

# Food Safety Oriented Consumer Complaints in Sales Points Case of Milk and Dairy Products

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**Abstract**—In this study, after sales consumer feedbacks concerning the products of a hypermarket chain, where food safety management system is applied, were used. Regular registry of the feedbacks and correct classification of consumers' reviews are the indications showing that the food safety system is effectively implemented. Feedbacks were sorted within food groups, within the products' own groups and according to consumers' problem descriptions. Probable causes of the problems in the feedbacks were mentioned. According to this, the food group of products where the highest number of problems was experienced was milk and dairy products. Within milk and dairy products, most feedbacks were on cheese types. Consumption patterns and the variety in cheese products affected the feedbacks received on types of cheese. However, the fact that the numbers of microbiological and sensorial feedbacks in other products were also high in the study leads to the understanding that production and storage conditions are important for all dairy products in terms of food safety

**Keywords**— Food safety, consumer, dairy products, milk

## I. INTRODUCTION

**F**OOD safety is defined as the degree of confidence that food will not cause sickness or harm to the consumer when it is prepared, served and eaten according to its intended use [1]. Potential undesirable compounds in foods cover a broad range, from natural (e.g. mycotoxins) and environmental contaminants (e.g. dioxins) to agrochemicals (e.g. pesticides, and veterinary drug residues) and many more [2].

The proportion of cases arising from food preparation practices in the home may be especially under-represented in outbreak statistics, due to many factors [3]. However, studies have estimated that between 50% and 87% of reported food borne disease outbreaks have been associated with the home [4]. Common mistakes identified include serving contaminated raw food, cooking/heating food inadequately, having infected persons handle implicated food and practice poor hygiene [5]. However it is known that a part of food borne illnesses in the home result from eating raw foods of animal origin or engaging in unsafe food preparation practices in the home [6].

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Milk and other dairy foods were recognized as important foods as early as 4000 BC, evidenced by rock drawings from the Sahara depicting dairying. In Egyptian tombs dating back to 2300 BC remains of cheese were found [7]. Due to the fact that milk and dairy products are among the most irreplaceable products of human nourishment, they are the most important and necessary products of food supply chain. According to the conducted researches and statistics, it is apparent that many people in the world are exposed to such risks due to the possible contamination of milk and dairy products by physical, chemical or microbiological hazards [8, 9]. Therefore, adequate quality and food safety implementations for milk during the process from the dairy farms to consumption are important in the dairy industry for food safety [8, 10, 11].

In foodstuff, relevance of quality with consumer perception and the use of methods that inquire direct consumer opinion for measuring quality raised the importance of the concept of conscious consumer. Conscious Consumer is an undeniable socioeconomic element that is organized, aims to gain the maximum benefit and considers its own real needs when purchasing a product or service, shops in a planned manner and documents its shopping, is conscious of the fact that it is not the object but the subject of shopping, has the maturity to choose high quality and standard, healthy, safe and environment-friendly product without compromising from choosing the product that is most suitable for its budget, places emphasize on making savings and also controls quality and therefore directs the economy gradually to efficiency [12]. Observations and feedbacks of conscious consumers have the potential to be important also in the verification, control, revision and improvement of food safety implementations.

In the present study it was aimed to examine the quantity and content of the data provided by the consumer complaints given through various channels of communication in order to assess the effectiveness of the food safety management system (ISO 22000) implemented in sales points. For this purpose, the data communicated by the consumers on milk and dairy products in an international chain of markets that operates in Turkey and has 13 branches, were examined.

## II. MATERIAL AND METHOD

### A. Data Collection

In the present study, the data gathered under the topic "Customer Complaint" and received through

- Face to face communication,
- interactive communication channels and
- written feedbacks

between the dates of 01.01.2012 and 01.09.2012 from all consumer groups of a hypermarket with 13 different sales point were used.

### B. Data Analysis

At first, consumer feedbacks were categorized as food and non-food statements. Then, the feedbacks related with food were grouped under the topics of

- a. Milk and dairy products,
- b. Meat and meat products,
- c. Bakery products,
- d. Water products,
- e. Fruit and vegetables,
- f. Beverages and
- g. Others.

Within these groups the feedbacks were examined in terms of content and grouped under subtitles by considering food safety risk groups (physical, chemical, biological).

## III. RESULTS AND DISCUSSION

The total number of the consumer feedbacks received between the dates of 01.01.2012 and 30.09.2012 was 2022. 29.2% (n = 591) of these feedbacks, which were communicated through various channels of communication, concerned milk and dairy products. With a rate of 53.64%, most common complaints within the whole dairy products group were the feedbacks where consumer descriptions indicated probable microorganism growth. These were followed by the abnormalities gathered under the product sensorial defects title that can be characterized as the characteristics of the products such as taste and smell being different than those that are inherent to the product (31.98%).

The classification carried out by considering consumers' food safety based feedbacks on milk and dairy products and the food safety risks of these feedbacks are shown in Table 1. Determination of biological food safety risks was mainly based on consumer feedbacks such as noticing visible mould growth on the product, experiencing general food poisoning symptoms after consumption and reporting taste and smell abnormalities in milk and dairy products that are believed to follow microbial growth. Sensorial abnormalities, on the other hand, were gathered by taking consumers' feedbacks such as detection and/or perception of taste and smell that are not inherent to the product and perceiving salty taste that is not similar to the characteristic taste or smell of the product.

Examining the data shows that, for the purpose of minimizing food safety risks of milk and dairy products in sales units primarily the measures and implementations intended to control biological risk factors carry importance. To that end, controlling premises and personnel hygiene, personnel trainings and controls during the phases of product storing, preparation and display can be carried out as effective activities. In addition, temperature controls are important in both storing and display stages. The fewness of the packaging defects indicates that the risk of microorganism growth in consequence of improper package is low and accordingly that the heat and physical control based inspection of the products carried out during the entry of the products to the place of sale

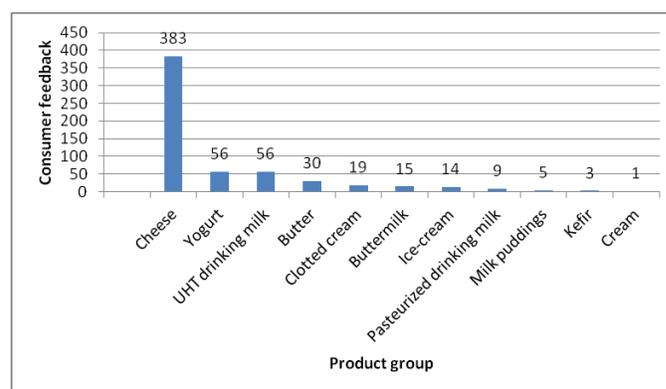
is performed effectively.

**TABLE 1.** FOOD SAFETY BASED CONSUMER FEEDBACKS ON MILK AND DAIRY PRODUCTS (N = 591)

Food Safety Risk Group	Problem description	Consumer description	Quantity (number)	Rate (%)
Biological	Microorganism Growth	Mould growth, intoxication, rancidity, microbial growth based smell and sour taste	317	53.64
	Structural problem	Consistency, color, soft, hard, rough	48	8.12
Physical	Presence of foreign matter	Hair, pest, piece of plastic	24	4.06
	Packing faults	Open lid / package	1	0.17
	Sensorial defects	Bad taste, heavy smell, salty, unusual smell	189	31.98
Others	Shelf life impropriety	Expiration of the sell-by date	12	2.03

Consequently, the primary control mechanisms that can be implemented after the entry to the sales unit and that may cause microorganism growth were determined to be cold chain application and personnel and premises hygiene. Also, availability of products on sale after their sell-by date is an indication of the training and control of sales personnel.

Product group based classification of the milk and dairy products subject to consumer feedbacks was carried out. Products were grouped under the main titles of cheese, yogurt, UHT drinking milk, butter, clotted cream, buttermilk, pasteurized drinking milk, milk puddings, kefir and cream (Figure 1). The product group which was subjected to the highest number of feedbacks was cheeses (64.81%).



**Figure 1.** Distribution of food safety based consumer feedbacks within the milk and dairy products groups

Highest numbers of feedbacks concerning cheese types were received on the deteriorations in consequence of microbial growth (48.83%) and sensory (36.81%) and

structural (8.36%) abnormalities. Maintaining cold chain is an important point in food safety. Biologic food safety risk factors emerge particularly with the break of cold chain and the following compromise of food safety during the production, transportation and storage of food products. Maintaining the storage conditions of cheese products at sales points can be achieved during the product entry phase, by carrying out heat controls and inspecting the products' compliance with quality and food safety control parameters. With the satisfactory compliance of cheese products, the production and transportation of which were carried out

properly, to the acceptance criteria at sales points, the products need to be offered for sale or stored as fast as possible and under proper conditions. At this point, maintaining storage conditions might not be possible with the consumer picking the product from the shelf. Break of cold chain for a long period during the time when the consumer carries the product to the place where the consumer will store it may cause the conditions suitable for microbial growth that will risk food safety.

**TABLE 2.** CONTENTS OF CONSUMER FEEDBACKS CONCERNING DIFFERENT MILK AND DAIRY PRODUCTS

Product Group	Improprity					
	Biological	Sensorial	Structural	Foreign Matter	Packaging	Shelf life
Cheese	187 (%48.83)	141 (%36.81)	32 (%8.36)	22 (%5.74)	0 (%0.00)	1 (%0.26)
Yogurt	37 (%66.07)	7 (%12.50)	8 (%14.29)	1 (%1.79)	1 (%1.79)	2 (%3.57)
UHT drinking milk	46 (%82.14)	2 (%3.57)	3 (%5.36)	0 (%0.00)	0 (%0.00)	5 (%8.93)
Butter	11 (%36.67)	18 (%60.00)	1 (%3.33)	0 (%0.00)	0 (%0.00)	0 (%0.00)
Clotted cream	13 (%68.42)	6 (%31.58)	0 (%0.00)	0 (%0.00)	0 (%0.00)	0 (%0.00)
Buttermilk	4 (%26.67)	7 (%46.67)	0 (%0.00)	1 (%6.67)	0 (%0.00)	3 (%20.00)
Ice-cream	4 (%28.57)	7 (%50.00)	3 (%21.43)	0 (%0.00)	0 (%0.00)	0 (%0.00)
Pasteurized drinking milk	9 (%100.0)	0 (%0.00)	0 (%0.00)	0 (%0.00)	0 (%0.00)	0 (%0.00)
Milk puddings	4 (%80.00)	1 (%20.00)	0 (%0.00)	0 (%0.00)	0 (%0.00)	0 (%0.00)
Kefir	2 (%66.67)	0 (%0.00)	1 (%33.33)	0 (%0.00)	0 (%0.00)	0 (%0.00)
Cream	0 (%0.00)	0 (%0.00)	0 (%0.00)	0 (%0.00)	0 (%0.00)	1 (%100.0)

The second highest number of complaints received about cheese products concerned sensorial abnormalities with 36,81%. Most of these abnormalities can be once again associated with improper product storage. Other than that also improper production parameters are effective in constituting the causes of these complaints. Improperness in the production conditions may cause sensorial differences in the characteristic quality and structure of the product. Any break of food safety that occurs in the production stage will be effective in the detection of the problem by the consumer, regardless of whether all the conditions ensuring food safety were perfectly met after production.

Consumer complaints registered with the detection of foreign matters in the products constituted 4,06% of the total complaints concerning dairy products. The same rate is 3,72% within types of cheese. Detection of foreign matters in food products is directly related with production conditions. It is the indication of improper production conditions.

As it is seen in the examination of milk and dairy product improperness, UHT drinking milks take a significant place in shelf life improperness. Therefore, the implementers have to take measures focusing on the control and inspection of the related product group during sales and the problems in applying the "First in - first out" principle to this product group should be removed by means of personnel trainings.

#### IV. CONCLUSION

The reasons of consumer feedbacks may be associated with the performance of production, storage and sales stages of foodstuff without compromising food safety. Fixation of the safety of foodstuff at the point of sale starts with the purchasing made in line with the determined criteria and continues with ensuring the properness of storing. Storage temperature at the sales point, storing with products that are not spoiled and preventing carriage deformation during storage are the parameters that enable product safety. It is possible to make improvements in the implemented food safety management systems by considering consumer feedbacks.

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