

Investigating Seafood Marketing Conditions in Some Important Turkish Seafood Markets in Comparison with European Countries

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Abstract

Turkish legislation on the wholesale and retail seafood markets was published in 2002, and the aim of this study was to compare important Turkish and European markets and determine whether or not the rules articulated in this legislation have actually been put into the practice. The structure and hygiene conditions of the wholesale and retail fish markets along the east coast of Turkey and in some European countries were compared *vis-a-vis* this legislation. To enable reliable comparison of retail fish markets and branches of a well-known gross market, the markets of İstanbul, Bodrum, Bobigny, and Bielefeld were inspected. No differences among them were found among retail markets, and they were determined to be working in accordance with the conditions outlined by the legislation.

Wholesale fish markets in İstanbul, İzmir, Rungis and Madrid were also compared and to one another discussed *vis-a-vis* to the Turkish legislation of 2002. Structural and hygienic problems were detected in two major wholesale fish markets in Turkey when they were compared to wholesale markets in Rungis and Madrid. It is clear that the Turkish legislation which was published on 2002 has not been fully applied in the two main wholesale fish markets in Turkey. Efforts should be made to revive the legislation for the sake of maintaining sanitation.

Key Words: Sanitation, fish market, seafood.

Introduction

The seas of Turkey are highly productive and include many different seafood species. There are 247 such species in Black Sea, 200 in Marmara Sea, 300 in Aegean Sea and 500 in Mediterranean Sea (Doğan, 1993).

It is important to use standards that are in line with those of Europe to export seafoods (Anon., 2000). Seafood species are delivered from the fish wholesale markets, and as a result, these markets have become important for seafood trade. Wholesale fish markets are places that are run by the jurists or by the municipality. The markets' capacity is over 10 tonnes/day. Seafood is sold by the auction in these markets (Anon., 2002). The hygienic conditions maintained in wholesale markets are also important because of its effect on the quality of the seafood.

It is known that non-hygienic conditions are the cause of many diseases and threaten human health. Due to the fact that the Turkish rules on the maintenance of the hygiene of shellfish and fish (91/432 and 91/493) had not been implemented, European countries ceased the importation of seafood from Turkey between the years of 1994–1998. This economic loss has underscored the importance of the hygiene in seafood trade (Çelikkale *et al.*, 1999).

In recent years, the application of the HACCP (Hazard Analysis and Critical Control Point) system to seafood has become ever more important, and 26 countries have signed the EC agreement that attempts to address this issue by the end of 1996. If there is no

assurance of quality from a seafood-exporting country; the importation of seafood will not take place. It is obvious that maintenance of hygienic standards on wholesale seafood markets is critical to human health as well as for the seafood economy (Poroy, 2001). In a handbook on the seafood quality control, published by the Turkish Ministry of Agriculture, it is stated that any firm that exports seafoods to the European countries must have a health certificate and its products must bear markings indicating that they are "Appropriate to the Hygiene rules of Ministry of Agriculture" (Anon., 2000).

Since individuals purchase their seafood from retailers rather than from wholesale markets, hygienic control of the retail fish markets is also crucial for the public health.

The aim of this study was to determine whether or not the rules of Turkish legislation on the wholesale and retail seafood markets have been properly applied. The export of seafood to European countries is essential to protect the economy and moreover to protect public health in Turkey. For these reasons, this study presents the structural and hygienic conditions of some wholesale and retail fish markets and compares their current status to the standards articulated in the Turkish seafood legislation that was published in 2002.

Materials and Methods

In this study, the physical conditions of wholesale fish markets in İstanbul (Turkey), İzmir

(Turkey), Rungis (France), and Madrid (Spain) were investigated between the years of 2000–2003. The sanitary conditions of buildings, workers, equipments, fish boxes, and vehicles in Turkey were examined in relation to the Turkish legislation (Anon., 2002) and then compared with those of some markets in Europe. The 4th unit / 9th, 10th and 11th sections and the 8th unit / 26th section of the legislation were the main criteria used to characterize the physical conditions of wholesale fish markets (Anon., 2002).

The hygienic and structural conditions of the retail fish markets were also studied along the western coasts of Turkey or in Europe. For a reliable result, four branch of a well-known supermarket chain in İstanbul, Bodrum (Turkey), Bobigny (France) and Bielefeld (Germany) were examined and their seafood departments were compared. The hygiene of the seafood departments, equipments, and workers was examined, and the potential sources of contamination were identified and discussed in regards to the legislation (Anon., 2002).

Results and Discussion

Wholesale Fish Markets

All vehicles carrying seafood to the wholesale markets had a cooling system in the wholesale fish markets of Rungis and Madrid. Some of the vehicles in the İstanbul and İzmir wholesale fish markets were

not equipped with any cooling system. Bogh and Oisson (1990) state that it is only possible to hinder microbial contamination during transport by means of a temperature control system.

Refrigeration inhibits microbial activity and retards the physical, chemical and biochemical spoilage. Growth of the pathogen bacteria slows down between 3.3–10°C, and they cannot grow below 3.3°C. Chilling decreases the mesophilic and thermophilic bacteria counts. Psychrophilic bacteria can grow between 0–15 °C, but they do not grow as fast at such low temperatures as they do when the temperature is 15–45 °C. Since seafood is perishable, it should be chilled as soon as possible after catching and must be kept chilled until the time of consumption (Varlik, 1987, Ganowiak, 1990). Investigations show that chilling systems are not available on the wholesale markets of İstanbul and İzmir, in contrast to the markets of France and in Spain (Table 1). Clearly, wholesale fish markets in İstanbul and İzmir must be equipped with the chilling systems as soon as possible.

Fish head removal, evisceration, skinning, and packaging should be carried in separate area from the one used for the storage of the seafood (Anon., 2002). However, there was no separate area made available for these purposes in either İzmir or İstanbul (Table 1). The seafood; especially mussels, sharks, rays, and anglers were being handled in the main hall of the market in spite of the recently passed legislation. In

Table 1. The units and their properties of the whole sale fish market

Unit	Section	Item	Contents of the Items	Rungis	Madrid	İstanbul	İzmir
4	9	a	The entrance of the market must be well-constructed and appropriate to unload seafoods under hygienic conditions	+	+	-	-
		b&j	Chilled rooms must be well-constructed and it is possible to monitor and record temperature	+	+	-	-
		c	Market place must be designed to provide selling seafoods under hygienic conditions	+	+	-	-
		d-h	Office rooms must be present to monitor marketing	+	+	+	+
		i	Separate room for handling and packaging of seafoods must be present	+	+	-	-
		k	There must be an ice-making plant in the market	+	+	+	+
		l	There might be a retail marketing unit in the whole market	-	-	-	-
		m	There must be a separate room to keep packaging materials under hygienic conditions	+	+	-	-
		n	A separate unit must be present to clean and disinfect the utensils and this unit should be closed to the depot of the disinfectants	+	+	-	-
		o	A refining unit must be constructed	+	+	-	-
		p	There must be a car park in the whole market	+	+	+	+
		r	There must be a laboratory	+	+	-	-
			First aid room	+	+	-	-
			Telecommunication, conference, repairing rooms	+	+	+	+
			ATM	+	+	+	+
			Security unit	+	+	+	+

+ The market is working under appropriate conditions according to the contents of this item.

- The market is not working under appropriate conditions according to the contents of this item.

the Rungis wholesale fish market, there were separate rooms in accordance with the European Union's hygienic rules (Anon., 2003). There were many construction problems found in the buildings of the İstanbul wholesale fish market (Table 2). In Turkish wholesale fish markets, fish boxes were generally laid on the floor, and this is a major cause of contamination. According to the Turkish legislation (Anon., 2002), fish boxes should be laid out on clean plastic or rustproof shelves (Table 2). These shelves should be easy to clean, smooth, and resistant to water as in the cases of the Rungis and Madrid wholesale fish markets. Furthermore, restrooms and dressing rooms were not designed to maintain hygienic conditions for the workers in İstanbul or in İzmir

(Table 2). Worker health was not found to be under control in the Turkish wholesale markets. Sometimes transport vehicles were seen in the immediate vicinity of the selling area in the markets (Table 3) in Turkey. The proximity of transport vehicles to the seafood as it was being sold had the potential to lead to more contamination, and this problem should be remedied in as short a short time as possible. The wholesale markets in İzmir, Rungis and Madrid were constructed suitably to avoid such contamination.

Despite the new legislation (no. 24790) concerning hygienic conditions for wholesale and retail seafood markets (Anon., 2002), wooden boxes were still being used for carrying seafood in İstanbul and İzmir wholesale fish markets (Table 3).

Table 2. The minimum physical and substructural properties of the whole sale fish market

Unit	Section	Item	Contents of the Items	Rungis	Madrid	Istanbul	Izmir
4	10	a	Around of the building must be well-constructed	+	+	-	-
		b	Market place must be surrounded with the walls 1.5 m in height least.	+	+	+	+
		c	Market must be constructed as a closed area and a ventilation system must be included.	+	+	-	-
		d	The whole market might be closed by the government when it is not appropriate to the rules.	+	+	+	+
		e	The waste must be thrown under hygienic conditions without any damage to the public health	+	+	-	-
		f	The temperature monitoring system must be included if there are freezing units	+	+	-	-
		g	The appropriate lightening in the market must be appropriate.	+	+	+	+
		h	The walls and ceiling of the market must be well constructed and there shouldn't be space between them	+	+	-	-
		i	The floor must be easy to wash, water resist and smooth	+	+	-	-
		j	The floor must be water resist, easy to clean and discharging of water must be simple	+	+	-	-
		k	The doors and windows must be constructed with a stainless materials and screens must be fitted against insects	-	-	-	-
		l	The entrance and exit of the product to the whole market must be separate	+	+	-	-
		m-n	The restrooms and dressing rooms must be designed to maintain the hygienic conditions of the workers	+	+	-	-
		o	Insect, pest and bird control must be planned and performed	+	+	-	-
		p	There must be signs on the walls to warn and educate staff	+	+	-	-
		r	There must be a system to provide: Drinking water and Clean sea water in the whole market	+	+	+	+
		s	There must be waste carrying vehicles and if the wastes can not be transported daily, there must be a chilled room to store them	-	-	-	-
		t	The fish boxes must be plastic, straphore or stainless; and they should be displayed on the easy to clean platform	+	+	-	-

Table 3. The minimum technical and hygienic properties of the wholesale fish market

Unit	Section	Item	Contents of the Items	Rungis	Madrid	İstanbul	İzmir
4	11	a	Seafood whole market must be used only for the trade, storage and processing/packaging (when necessary) of seafoods	+	+	+	+
		b	Eviscerating, gutting, cleaning, washing and icing must be processed in a separate area; not in the offices or in the marketing place	+	+	-	-
		c	Wooden boxes and equipments must not be used when contact to the fish directly	+	+	-	-
		d	Only one kind of seafood must be present in each box	+	+	-	-
		e	The plastic boxes should be cleaned and disinfected after using	+	+	-	-
		f	When keeping seafoods alive, flowing and draining clean water systems must be provided to maintain the best living conditions	-**	-**	-**	-**
		g	Vehicles in the market must not be allowed since they destroy the quality of seafoods with exhaust fumes	+	+	-	-
		h	Cleaning must be planned and recorded before and after the marketing	+	+	-	-
		i	All the staff must wear white clothes and boots; and use ID card	+	+	-	-
		j	Entrance of the visitors to the whole market must be under the control and they must wear boots and white clothes	+	+	-	-
		k	Check up must be applied in every 3 months to control the health of the workers in whole market	+	+	-	-
		l	Vehicles must not enter in the market place	+	+	-	-
		m	Unloading seafoods must be as fast as possible and they must be transported to the chilled room quickly	+	+	-	-
		n	Unloading equipments must be easy to clean and they should be kept under proper conditions	+	+	-	-
		o	Utensils and equipments must be easy to clean, smooth, stainless and must be always kept clean. They must be acid, alkali, salt, heat and vapor resist	+	+	-	-
		p	Packaging materials must be approved by the government	+	+	-	-

+ The market is working under appropriate conditions according to the contents of this item.

- The market is not working under appropriate conditions according to the contents of this item.

** Non of these markets try to keep seafoods alive

Fishermen prefer wooden boxes because they are cheaper than plastic ones. However, wooden boxes can easily be contaminated by blood, scales, and dirt. Carrying containers should be water tight, smooth, and easy to clean (Aran, 1993). Plastic containers and boxes should be used in Turkey, as they are in the Rungis and Madrid wholesale markets, and the containers must be cleaned and disinfected after each use.

Workers were wearing plastic boots and white coats in the Rungis wholesale fish market, but workers in other markets were not dressed in such protective clothing (Table 3). The Turkish legislation (Anon., 2002) specifically requires that all the workers be dressed in white clothes and plastic boots,

and that they wear an identity card somewhere on their clothes.

Retail Fish Markets

Four branches of a well-known supermarket chain in İstanbul (Turkey), Bodrum (Turkey), Bobigny (France) and Bielefeld (Germany) were inspected and their seafood departments were compared to one another. The floors of the markets in Bobigny and Bielefeld were covered with epoxy, while ceramic was preferred in İstanbul and Bodrum. The walls of the supermarkets and the equipment were easy to clean, and the workers were dressed properly in all cases (Table 4).

Table 4. Technical and hygienic properties of the retail fish markets

Unit	Section	Item	Contents of the Items	Bobigny	Bielefeld	İstanbul	Bodrum
8	26	a	The walls must be easy to clean, smooth and should be always kept clean	+	+	+	+
		b	Market area must be ventilated, lightening must be proper and it must not change the color of the products	+	+	+	+
		c	Restrooms must not be near to the marketing and/or packaging area. There must be liquid soap, paper towel, cold/warm water and foot-controlled taps in the restroom	+	+	+	+
		d	Chilled rooms must be present and the seafoods should be kept in these rooms after/before marketing	+	+	+	+
		e	A separate room must be present for cleaning and for the disinfection of utensils. Detergents must be kept in a separate unit	+	+	+	+
		f	Seafoods must be displayed in semi-closed, and humid shelves between 0-4°C	+	+	+	+
		g	Wooden equipments must not be used for displaying, packaging or for another purpose	+	+	+	+
		h	All the equipments must be easy to clean, smooth, stainless and disinfection must be possible	+	+	+	+
		i	Packaging material must be approved by the government	+	+	+	+
		j	Clean/dirty water systems and a separate, hygienic unit must be present for gutting and eviscerating operations of seafoods; the equipments must be stainless and disinfection must be possible. Wastes must be removed daily and waste boxes must be cleaned and disinfected	+	+	+	+
		k	The water and ice must have drinkable quality	+	+	+	+
		l-m	Informative labels and the prices of the products must be present	+	+	+	+
		n	Check up must be done 3 months periods to control the health of the workers	+	+	+	+
		o	All the workers must keep hygiene procedures and they must wear according to these rules	+	+	+	+
		p	Insects and pests must be controlled systematically and proper equipments must be present to kill them	+	+	+	+
		r	There must not be animals in the market except the seafoods in the aquarium	+	+	+	+
		s	Public health must not be considered during the marketing	+	+	+	+
		t	Waste must be removed under hygienic conditions without any damage to the public health	+	+	+	+
		u	First aid kit must be present	+	+	+	+
		v	Persons graduated from fishery, veterinary, or food faculties must work at the markets selling over 10 tones of seafoods per year	+	+	+	+

+ The market is working under appropriate conditions according to the contents of this item.

- The market is not working under appropriate conditions according to the contents of this item.

In Bodrum and Bielefeld, vehicles unloaded seafoods directly to the chilled area of the market. However, in İstanbul and Bobigny, there were distance between the unloading area and the chilled rooms of the market that could lead to contamination of the seafood.

Restrooms were located away from the seafood departments, and there was a system of foot controls in place to operate the taps in all of the supermarket restrooms. In every case, chemical solutions were available for the disinfection of boots and hands; wearing plastic boots, gloves, white coats and caps were obligatory for the workers. Routine health checks of the workers were the responsibility of the administration in all markets (Table 4).

It was also found that, showers for the workers are only obligatory in Bodrum and İstanbul retail fish markets. It is widely known that workers must have

good personal hygiene to make it possible to maintain proper hygiene in the market and in the product (Yücel, 1991).

In Bielefeld (Germany), customers were prohibited from entering the fish department. This is an advisable policy to prevent seafood from becoming contaminated, since customers may carry microorganisms that could damage the products.

Automatic doors or plastic screens were used in all of these markets, freeing workers from having to use their hands to open the doors. This is essential for the maintenance of hygiene (Yücel, 1991).

Conclusion

In this study, it was found that among several branches of a well-known supermarket chain in İstanbul (Turkey), Bodrum (Turkey), Bobigny

(France) and Bielefeld (Germany), significant differences did not occur between the hygienic conditions of the seafood departments of retail fish markets. However, wholesale fish markets in İstanbul (Turkey) and İzmir (Turkey) had structural and hygienic problems compared to wholesale markets in Rungis (France) and Madrid (Spain). It is clear that the Turkish legislation that was passed in 2002 is still not applied comprehensively in the wholesale fish markets of Turkey. Thus, concerted efforts should be made as soon and as quickly as possible to implement legislation to establish and maintain hygienic and sanitary conditions in these markets.

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