

# DETERMINATION OF HYGIENIC STATUS OF BUTCHERS, DELICATESSENS AND MARKET SALE DEPARTMENTS IN ISTANBUL

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## Highlights

- Considering the diseases transmitted to humans through the consumption of meat and meat products, it is imperative to comply with the hygiene rules at every stage of production, and
- to regularly control the hygienic control of the personnel working in the production and sales stages.
- Evaluation of the training status of the employees in terms of food safety.
- Infrastructure impacts of meat and meat products sales points in terms of food safety.

## Article Info

## Abstract

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This study was carried out to determine whether the education level of the personnel working in the meat sections of the randomly selected butchers, delicatessens and markets operating in İstanbul, the technical conditions of the workplaces and the cleaning system applied are sufficient. In the study, they were asked to answer a 41-question questionnaire in 150 businesses, 50 of which were butchers, 50 delicatessens, and 50 markets, and again, hygiene status of tool equipment and personnel hands of these businesses, 15 of which were delicatessen, 15 meat aisles, and 20 butchers was determined using a colored hygiene test kit. According to questionnaire, in 61% of the enterprises, the health examinations of the personnel are carried out on time; 28% of the workplace personnel do not use gloves and 11% do not use aprons. As a result, it was determined that the butchers, delicatessens and markets that were randomly selected and examined in İstanbul were not hygienically sufficient. In the control made with the ready hygiene kit on the results, 68% of them were found to be dirty, which shows that hygiene and cleanliness are not given the necessary importance in these enterprises.

## İSTANBUL'DAKİ BAZI KASAPLARIN, ŞARKÜTERİLERİN VE MARKETLERİN ET SATIŞ REYONLARININ HİJYEN DURUMUNUN BELİRLENMESİ

## Makale Bilgileri

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Bu çalışma, İstanbul'da faaliyet gösteren ve rastgele seçilmiş olan kasaplar, şarküteriler ve marketlerin et reyonlarında çalışan personelin eğitim düzeyinin, işyerlerinin teknik şartlarının ve uygulanan temizliğin yeterli olup olmadığının belirlenmesi amacıyla yapılmıştır. Çalışmada, 50 kasap, 50 şarküteri, 50 market olmak üzere toplam 150 işletmede 41 soruluk anket formunu cevaplamaları istenmiş ve yine bu işletmelerin 15'i şarküteri, 15'i market et reyonu ve 20'si kasap olmak üzere toplam 50'sinde renkli hijyen test kiti kullanılarak alet ekipmanın ve personel ellerinin hijyen durumu belirlenmiştir. Renkli hijyen test kiti kullanılarak ölçüm yapılan 20 kasabın 15'inde, 15 market et reyonunun 11'inde, 15 şarküterinin 8'inde kullanılan ekipmanın ve personel elinin kirli olduğu tespit edilmiştir. Anket sonuçlarına göre, işletmelerin %61'inde personelin sağlık muayenelerinin zamanında yapıldığı; işyeri personelinin % 28'inin eldiven, % 11'inin önlük kullanmadığı belirlenmiştir. İncelenen kasapların, şarküterilerin ve marketlerin hijyenik yönden yeterli olmadığı tespit edilmiştir. Hijyen kiti ile yapılan kontrolde, yüzde %68'inin kirli saptanması, bu işletmelerde hijyene ve temizliğe gereken önemin verilmediğini göstermektedir.

## 1. Introduction

Meat products are the most preferred foods in human nutrition throughout history since they contain high amounts of protein, mineral substances, vitamins and flavorings. A healthy and balanced diet is essential for a healthy life. Therefore, ensuring the hygienic quality of these products is important for public health.

Food-borne microbial intoxications are microbial food poisonings caused by toxic effects caused by the absorption of toxins formed on the food by microorganisms. It occurs when certain microorganisms that produce chemical poisons and toxins out of the cell grow in foodstuffs. It is not compulsory to take live bacteria into the body, it is sufficient to consume food containing toxins and to produce food poisoning (McLauchlin et al. 2007, Öztürk 2007, Yılmaz et al. 2009).

Considering the diseases transmitted to human through the consumption of meat and meat products, it is obligatory to comply with the hygiene rules at every stage of production, and to have regular hygienic control of the personnel working at the production and sales stages.

If the necessary importance is not given to hygiene in food establishments, it has been revealed by many studies that contaminated food, raw materials, workplace conditions, equipment used and workplace personnel contaminated with undesirable biological, chemical and physical origin (Hobson 1970, Gutrie 1988, Hayes 1992, Ildız 1997).

Today, meat and meat products are sold in markets, supermarkets or similar big markets, as well as butchers. With rapid urbanization, grocery stores have started to transform into a market system and continue their development as super, hyper and gross markets in the retail and wholesale sector. As technological developments and the transition from the agricultural

society to the industrial society increased the number of working people, the fact that people pushed to buy products that are easy to prepare at home caused an increase in the number of personnel in the markets selling ready-to eat. It is important that the butchers and markets, which are the last stage of meat and meat products reaching people, are controlled by the administrators with routine controls and that the personnel are trained in hygiene and sanitation. Grocery stores also have a very important place in terms of consumer health, as they provide great convenience in supplying basic necessities of consumers. For this reason, hygienic and all kinds of foodstuffs sold must be healthy and reliable (Civan 1993, Kutluay and Birer 1997, Erkan 1997, Atasever 2000, Yılmaz et al. 2004, Öztürk 2007, Yılmaz et al. 2011).

In this research, the hygienic condition of the meat shops of the butchers, delicatessens and markets in Istanbul was tried to be determined; it is aimed to control the education level of the business owners and staff, as well as the current legislation and hygiene knowledge, as well as the adequacy of the technical conditions of the enterprises.

## 2. Theoretical Background/Experimental

The research material consisted of a total of 150 sections of butchers (50 pieces), delicatessen (50 pieces) and markets (50 pieces) selected randomly in various districts of Istanbul. The information levels of the employees of the workplaces regarding the education and food legislation, whether the medical examinations are carried out regularly, the adequacy of the cleaning and temperature control system and technical conditions of the workplaces were measured by using the questionnaire form with 41 questions, without going to inform the businesses. In 50 of these enterprises, the hygienic condition of the cutting and preparation benches and knives and staff hands were determined by using the rapid test kit. In the evaluation

of the results, chi-square test was applied using the Minitab program (Soysal 1992).

### 3. Results and Discussion

#### 3.1 Determination of General Hygiene Status

A total of 150 workplaces have been carried out, including 50 butchers, 50 delicatessens and 50 market meat shops. It has been determined that there are 1-5 employees in 91 workplaces (60%), 5-10 in 31 workplaces (21%) and more than 10 in 28 workplaces (19%) (Table 1).

The difference in the number of personnel working by type of enterprise was found significant in statistical analysis ( $P < 0.01$ ). It is determined that the number of personnel working in the markets is higher than that of the butchers and delicatessens.

In the research, 41 (27%) of 150 personnel were in 1-5 years, 43 (29%) were in 6-10 years, 36 (24%) were in 11-15 years, 17 (11%) were in 15-20 years. It was determined that 13 (9%) had been doing their job for more than 20 years.

The professional experience status of the employees according to the type of enterprise is given in Table 1. It is understood that there is no statistical difference in the professional experience of the personnel working in butchers, delicatessens and markets ( $P > 0.05$ ). 31 (21%) of the employees are primary school, 47 (31%) are secondary school, 58 (38%) are high school, 10 (7%) are technical vocational school and 4 (3%) are graduate ( $P < 0.01$ ). It was observed that the education level of the employees working in the markets was higher. Nearly similar results were obtained by Göbel (2008).

78 of the 150 people surveyed (52%) stated that they did not receive food hygiene training from an official institution (Table 1). It was determined that the number of personnel who received hygiene education according

to the type of enterprise was statistically significant ( $P < 0.01$ ).

It has been determined that the staff with higher level of hygiene training works in the butchers and the number of staff trained in the delicatessens is low. It was understood that 24 (15%) of the workplaces received in-service training ( $P < 0.01$ ). In-service training is provided only in grocery stores. These results are similar to Demirel (2006).

91 out of 150 staff (61%) stated that they did not know about the Food Law 5179 and Turkish food legislation (Table 1). When analyzed statistically, the number of personnel who know the food legislation varies significantly according to the type of enterprise ( $P < 0.01$ ). Knowing the food legislation of the staff working in the supermarkets is at a better level.

It is determined that 52.5% of those who say they have information about food legislation are market personnel. Thus, it was understood that the market staff's knowledge of the food legislation was better than the delicatessens and butcher staff. It was determined that 8 (5%) of the workplaces where the study was carried out had HACCP. The application of HACCP varies significantly according to the type of enterprise ( $P < 0.01$ ). It is determined that the HACCP system is applied only in markets.

In the research, it was determined that the health examinations of the employees were made on time and regularly in 92 (61%) of the workplaces. 51 of these 92 workplaces prevented the carrier personnel from coming into contact with food if the inspection result is negative; 41 of them stated that no employee examination results are negative yet. Having the health examinations of the employees and the procedure applied according to the result shows a statistically significant difference according to the type of enterprise ( $P < 0.01$ ). Having health examinations in delicatessens is lower than other businesses. It was

determined that 104 of the 150 workplaces (69%) had toilets, and all of the enterprises with toilets did not open the toilet door to the production area ( $P < 0.05$ ). It was observed that the rate of toilet availability in the markets was higher than that of delicatessen and butchers (Table 1). As a result of the research, 115 (77%) of the enterprises are cleaned daily, 15 (10%) are cleaned three times a week, 12 (8%) are cleaned twice a week, 8 (5%) are cleaned once a week and It is stated that all of the enterprises use cleaning agents approved by the Ministry of Health. In terms of general cleaning frequency, statistical difference was found insignificant according to the type of enterprise ( $P > 0.05$ ). It has been determined that 109 (73%) of 150 workplaces have hot running water for cleaning. This situation is similar to Demirci and Ersoy (2011). The rate of running hot water in delicatessens is lower than in butchers and markets ( $P < 0.01$ ). Only 19 (13%) of the workplaces have been sprayed against pests and pests, and all of these enterprises have an agreement with a spraying company; It was determined that 16 of these renewed once a month and 3 of them renewed every two weeks. The difference between the butchers, delicatessens and grocery applications was found statistically insignificant ( $P > 0.05$ ). As a result of the research, it was seen that the pest control is insufficient. The current results of hygienic knowledge of staffs were nearly similar previous studies (Sargin, 2005 and Kayalı, 2013)

It was determined that 42 (28%) of the personnel did not use gloves during product preparation. 61 employees (41%) stated that they changed gloves once a day, 27 employees (18%) after each procedure, 20 employees (13%) changed gloves 3-4 times a day (Table 1). The frequency of changing working gloves and changing gloves when working according to the type of operation is statistically significant ( $P < 0.01$ ). While the rate of not using gloves is high among the delicatessen employees, market personnel tend to

change gloves more frequently. We have determined are similar to those of Demirci and Ersoy (2011).

Of the 150 workplace personnel, 17 (11%) were not wearing aprons, 46 (31%) were daily, 27 (18%) were every two days, 37 (25%) were weekly, 23 (15%) it was determined that he changed his apron as it got dirty ( $P < 0.05$ ). While it is observed that the staff who do not use aprons in the butchers are lower than the delicatessens and markets, it is seen that the frequency of changing the apron of the staff working in the delicatessen is less frequent than the butchers and the markets.

It was determined that 47 (31%) of the researched workplaces had first aid materials and cabinets (Table 1). Delicatessens have a lower rate of first aid cabinets compared to butchers and markets. This status is statistically significant ( $P < 0.01$ ). It has been determined that the rate of first aid equipment and cabinet in the workplaces is low. 111 (74%) of the cutting and preparation machines used for processing meat products are made of marble and 39 (26%) are made of plastic (Table 1). The quality of the material used in the machines according to the type of operation showed a statistically significant difference ( $P < 0.01$ ). While it is seen that plastic counters are mainly used in delicatessen and markets, the usage rate in butchers is low. It was determined that 96 (64%) of 150 workplaces were used with meat grinders and all workplaces stated that the meat grinder was cleaned every day.

Consumer complaints were reported in 30 (20%) out of 150 businesses surveyed. It is understood that consumer complaints are concentrated in selling chicken packaged by the producer. They stated that there were complaints from consumers about watering in the package and were not satisfied with the taste of the product.

In the study, it was determined that 96 of 150 enterprises sold red meat and 66 of them accepted meat while veterinary health reports were received. Product packaging and labeling is not done in any of the delicatessens and butchers. It was determined that product packaging was made in 7 markets (5%) and 5 of them were labeled. It was determined that the meat was cut and processed in 14 (9%) days, and 5 (3%) per week, and the temperature of the medium where the process was processed was 131 and 88 (88%) did not control the ambient temperature (Table 1). The frequency of controlling the temperature of the treated environment does not differ statistically according to the type of operation ( $p > 0.05$ ). The obtained results were nearly similar to those obtained by Göktaş (2019) and Kayalı (2013).

It was understood that the temperature control of the meat products cold sale cabinets was not performed in 31 (21%) of the establishments, 45 (30%) were done every day, 36 (24%) were once a week, and 35 (23%) were several times a week. It has been determined that 3 (2%) enterprises do not have a sales cabinet. It was determined that only 6 (4%) of the workplaces that were studied received samples from the products they sold and sent them for analysis. It was understood that only products sold in markets were sent for analysis (Table 1). Special laboratories are preferred for analysis.

There are 1 cold store rooms in 62 (41%), 2 in 36 (24%), 3 in 4 (3%) and 4 (2%) in the enterprises. 45 (30%) enterprises without cold storage were determined. The difference between the type of operation and the number of cold stores is statistically significant ( $P < 0.01$ ). The number of cold stores in the markets is higher than other businesses.

Frozen products are sold in 58 of the researched workplaces and all of them have cold storage and / or cupboards operating at (-18°C). The sale of frozen products differs significantly from the enterprise ( $P$

$< 0.01$ ). The sale of frozen products is higher in markets than delicatessen and butchers. According to the research, it is understood that 20 (19%) of 105 enterprises with cold storage do not control temperature, 33 (32%) are checking every day, 18 (17%) are weekly, 34 (32%) it controls temperature at random times.

Only 24 (16%) of the enterprises stated that they accepted their products by looking at their dates while accepting them. Other enterprises do not have any control at this stage. 59 of the enterprises (39%) have a separate return section for foodstuffs that have expired. It was understood that the difference between the type of business and the availability of a return section was significant when analyzed statistically ( $P < 0.01$ ). While it is seen that the rate of return section in the delicatessens is very low, it is determined that the markets give more importance to this issue compared to other enterprises.

Food products that are past their expiration, moldy, stinking and risk of contamination with other foodstuffs must be stored in a separate area for return and disposal. It has been determined that 61% of the enterprises are not sensitive in this regard.

10% of the enterprises stated that they are not satisfied with the official audits. 15 (10%) of the surveyed personnel stated that they do not want formal inspections, 20 (13%) inspect monthly, 40 (27%) inspect every 3 months, 34 (23%) inspect every 6 months, 41 (27%) said that they want an annual audit.

Stating that 90% of the workplaces are requested to perform official audits, the operators are open to inspection. Despite this, the fact that 27% of the population stated that they want to make an audit once every 6 months and 27% of them want to be audited annually, has led to the conclusion that operators often do not want to be subject to audits. This situation and

administrative penalties applied by the institutions are considered as the reason for this situation.

Inspections made by different institutions for businesses create problems for businesses.

### 3.2. Equipment and Personnel Hygiene Control

Cleaning control was carried out in 50 workplaces using a color hygiene test kit. 50 workplaces are determined as 20 butchers, 15 as delicatessen and 15 as market meat department. In 10 of 20 butchers, control was done in the hands of 5 personnel who did not use cutting and preparation benches, 5 used knives and 5 did not use gloves.

8 of the 15 market meat sections were cut and prepared, and the blade used in 7 was checked. In 5 out of 15 delicatessens, control was performed in the hands of 5 personnel who did not use cutting and preparation benches, 5 used knives and 5 gloves.

As a result, the hands of 14 (70%) of 20 controlled cutting and preparation machines, 13 (65%) of 20 knives and 7 (70%) of 10 personnel were found to be dirty. When evaluated statistically, it was understood that there was no difference between the dirtiness of the tool equipment according to the type of enterprise. It has been found that the instrument equipment and personnel hands used in this study have high pollution rate in terms of biological wastes and residues, in parallel with similar studies that measure the equipment cleaning microbiologically. The values we detected were Aksu et al. (2017).

### 4. Conclusions

As a result, it was determined that the butchers, delicatessens and markets that were randomly selected and examined in Istanbul are not hygienically sufficient.

In the control performed with the ready-made hygiene kit on the cutting and preparation benches, knives and

hands, 68% of them are found to be dirty, indicating that hygiene and cleanliness are not given importance in these enterprises.

As a result of this research, it has been understood that the hygiene level of the enterprises is in direct proportion with the level of education in terms of complying with the requirements of the current legislation. It was observed that hygiene awareness increased as the level of education increased.

Employees stated that they do not know the law number 5179 and the food legislation in 60% of the workplaces and that they do not receive food hygiene training in 52%. It is remarkable that primary and secondary school graduates have a high rate of 52% and that the level of hygiene is low in enterprises with low education level. In enterprises where poorly trained personnel work, general cleaning is less frequent; the use of gloves and aprons is not taken care of; it was understood that the temperature controls of the cold cabinets and worktops were not done frequently enough. In the vast majority of businesses, gloves and aprons are not changed regularly; the temperature controls to be made in the workplace are not paid attention; no samples were taken from the products sold; no fight against pests; It has been determined that the health examinations of the employees are insufficient. Stating that 90% of the workplaces are requested to perform official audits, the operators are open to inspection. Despite this, the fact that 27% of the population stated that they want to make an audit once every 6 months and 27% of them want to be audited annually, has led to the conclusion that operators often do not want to be subject to audits. Studies reveal is how important the training of the staff working in the food business. Employees should be trained on when and how to clean their hands and other parts of their body before touching food. Turkish food legislation also brought some obligations to businesses in this regard. According to the legislation, personnel who are

known or suspected to have diseases or symptoms that can be transported by food (jaundice, diarrhea, vomiting, fever, febrile sore throat, nose, eye or ear discharge, etc.) should not be allowed to enter food storage and production areas; For skin problems such as wounds and boils, the wound should be closed properly; measures should be taken to prevent direct or indirect contact with food; personal cleaning rules must be followed; no smoking, food or drink should be consumed in the production area and warehouses; personnel working in the production and storage area should not wear watches and jewelry; The hair, mustache, beard and arms of all employees who are in direct contact with the product should be covered so as not to cause contamination; hands must be cleaned and disinfected before entering the production area; personnel who are in direct contact with foodstuffs should be easily cleaned, should wear clean and preferably light colored protective clothing, if necessary, headgear, boots or special shoes, working clothes, gloves should be used; There must be a staff member responsible for personnel hygiene in the enterprise; personal belongings and clothes of the personnel should not be placed in areas where food is produced; there should be no foodstuffs and animals in contact with people at the workplace, and direct contact of staff with animals should be strictly prohibited; working staff should be informed about the nature of their work and be trained on food hygiene; In workplaces that implement HACCP and good practice guidelines, responsible persons should be provided with adequate training in the implementation of HACCP principles; brought the provisions of the working staff to be informed about the legislation on the subject of the work.

By fulfilling these responsibilities regarding the implementation of personnel hygiene, administrators help to protect the health of personnel, ensure the reliability of food and prevent the production disruption

as well as fulfilling the obligations brought by the legislation.

With the research, it was understood that the personnel of enterprises selling meat products and delicatessen products should be given training on food hygiene, microbiology knowledge and food legislation at certain intervals. Personnel should be made aware that they should change their gloves and aprons as they get dirty.

In order to achieve the necessary level of equipment hygiene, enterprises must establish a certain cleaning system. It is recommended that administrators take microbiological analysis by taking samples from the products they sell in certain periods and to control the equipment used hygienically.

#### **Conflict of Interest**

There is no conflict of interest.

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**Table 1.** Status and hygiene knowledge of the staff working in the butcher, delicatessen and supermarket

	Butcher N=50	Delicatessen N=50	Supermarket N=50	Butcher N=50	Delicatessen N=50	Supermarket N=50
<b>Number of enterprises by the number of employees</b>				<b>Personnel use of gloves</b>		
<i>1-5 employees</i>	34	43	14	<i>ungloved</i>	10	8
<i>6-10 employees</i>	12	7	12	<i>Changing once a day</i>	19	19
<i>10 &gt; employees</i>	4	-	24	<i>Replaces after each transaction</i>	12	13
<b>Number of personnel by profession years</b>				<i>Replaces 3-4 times a day</i>	9	10
<i>1-5 years</i>	8	13	20	<b>The use of apron of the staff</b>		
<i>6-10 years</i>	17	16	10	<i>Apron-free</i>	3	6
<i>11-15 years</i>	11	14	11	<i>Changing aprons every day</i>	16	21
<i>16-20 years</i>	8	4	5	<i>Changing apron every two days</i>	14	9
<i>20 &gt; years</i>	6	3	4	<i>Changing apron once a week</i>	12	8
<b>Education level of the staff</b>				<i>Changing the apron as it gets dirty</i>	5	6
<i>Primary school</i>	18	8	5	<b>Is there a first aid cabinet?</b>		
<i>Secondary school</i>	22	19	6	<i>Yes</i>	16	23
<i>High school</i>	14	19	25	<i>No</i>	34	27
<i>Vocational school graduated from a University</i>	-	-	10	<b>Material from which preparation and cutting benches are made</b>		
<b>Status of receiving hygiene education from a public institution</b>				<i>Marble</i>	38	34
<i>Yes</i>	33	17	22	<i>Plastic</i>	12	16
<i>No</i>	17	33	28	<b>Ambient temperature control</b>		
<b>In-service training status</b>				<i>No control</i>	45	40
<i>Yes</i>	-	-	24	<i>Every day</i>	4	7
<i>No</i>	50	50	26	<i>Once a week</i>	1	3
<b>Having knowledge about the legislation</b>				<b>Sales cabinet temperature control</b>		
<i>Yes</i>	16	12	31	<i>no</i>	8	25
<i>No</i>	34	38	19	<i>Once a day</i>	17	19
<b>Is HACCP applied?</b>				<i>Once a week</i>	12	10
<i>Yes</i>	-	-	8	<i>Three times a week</i>	10	14
<i>No</i>	50	50	42	<i>No cabinet</i>	3	-
<b>Are the vector analysis done properly?</b>				<b>Are the products sent for analysis?</b>		
<i>Yes</i>	35	18	39	<i>Yes</i>	-	6
<i>No</i>	15	32	11	<i>No</i>	50	44
<b>Personnel with negative results of vectors</b>				<b>How often is the general cleaning done?</b>		
<i>Contact with food is prevented</i>	19	15	17	<i>Every day</i>	39	42
<i>No negative results of vector</i>	16	3	22	<i>Three times a week</i>	4	3
<b>Do you have a toilet in your business?</b>				<i>Two times a week</i>	3	4
<i>Yes</i>	33	29	42	<i>Once a week</i>	4	1
<i>No</i>	17	21	8			