2 (7.7)	1 (3.8)	0.918	0.632*
Give importance of the meat had sufficient quality and texture	3 (11.5)	0 (0.0)	1 (3.8)	3 (11.5)	2 (7.7)	0 (0.0)	4 (15.4)	0 (0.0)	2 (7.7)	3 (11.5)	2 (7.7)	0 (0.0)	6 (23.2)	0 (0.0)	0 (0.0)	1.347	0.510*
Take practices suitable for Turkish Food Codex	9 (34.7)	0 (0.0)	2 (7.7)	3 (11.5)	2 (7.7)	0 (0.0)	2 (7.7)	0 (0.0)	1 (3.8)	2 (7.7)	2 (7.7)	0 (0.0)	3 (11.5)	0 (0.0)	0 (0.0)	0.813	0.666*
Make sure of the transporter bus as clean, at convenient temperature and veterinary inspection	1 (3.8)	0 (0.0)	0 (0.0)	3 (11.5)	1 (3.8)	0 (0.0)	7 (27.1)	1 (3.8)	0 (0.0)	3 (11.5)	1 (3.8)	1 (3.8)	5 (19.4)	1 (3.8)	2 (7.7)	2.910	0.233*
Buy the meat from the slaughterhouses	3 (11.5)	3 (11.5)	1 (3.8)	2 (7.7)	0 (0.0)	0 (0.0)	3 (11.5)	0 (0.0)	0 (0.0)	5 (19.4)	0 (0.0)	1 (3.8)	6 (23.2)	1 (3.8)	1 (3.8)	2.056	0.358*
Take care of cutting and preparing the meat by myself	15 (57.9)	2 (7.7)	2 (7.7)	1 (3.8)	0 (0.0)	0 (0.0)	2 (7.7)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.8)	0 (0.0)	1 (3.8)	1 (3.8)	1 (3.8)	2.072	0.355*
Consider buying the meat at low cost from the producers	3 (11.5)	1 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	7 (27.2)	0 (0.0)	1 (3.8)	3 (11.5)	1 (3.8)	1 (3.8)	6 (23.1)	2 (7.7)	1 (3.8)	0.569	0.752*
Consider transporting the meat at low cost	3 (11.5)	1 (3.8)	0 (0.0)	2 (7.7)	1 (3.8)	0 (0.0)	6 (23.3)	0 (0.0)	1 (3.8)	3 (11.5)	1 (3.8)	1 (3.8)	5 (19.4)	1 (3.8)	1 (3.8)	0.821	0.663*
Take care of official seal and report belongs to veterinary	1 (3.8)	1 (3.8)	0 (0.0)	3 (11.5)	0 (0.0)	0 (0.0)	7 (27.1)	0 (0.0)	1 (3.8)	6 (23.1)	0 (0.0)	0 (0.0)	2 (7.7)	3 (11.5)	2 (7.7)	3.557	0.169*
Give importance for the producers implemented good practices	9 (34.6)	2 (7.7)	2 (7.7)	4 (15.4)	0 (0.0)	0 (0.0)	0 (0.0)	2 (7.7)	1 (3.8)	2 (7.7)	0 (0.0)	0 (0.0)	4 (15.4)	0 (0.0)	0 (0.0)	0.483	0.785*

¹ Small, middle and large sized meat processing firms consisted of 19, 4 and 3 businesses, respectively, * NS-not significant

Table 2. Characterization of the meat processing firms for the crucial variables aimed at food safety in processing period (n= 26)¹**Tablo 2.** İşleme periyodunda gıda güvenliği için kritik değişkenlere yönelik et işleme firmalarının karakterizasyonu¹

Statements	Never (n, %)			Seldom (n, %)			Sometimes (n, %)			Generally (n, %)			Always (n, %)			Chi-Square (χ ²)	P Value
	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size		
Consider for the classification process as to animal varieties and fat content of the meat	5 (19.3)	1 (3.8)	1 (3.8)	4 (15.5)	1 (3.8)	1 (3.8)	2 (7.7)	0 (0.0)	0 (0.0)	2 (7.7)	1 (3.8)	0 (0.0)	6 (23.2)	1 (3.8)	1 (3.8)	0.086	0.958*
Implementation of the processing practices in respect of the present quality safety systems	2 (7.7)	0 (0.0)	2 (7.7)	3 (11.4)	2 (7.7)	1 (3.8)	2 (7.7)	0 (0.0)	1 (3.8)	2 (7.7)	4 (15.5)	0 (0.0)	4 (15.5)	1 (3.8)	2 (7.7)	1.229	0.541*
Take care of the meat had health certification and convenient at internal heat	1 (3.8)	0 (0.0)	0 (0.0)	6 (23.2)	1 (3.8)	0 (0.0)	4 (15.5)	0 (0.0)	2 (7.7)	3 (11.4)	2 (7.7)	1 (3.8)	5 (19.3)	1 (3.8)	0 (0.0)	0.494	0.781*
Keeps the meat at cold storage conditions	1 (3.8)	0 (0.0)	0 (0.0)	1 (3.8)	1 (3.8)	0 (0.0)	6 (23.2)	0 (0.0)	0 (0.0)	6 (23.2)	0 (0.0)	2 (7.7)	5 (19.3)	3 (11.4)	1 (3.8)	1.946	0.378*
Give importance to fermentation temperature depended on the bones of the meat and product variables	1 (3.8)	0 (0.0)	0 (0.0)	4 (15.5)	3 (11.5)	1 (3.8)	3 (11.6)	2 (7.7)	4 (15.5)	2 (7.7)	1 (3.8)	1 (3.8)	1 (3.8)	2 (7.7)	1 (3.8)	0.233	0.890*
Always being aware of water content and results of the analyses	8 (30.8)	3 (11.5)	1 (3.8)	3 (11.5)	0 (0.0)	0 (0.0)	4 (15.5)	0 (0.0)	1 (3.8)	0 (0.0)	0 (0.0)	1 (3.8)	4 (15.5)	1 (3.8)	0 (0.0)	0.722	0.697*
Take practices suitable for Turkish Food Codex (TFC) at packaging stage	1 (3.8)	0 (0.0)	1 (3.8)	2 (7.7)	0 (0.0)	0 (0.0)	7 (27.0)	1 (3.8)	0 (0.0)	4 (15.5)	1 (3.8)	1 (3.8)	5 (19.3)	2 (7.7)	1 (3.8)	1.230	0.541*
Give sufficient importance for loading, transporting and delivering process suitable for (TFC)	2 (7.7)	0 (0.0)	1 (3.8)	3 (11.5)	1 (3.8)	0 (0.0)	6 (23.3)	0 (0.0)	1 (3.8)	3 (11.5)	2 (7.7)	0 (0.0)	5 (19.3)	1 (3.8)	1 (3.8)	0.462	0.794*

¹ Small, middle and large sized meat processing firms composed of 19, 4 and 3 businesses, respectively, * NS-not significant

meat at a low cost from the producers". It may be inferred that the managers of the meat processing firms might be able to give sufficient care linked with food safety approaches, although there were some barriers explored in the research. It was indicated that food producers (farmers, food processors, food retailers) will supply food safety if it is profitable for them to do so. However, the provision of safer food will require the use of more resources (greater selectivity in choosing raw materials, more hygienic handling procedures, better chill-chain facilities, etc.). Thus, it was stressed that the marginal cost of producing additional units of food safety is likely to rise²¹. In another study conducted among Turkish food businesses, food safety practices were reported to be the main barrier to implementing a HACCP (Hazard Analysis of Critical Control Points) based food safety management system. The lack of prerequisite programs, lack of knowledge, inadequate Turkish sources related to HACCP, cost and time were also considered barriers. Problems in the implementation of HACCP in Turkey food businesses have been designated as inadequate equipment and physical conditions of the facility¹³. The critical point should be made that this very complex legal regulation has still been implemented in Turkey despite the barriers. Maybe the "never" responses

that were frequently obtained on "incorporate practices suitable for the Turkish Food Codex", "take care when cutting and preparing the meat by myself", "maintain the importance of producers to implement good practices" were given for that reason. However, the legal regulations that have been implemented so far in Turkey have shown very complex characteristics. Thus, that complexity may be creating problems in maintaining a centralized structure for monitoring and intervention, in order to ensure effectiveness of food safety control and monitoring in many instances. The recent enforcement of Law No. 5996 requiring the services of veterinary, plant health, food and feed laws published on 13.6.2010, as required by the EU accession period²², may result in more satisfied results in the near future. According to the second results obtained in processing stages, there were no statistical differences among the small, middle and large sized meat processing firms during the processing period. The "never" and "seldom" responses were frequently given on "consider the classification process as to animal varieties and fat content of the meat", "maintain awareness at all times of water content and results of the analyses", "assure that the meat had health certification". "Generally", "sometimes" and "always" replies were obtained from "maintain practices

Table 3. The perceptions of the managers for the meat processing firms with regard to defining key barriers after the processing stage (n= 26)¹**Tablo 3.** İşleme sonrası süreçte anahtar engellerin tanımlanmasına yönelik olarak işleme firmaları yöneticilerinin algıları¹

Statements	Never (n, %)			Seldom (n, %)			Sometimes (n, %)			Generally (n, %)			Always (n, %)			Chi-Square (χ ²)	P Value
	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size	Small Size	Middle Size	Large Size		
Customers determine the product varieties	9 (34.7)	1 (3.8)	1 (3.8)	1 (3.8)	0 (0.0)	0 (0.0)	1 (3.8)	1 (3.8)	0 (0.0)	2 (7.7)	0 (0.0)	0 (0.0)	6 (23.2)	2 (7.7)	2 (7.7)	1.130	0.568*
Determine the product varieties by myself	6 (23.1)	2 (7.7)	2 (7.7)	0 (0.0)	0 (0.0)	0 (0.0)	2 (7.7)	0 (0.0)	0 (0.0)	1 (3.8)	0 (0.0)	0 (0.0)	10 (38.5)	2 (7.7)	1 (3.8)	0.847	0.655*
Marketing profiles occur as a result of retail in general	2 (7.7)	1 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (7.7)	0 (0.0)	0 (0.0)	4 (15.4)	0 (0.0)	1 (3.8)	11 (42.4)	3 (11.5)	2 (7.7)	0.297	0.862*
Marketing profiles occur as a result of wholesale in general	11 (42.5)	2 (7.7)	2 (7.7)	1 (3.8)	0 (0.0)	0 (0.0)	1 (3.8)	0 (0.0)	0 (0.0)	1 (3.8)	1 (3.8)	0 (0.0)	5 (19.3)	1 (3.8)	1 (3.8)	0.024	0.988*
Marketing profiles consist of awarding	16 (61.7)	3 (11.5)	3 (11.5)	2 (7.7)	0 (0.0)	0 (0.0)	1 (3.8)	1 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0.911	0.634*
Marketing profiles occur in boutiques (small retail store)	19 (73.2)	3 (11.5)	3 (11.5)	0 (0.0)	1 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5.500	0.064**
Marketing profiles formed by the franchise	19 (73.1)	4 (15.4)	2 (7.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.8)	7.667	0.022***
Create the advertisement activities for promotion	15 (57.9)	3 (11.6)	2 (7.7)	1 (3.8)	0 (0.0)	0 (0.0)	1 (3.8)	0 (0.0)	1 (3.8)	1 (3.8)	0 (0.0)	0 (0.0)	1 (3.8)	1 (3.8)	0 (0.0)	0.224	0.894*
Make the advertisement activities refer to taste	16 (61.6)	4 (15.4)	2 (7.7)	0 (0.0)	0 (0.0)	0 (0.0)	2 (7.7)	0 (0.0)	1 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.8)	0 (0.0)	0 (0.0)	1.313	0.519*
Make the advertisement activities as visual publications	11 (42.6)	2 (7.7)	1 (3.8)	1 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.8)	4 (15.4)	1 (3.8)	1 (3.8)	3 (11.5)	1 (3.8)	0 (0.0)	0.233	0.890*
Make the advertisement activities in poster form	14 (53.9)	4 (15.5)	2 (7.7)	1 (3.8)	0 (0.0)	0 (0.0)	1 (3.8)	0 (0.0)	1 (3.8)	1 (3.8)	0 (0.0)	0 (0.0)	2 (7.7)	0 (0.0)	0 (0.0)	1.358	0.507*

¹ Small, middle and large sized meat processing firms composed of 19, 4 and 3 businesses, respectively,

* NS-not significant, **Significant for P<0.10, ***Significant for P<0.05

suitable for the Turkish Food Codex (TFC) at the packaging stage", "assure that the meat had health certification", and "stores the meat in cold storage conditions" expressions. Despite the fact that it would take better outcomes on hygiene and food safety concepts in the processing stage, it may be deduced that meat processing firms were ready for good hygienic practices (GHP). It is well known that the Aydin Provincial Agricultural Directorate (APAD) has been working very seriously in the region at firm level processing directed at food safety. While it was emphasized that a lack of knowledge about HACCP and other food safety programs were identified as the main barriers for food safety in Turkey, hypermarkets and retail markets with large meat selling capacity want the meat processing firms to implement GHP directed toward stabilization of sustainable domestic markets¹⁴. Those drivers may be enforcing meat firms to implement GHP intended for food safety approaches very seriously. An investigation of the perceptions of the managers in the meat processing firms with regard to defining key barriers after the processing stage, showed no statistical differences among identified variables in the three-sized business classification except for two statements. These

expressions were "marketing profiles occur in boutiques (small retail stores)" and "marketing profiles are determined by the franchise". Additionally, these statements were statistically significant at 10% (P<0.10) and 5% (P<0.05) levels, respectively. All statements indicated that "never" replies were in the first range in the small sized firms specifically. It may be deduced that meat processing firms do not need the use of attractive marketing instruments. It can be reasoned that the firms can sell their goods in the domestic market without difficulty. Thus, although the meat processing firms have been working in relatively competitive conditions in the domestic market and have not been implementing good marketing practices efficiently, these businesses can sell their products regardless. It was indicated that a combination of product liability, governmental regulations, and market forces determine the current level of food safety²³. It may be inferred that managers of the firms considered that the current practices were sufficient for safely and sustainable marketing powers, especially since these negative responses were predominantly grouped in the small firms. Those plants did not want to spend money on practices that might obstruct the current marketing network in the

event that they were not implemented. This point of view was stressed in some crucial studies^{6,24,25}. They examined the negative incentives of higher per unit production cost of adopting food safety and quality practices for smaller firms. It was noted that because the monitoring and the record keeping requirements of regulations are largely fixed costs, the average cost per unit of production was higher for smaller firms than for larger firms⁶. Therefore, size was another possible firm characteristic that could explain the importance of the cost of implementation as an incentive to adopt food safety and quality practices.

REFERENCES

1. **Sinclair U:** The Jungle; New York: Doubleday, Jabber, and Company, 1906.
2. **Hoffman S:** Food safety policy and economics. Discussion Paper, July 2010. RFF DP 10-36, 1-36, 2010.
3. **Chambers RG:** Applied production analysis: A dual approach. Cambridge: Cambridge University Press, 1988.
4. **Buzby JC, Frenzen PD, Rasco B:** Product liability and microbial food-borne illness. Washington DC: United States Department of Agriculture, ERS Agricultural Economics Reports, 799 - 2001, 2001.
5. **Loader R, Hobbs JE:** Strategic responses to food safety legislation. *Food Policy*, 24, 685-706, 1999.
6. **Antle JM:** Choice and efficiency in food safety policy. Washington DC: AEI Press, 1995.
7. **Antle JM:** Economics analysis of food safety. In, Gardner B, Rausser G (Eds): Handbook of Agricultural Economics. 1, 1083-1136, Amsterdam, Elsevier Science, 2001.
8. **Henson S, Heasman M:** Food safety regulation and the firm: Understanding the compliance process. *Food Policy*, 23 (1): 9-23, 1998.
9. **Henson S, Hooker N.H:** Private sector management of food safety: Public regulation and the role of private controls. *Int Food Agribusiness Manage Rev*, 4, 7-17, 2001.
10. **Krishantha U, Mudalige J, Henson S:** Economic incentives for firms to implement enhanced food safety controls: Case of the Canadian red meat and poultry processing sector. *Rev Agric Econ*, 28 (4): 494-514, 2006.
11. **Kursun O, Guner A, Ozmen G:** Prevalence of *Bacillus cereus* in rabbit meat consumed in Burdur-Turkey, its enterotoxin producing ability and antibiotic susceptibility. *Kafkas Univ Fak Derg*, 17 (Suppl A): S31-S35, 2011.
12. **Kale MC, Aral Y, Aydın E, Cevger Y, Sakarya E, Güloğlu SC:** Determination of by-product economic values for slaughtered cattle and sheep. *Kafkas Univ Fak Derg*, 17 (4): 551-556, 2011.
13. **Baş M, Ersun AŞ, Kivanç G:** Implementation of HACCP and prerequisite programs in food businesses in Turkey. *Food Control*, 17, 118-126, 2006.
14. **Baş M, Yüksel M, Çavuşoğlu T:** Difficulties and barriers for the implementing of HACCP and food safety systems in food businesses in Turkey. *Food Control*, 18, 124-130, 2007.
15. **Malhotra NK:** Marketing Research: An Applied Orientation. 2nd ed., Prentice-Hall, Englewood Cliffs, 1996.
16. **Davis JA:** Elementary Survey Analysis. pp. 9-32, Printice Hall, New Jersey, 1971.
17. **SPSS:** PASW 19, Predictive Analytics Software, SPSS Inc., Chicago, USA, 2010.
18. **Gujarati DN:** Basic econometrics. 3rd ed., McGraw-Hill, Boston, MA, 2005.
19. **Akkaya S, Pazarlioglu V:** Ekonometri I (Econometrics I). Anadolu Matbaacilik, Izmir, Turkey, 1998.
20. **Kruskal WH, Wallis WA:** Use of ranks in one-criterion variance analysis. *J Am Stat Assoc*, 47 (260): 583-621, 1952.
21. **Fearne A:** The evolution of partnerships in the meat supply chain: Insights from the British beef industry. *Int J Supply Chain Manag*, 3, 4, 1998.
22. **ONTR:** The services of veterinary, plant health, food and feed law published on 13.6.2010. Law no. 5996, Official Newspapers of Turkish Republic (ONTR), 2010.
23. **Buzby JC, Frenzen PD:** Food safety and product liability. *Food Policy*, 24, 637-651, 1999.
24. **Holleram E, Bredahl ME, Zaiet L:** Private incentives for adopting food safety and quality assurance. *Food Policy*, 24, 669-683, 1999.
25. **Taylor E:** HACCP in small companies: Benefit or burden. *Food Control*, 12, 217-222, 2001.