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Survey into the Characteristics, Working Conditions and Deficiencies of Turkish Seafood Processing Firms

Suhendan Mol[1,*], Birsen Eygi Erdogan[2], Safak Ulusoy[1]

[1] Istanbul University, Fisheries Faculty, Ordu st. No: 200, 34470, Laleli, Istanbul, Turkey.
[2] Marmara University, Faculty, Faculty of Arts and Sciences, Department of Statistics, 34722, Kadıköy, İstanbul, Turkey.

* Corresponding Author: Tel.: +90.212 4555700; Fax: +90.212 4555700;
E-mail: suhendan@istanbul.edu.tr

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Abstract

Since Turkey is an important seafood supplier to the world market, working conditions and deficiencies of Turkish seafood processing firms were surveyed. Inadequacy of employee education was the main barrier of HACCP implementation. Unpredictable raw material availability, price of raw material, defective audit policy of the government, lack of information transfer from the universities, excessive bureaucracy, difficulty of employee education, excessive use of glazing and additives by rivals, tax rates, ignorance of the inspectors, difficulty to getting credits were the factors, complicating productivity.

The domestic trade barriers were the unbounded seafood imports, antipathy of Turkish consumers against seafoods, price of seafood, inadequacy of cold chain conditions. Instability of foreign exchange, undersell of seafoods in the global market, instability of raw material quality, uninformative attitude of the government about foreign supports, communication problem with the buyers, excessive bureaucracy, obscurity of Turkish seafoods products were the barriers, complicating foreign trade.

As an important seafood supplier, improving working conditions and elimination of deficiencies are essential for Turkey. Turkish government has to inform processing firms about the available supports and opportunities of foreign trade. Making provisions for distortions in credit market and providing convenience to get credit might be the other tasks of the government.

Keywords: Seafood, survey, processing firm, import, export.

Türk Su Ürünleri İşleme Tesislerinin Yapıları, Çalışma Koşulları Ve Eksiklikleri Üzerine Bir Anket Çalışması

Özet

Türkiye dünya pazarında önemli bir su ürünleri tedarikçisi olduğundan, Türk su ürünleri işleme tesislerinin çalışma koşulları ve eksiklikleri anket yapılarak incelenmiştir. Personel eğitimini yetersizliği HACCP sistemini uygulanması konusundaki esas engeldir. Ham materyal kalitesinin belirsizliği, ham materyalin fiyatı, devletin denetim politikasındaki yetersizlik, üniversitelerden bilgi transferinde eksik, aşırı bürokrasi, personel eğitimindeki zorluklar, rakiplerin aşırı glaze ve katkı kullanması, vergi oranları, denetçilerin bilgi eksiklikleri, kredi almadaki zorluklar üretimi güçleştiren faktörlerdir.

İç pazarda ticareti güçleştiren faktörler kontrolsüz su ürünleri ithalatı, Türk tüketicisinin su ürünlerine karşı antipatisi, su ürünlerini fiyatı, soğuk zincir koşullarının yetersizliğidir. Dövizdeki istikrarsızlık, dünya pazarında su ürünlerinin düşük fiyatlara satılması, ham materyal kalitesinin değişkenliği, devletin yabancı destekler hakkında bilgilendirmede bulunmaması, alıcı ile iletişim sıkıntısı yaşanması, aşırı bürokrasi, Türk su ürünlerin yeterince tanınmıyor oluşu ise dış pazardaki zorlukları oluşturmaktadır.

Önemli bir su ürünleri tedarikçisi olarak Türkiye'nin çalışma koşullarını iyileştirmesi ve eksiklikleri gidermesi gereklidir. Türkiye'nin işleme tesislerini yabancı ticaretle ilgili uygun destekler ve fırsatlar ile ilgili olarak bilgilendirmesi gereklidir. Kredi düzensizliklerinde provizyon ve kredi almada kolaylık sağlaması da devletin yapabileceği diğer katkılardır.

Anahtar Kelimeler: Su ürünleri, anket, işleme firması, ihraç, ithal

Introduction

Fishery is a promising sector for the future, according to the OECD/FAO report. Annual per capita fish consumption in the world increased from 9.9 kg in the 1960s, to 17.0 kg in 2007. As a result of this demand, seafood prices raised both in domestic and export markets. Turkey is the 29th country,

contributing seafood supply and has 494,124 t contributions to the world market (OECD/FAO, 2011). Turkey exports fresh, frozen and processed (marinated, smoked, salted, canned and dried) seafoods mainly to Europe, but Japan and other far-east countries are also important buyers (Ozdemir and Aras, 2005).

In general, processed food trade has been increased in last decades, and developed countries are the main buyers of them from many developing countries. Developing countries have a fish trade surplus of US$ 17.4 billion in 2002 (Ababouch, 2006), and there is a net flow of fish from developing to developed countries (Swartz *et al.*, 2010). However, marketing unprocessed and processed seafoods poses some challenges for developing countries. One of the most important challenges is to meet tightened food safety standards (Jongwanich, 2009). Implementation of food safety standards is a necessity especially for high-risk foods such as seafood (Codex Alimentarius, 1993; FAO, 1998), but results in some additional costs and requirements. Due to the inadequate resources to reach and purchase the latest information and technology; sufficiency of food safety systems in developing countries is dubious (Jongwanich, 2009). Cope up with the global increase in fish price (OECD/FAO, 2011) and overcome the distortions in the credit market (Jongwanich, 2009) are the other important challenges of developing countries. Overcoming cold chain inadequacies is another necessity (Akca *et al.*, 2006).

Sufficiency of food safety systems in developing countries became a crucial question for human health, due to the growing international food trade. Since Turkey is an important seafood supplier, determining the working conditions and deficiencies of Turkish seafood processing firms is needed for foreign market as well as Turkish domestic market. Therefore, the present conditions of Turkish seafood processing firms were studied in this study. The major difficulties of implementing food safety systems, main problems during processing, barriers to supply seafoods both in domestic and foreign markets were asked to the firms via an e-mailed survey. The main processing/ preservation technologies in use were also questioned. Results of this survey may be helpful to understand main barriers of domestic and foreign seafood trade. Therefore, short and long term marketing policies may be created.

Materials and Methods

In order to examine working conditions, main problems and current marketing situation of Turkish seafood processing firms, a survey was constructed and e-mailed to the seafood processing firms, in the year of 2012.

The survey contained 20 questions. Five of them were about the characteristics of the firm (annual endorsement, annual capacity, origin of the raw material, share of seafoods in the facility, annual amounts of domestic and foreign trade). The most important barriers to supply seafood products to the domestic and foreign markets were questioned. Opinions of the firm officers about food safety systems, implementation of HACCP system in the facility, transferring conditions of raw material, major problems related to hygiene and sanitation in the facility, current markets (foreign or domestic) of the firms, the main purchasing countries, processing& packaging techniques in use, main problems during processing were also asked. A random sample of 78 seafood processing firms were e-mailed with a 50% response. Three of the returned questionnaires were eliminated because of unreliable responses. Therefore 36 questionnaires were evaluated to obtain results.

Descriptive statistical methods were used to analyze the responses. Statistical package program NCSS was used to produce tables of frequency counts and percentages for discrete variables.

Results and Discussion

General Characteristics of the Respondent Firms

General characteristics of the respondent firms were presented in Table 1. More than a half of respondent firms declared their annual endorsement below 5 million Euros. The firms, having an annual endorsement above 20 million Euros were only 6.2%. The annual capacity of the respondent firms was generally between 1000-1999 tonnes. Origin of the raw material was generally (72.2%) domestic, and 71.3% of the respondents declared that they process only seafoods in their facility.

On the other hand, large majority of the facilities (94.4%) have been employing an engineer, specialized in seafood science, according to the responses (data not shown).

Barriers of HACCP Implementation, and Difficulties in Maintaining Hygiene and Sanitation

Today, maintenance of safety controls cause additional costs and workloads. Therefore, it is more difficult to meet food safety standards for developing countries than developed ones. However, implementation of food safety systems improves quality, increase the sales and decrease total safety/quality costs (Lupin *et al.*, 2010). Food safety is very important to maintain a healthy and reliable food and quality assurance is a priority for many governments. Maintaining food safety and imposing food standards are extremely important since they increase the sales amount (Ababouch, 2006). Jongwanich (2009) showed an important decrease in the detention cases of processed food export from Turkey to US, thanks to the implementation of food safety standards. In this study, the majority of companies considered (94.4%) HACCP, ISO 22000

and other quality systems as very important, but 2 of them declared that they do not believe such systems to maintain product quality. Likewise, Ragasa *et al.* (2011) mentioned that some food processors have not embraced food safety systems.

According to their declarations, HACCP system has been working without any problem in a remarkable part (80.6%) of respondent firms (data not shown). In recent years Turkey has been harmonized with regulations and directives related to food products, within the process of integration into the European Union. HACCP and other standards have been implemented in fishery sector. Turkish producers and exporters have been adapted their production and sales chain to international norms and their share in the world market keeps on growing (Civaner, 2011). On the other hand, the system has been working with some problems in 11.1% of the firms, and 2.8% of them still trying to set it up. Since they disbelieve in HACCP system, the other firms declared that they are against to establish it.

The seafood processing firms were asked about the major barriers of HACCP implementation, and difficulties to maintain hygiene and sanitation. Multi-answering was allowed. As it may be seen in Figure 1, the major difficulty was the inadequacy of employee education. In seafood processing sector, it is very rare to employ permanent workers. So, education of seasonal workers is very difficult and inadequate. Likewise, 31% of seafood processing employees have been reported as seasonal workers in South Africa (Jeebhay *et al.*, 2000). Employing permanent workers is necessary for training them on food safety rules. The other important benefits of employing permanent workers are the implementation of good work practices, maintaining a controlled system; therefore, decreasing potential health hazards of the workers (Nag and Nag, 2007).

The absorption of cleaning agent costs (33.3%) was another difficulty according to the respondent seafood processing firms (Figure 1). Lupin *et al.* (2010) have also complained about the costs of

Table 1. General characteristics of the respondent firms

		Response Percent (%)			Responce percent (%)
Annual endorsement of the facility	<1 million Euros	24.2	Annual capacity of the facility	<500 tonnes	11.1
	1-5 million Euros	33.3		501-999 tonnes	16.7
	5-10 million Euros	12.1		1000-1999 tonnes	30.6
	10-20 million Euros	24.2		2000-3999 tonnes	19.4
	>20 million Euros	6.2		>4000 tonnes	22.2
Origin of the raw material	100 % Domestic seafood	72.2	Share of seafoods in the facility	<25%	2.9
	100% Imported seafood	5.6		26-50%	2.9
	50% domestic /50% imported	2.8		51-75%	2.9
	Mostly domestic	11.1		76-99%	20
	Mostly imported	8.3		100%	71.3

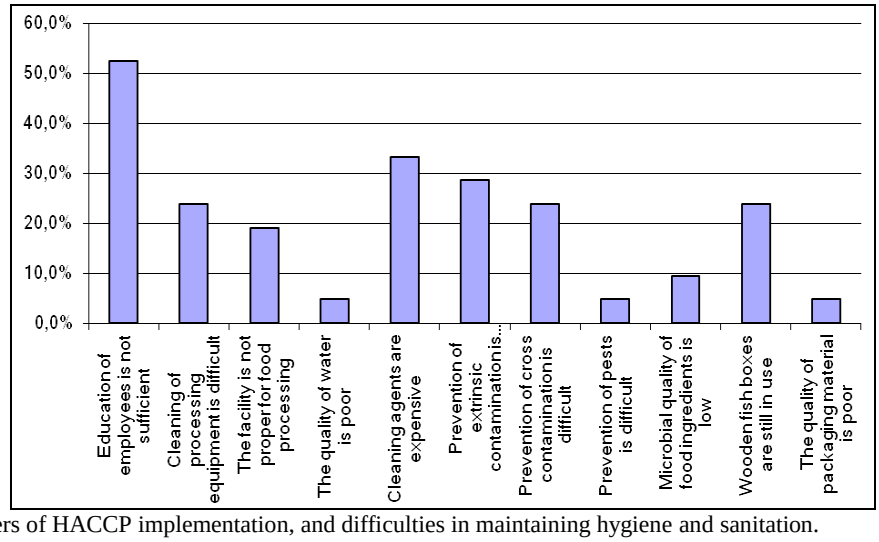

Figure 1. Barriers of HACCP implementation, and difficulties in maintaining hygiene and sanitation. (multi-answer allowed)

implementing safety system in fish processing plants. But they have also underlined that, costs are coverable in the first years of HACCP implementation, due to the increased quality and decreased total quality costs. The other important difficulties of respondent firms were preventing the extrinsic contamination (28.6%), maintaining the effective cleaning of the processing equipment (23.8%), and prevention of cross contamination (23.8%). As it is known, prevention of cross contamination is a difficult issue for seafood processing, and requires more accuracy (Ahmed and Anderson 1994). The false behavior of the sector to use wooden fish boxes is another declared problem (Figure 1).

The transportation of raw material is known as another factor, affecting food safety and quality. Therefore, transportation vehicles in use were asked to the firms. It was determined that raw materials generally transferred to the processing firms in frigorific trucks (71.4%). However, rest of the firms declared that they may accept iced raw materials, transferred in other trucks. Akca *et al.* (2006) emphasized inadequate cooling chain during seafood marketing as a weakness of the fisheries sector in Turkey.

Domestic and Foreign Sales of the Respondent Firms

Developing countries are important for the global seafood trade (Iles, 2007). According to our results, 85.7% of the respondent firms have been exporting their products, while 72.7% marketing into the domestic market. On the other hand, 58.4% of the firms declared that they have been marketing their products both to the domestic and foreign markets (Data not shown). As it was presented in Table 2, most of the processing firms (60%) declared an annual export below 1000 tonnes. As to domestic market, 68.2% of the firms stated an annual marketing capacity no more than 500 tonnes.

Seafood Importing Countries from the Respondent Firms

The exporter respondents were questioned as "Which countries do you export your products?". Since they export their products more than one countries, multi-answering was allowed. As it was presented in Figure 2, Germany (51.6%) and Holland (41.9%) are the main customers of the respondent firms. Likewise, Jongwanich (2009) asserted EU countries as one of the main processed food importers from developed countries. It is known that, market necessities and consumer preferences are very important for the marketing success (Lindkvist, 2010). Marketability of a product differs regarding the economic, political, and cultural structures of the target countries. Quantity of sales are significantly influences from these characteristics (Iles, 2007). So,

Table 2. The annual amounts of seafoods, exposed for domestic and foreign sale by the respondent firms

Export market	Response percent (%)	Domestic market	Response percent (%)
Below 500 tonnes	30	Below 250 tonnes	50
501-999 tonnes	30	251-500 tonnes	18.2
1000-1999 tonnes	13.3	501-999 tonnes	4.5
2000-3999 tonnes	16.7	1000-1999 tonnes	22.7
Above 4000 tonnes	10	Above 2000 tonnes	4.5

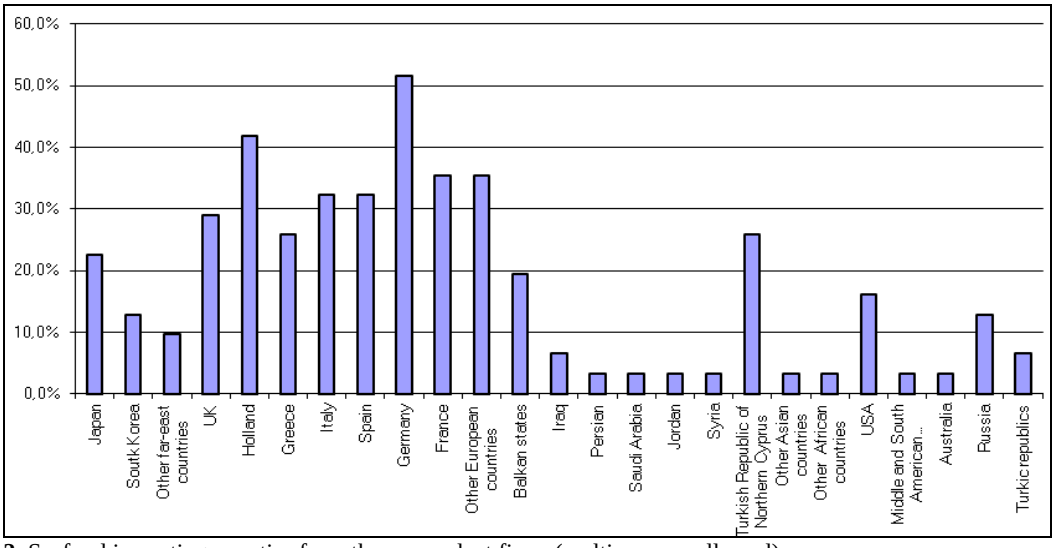

Figure 2. Seafood importing counties from the respondent firms (multi-answer allowed).

the significant amount of resident Turks in Germany and Holland might be one of the main reasons of this result.

The Main Preservation and Packaging Technologies in Use

The seafood processing firms were questioned about the current preservation and packaging technologies in use. Multi-answering was allowed, since the firms generally use more than one technology. The respondent firms declared that they may prefer different preservation/ packaging technologies for domestic and for foreign trade products (Table 3).

As it was presented in Table 3, freezing was the most common technology for seafoods. Jeebhay *et al.* (2000) surveyed seafood processing firms in South Africa and reported the main process as freezing (71%), similarly. Chilling was the second common technology; used by 70.8% of the exporters and 40.0% of domestic market producers.

As to processing, marinating and smoking were the mostly used technologies, followed by salting, canning and drying. Marinating, salting (Shenderyuk and Bykowski, 1990), smoking and drying (Varlik *et al.*, 2011) are known as very old and common techniques to preserve fish.

For the exported seafoods, processing firms generally preferred air packaging (58.6%), vacuum packaging (55.2%), and shrinking (48.3). Vacuum packaging (60.9%) and air packaging (52.2%) were the most preferred technologies for the seafoods, launched to the domestic market. As it is known, air packaging is a common, easy and cheap method for the seafood processors. On the other hand, vacuum packaging has been presented as an established technique for the food processing industry by McDonald and Sun (2000). Modified atmosphere packaging was another technology; used by 13.8 % of the exporters and 17.4% of domestic market producers. Oxygen absorbers, sous vide and irradiation have been regarded as the novel food processing technologies by Barbosa-Canovas *et al.* (2005). According to our results, these technologies have not being used by any of the respondent firms for now (Table 3).

Factors Complicating the Productivity of Respondent Firms

The main factors complicating their productivity were asked to the seafood processing firms (Table 4). Since they have usually more than one complaint, multi-answering was allowed. Due to the instability of catching conditions, 67.6% of the firms complained about the unpredictable raw material availability. Likewise, Hackett *et al.* (2005) underlined the important effect of raw material availability on seafood processing sector in US. They reported that, fish processing industry in US have been adapted to the pulse of landings in derby fisheries.

On the other hand, decreasing fish populations in Turkish waters was declared as another important problem, threatening seafood trade and increasing fish prices (Celik *et al.*, 2012). More than half of the respondent firms (55.9%) complained about the price of raw material (Table 4). According to FAO Fish Price Index, fish prices have been on the rise and higher than ever (OECD/FAO, 2011).

Defective audit policy of the government, lack of information transfer from universities and excessive bureaucratic procedures were the other common complaints of respondent firms. They suggested that, these factors negatively affecting their productivity. The difficulty of educating employees on hygiene and sanitation procedures was regarded as an important problem by 35.3% of the respondents. Employing permanent workers is needed to provide an effective education (Chesworth, 1997).

Excessive use of glazing (23.5%) and food additives (11.8%) by rival firms were also pronounced as important problems by the respondent firms (Table 4). They have mentioned that, the use of glazing and food additives must be strictly controlled by the Turkish government. Otherwise productivity of conformist firms have been negatively affecting, since it is very difficult to compete with overusing rival companies. It is also known that, overused additives might be harmful for consumer health (Varlik *et al.*, 2011).

Of the firms attending our questionnaire 23.5% complained about the taxes, while 20.6% talked about the ignorance of the official inspectors. Difficulty to get government credits was declared as another factor

Table 3. Preservation and packaging technologies in use (multi-answer allowed)

	Response percent (%)			Response percent (%)	
	Foreign trade (Exported)	Domestic trade		Foreign trade (Exported)	Domestic trade
Chilling	40.0	70.8	Air packaging	58.6	52.2
Freezing	86.7	98.8	Vacuum packaging	55.2	60.9
Drying	3.3	4.2	Shrink packaging	48.3	34.8
Salting	16.7	20.8	Modified atmosphere packaging	13.8	17.4
Smoking	20.0	25.0	Sous vide packaging	0.0	0.0
Marinating	30.0	25.0	Oxygen absorbers	0.0	0.0
Canning	6.7	16.7	Irradiation	0.0	0.0

by 17.6% of the respondents, hindering their productivity.

The Main Trade Barriers of Respondent Firms

The main trade barriers, threatening domestic and foreign seafood trades, were presented in Table 5 and Table 6, respectively. Since the respondent firms usually have more than one complaints, multi-answering was allowed.

When examining the main domestic trade barriers (Table 5); the respondent firms mostly (58.3%) complained about the unbounded seafood imports, especially from China. China is a very important seafood supplier (Celik *et al.*, 2012). The respondents declared that, cheap and excessive imported seafoods decrease their domestic sells, since the consumer prefers cheaper Chinese imports. On the other hand, antipathy of Turkish consumers against seafoods has been regarded as an important barrier for the domestic seafood trade (Table 5). The annual seafood consumption per person is about 7 kg in Turkey (Anonymous, 2013). According to the results of another survey, seafoods have never been consumed by 15.53% of Turkish consumers (Erdogan *et al.*, 2011). Red meat has been the favorite muscle food for Turkish consumers, and they generally have not been used to consume seafood (Celik *et al.*, 2012). The positive effect of consumer education on food marketing has been mentioned formerly (Anderson and Anderson, 1991). Education of Turkish consumers about the health benefits of seafood consumption may help to overcome this barrier. Since the price of seafood is generally higher than that of red meat and poultry, 37.5% of the respondent firms regarded the price as an important domestic trade barrier. On the other hand, inadequacy of cold chain conditions was declared as another important barrier by 25% of the respondents. Necessity to deal with cold chain inadequacies in Turkey has also been pronounced by Akca *et al.* (2006).

As to the main barriers complicating seafood exports, the most preferred answer (57.1%) was 'the instability of foreign exchange' (Table 6). More than half of the exporter respondents (53.6%) regarded the undersell of seafoods in the global market as an important foreign trade barrier. As it is known, China is the global leader of fish supply, while Turkey is 29th country in the rank (Celik *et al.*, 2012). Accordingly, the respondent firms mostly declared

Table 4. The main factors complicating productivity of seafood processing firms (multi-answer)

	Response percent (%)		Response percent (%)
Unpredictability of raw material availability	67.6	Excessive use of glazing by rival firms	23.5
Price of raw material	55.9	Excessive amounts of taxes	23.5
Defective audit policy of the government	44.1	Ignorance of the official inspectors	20.6
Lack of information transfer from the universities	44.1	Difficulty to get government credits	17.6
Excessive bureaucratic procedures	44.1	Excessive use of food additives by rival firms	11.8
Difficulty of employee education	35.3		

Table 5. The main domestic trade barriers (multi-answer)

	Response percent (%)
Unbounded seafood imports	58.3
Antipathy of Turkish consumers against seafoods	45.8
Relatively higher price of seafood than meat and poultry	37.5
Inadequacy of cold chain conditions in Turkey	25.0

Table 6. The main foreign trade barriers (multi-answer)

	Response percent (%)
Instability of foreign exchange	57.1
Undersell of seafoods in the global market	53.6
Instability of raw material quality	39.3
Uninformative attitude of the government about foreign supports	35.7
Communication problem with the buyers	25.0
Excessive bureaucracy for Turkish exports	25.0
Obscurity of Turkish seafood products	10.7

that they cannot compete with China's low prices. Instability of the raw material quality has also been regarded as another barrier by 39.3% of the firms. It is well known that, the quality of raw material is very important to maintain an acceptable product in the foreign market (Chesworth, 1997). According to 35.7% of the respondent firms, uninformative attitude of the government about foreign supports is an important trade barrier. They underlined the need of being informed by the government about the available supports and opportunities of foreign trade. The governments of developing countries must reduce distortions in credit market and help to the processing firms to access supports (Jongwanich, 2009). The other important barriers of foreign trade were the communication deficiency and excessive bureaucracy (Table 6). According to 25% of the respondent firms, bureaucratic procedures must be reduced to improve and simplify seafood exports. Obscurity of Turkish seafood products in the world market is another trade barrier as well. Overcoming prejudice about the quality of Turkish seafood products is an important issue, according to 10.7 % of the respondent firms.

Conclusion

It was determined that, seafood processing firms in Turkey generally appreciated the importance of HACCP system and this system has been working without any problem in a remarkable part (80.6%) of respondent firms. Inadequacy of employee education is the major difficulty, regarding to maintain hygiene and sanitation. Employing permanent workers is needed to deal with this difficulty.

Turkish government has to make provisions for distortions in credit market and provide convenience to get credits. The excessive use of glazing and food additives must be strictly controlled to avoid unfair competition. Informing the processing firms about the available supports and opportunities of foreign trade, and facilitating to access supports must be the other tasks of the government.

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