Scientific
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Consumers' Perception and Attitudes toward Packaged Milk in Turkey—A Descriptive Study

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Abstract

This study was conducted to analyze obtained data by consumer survey about packaged milk as long-life (UHT, ultra-high temperature) and pasteurized fluid milk (PFM). To achieve a 2.83% sampling tolerance, 1222 consumers were interviewed in person, and the data were collected. Although 76.4% of urban consumers (UCs) preferred UHT and PFM, the potential customer rate was 51.1% to 56.9%. In addition, the consumers who identify PFM with negative expression were identified as a high level of 68.4%. The definitions used for UHT can be considered as more neutral. 52.6% of consumers consider that there is a change in the composition of UHT and PFM during the production. The consumer groups (51.3%) thinking that this change is due to the addition of additives stand out. It is possible to assert that the main motivation factor for the negative attitudes of consumers towards UHT and PFM is the distrust of the technology in use.

1. Introduction

Foodborne illness is caused by consumption of foods contaminated with viruses, bacteria, parasites, toxins, metals, and prions [1]. Outbreaks of foodborne disease in humans are often caused by raw or improperly pasteurized milk and milk products that are contaminated with bacteria [2]. Raw milk often contains microorganisms, which may cause food-borne diseases [3]. It is important to remember that raw milk with high microbiological numbers or poor sensory properties will likely lead to finished products that fail to meet established shelf-life standards. High-quality raw milk that is stored at low temperatures and processed and packaged under sanitary con-

ditions provides the basis for food safety [4].

Food is packaged for storage, preservation, and protection traditionally for a long time. These three are the basic functions of food packaging that are still required today for better maintenance of quality and handling of foods [5]. Pasteurization of raw milk was therefore introduced in the end of the 19th century to increase the safety of milk and milk products [3]. Applying heat treatment to the different levels and techniques is the principal method used in the milk production. The techniques use, and post-process packaging material determines the shelf life of these foods. The market share of ultra-high temperature (UHT) milk has grown quickly over the last 15 years globally with a concomitant decrease of pasteurized milk sales, mainly in consequence of the extended shelf life provided by the aseptic carton pack [6]. Major technological advances in the fluid milk processing industry in the last 25 years include significant improvements in all the unit operations of separation, standardization, pasteurization, homogenization, and packaging. Much advancement has been directed toward production capacity, automation, and hygienic operation [7].

The heated and packaged milk is regarded as a safe food for consumers and is expected to be preferred accordingly. Because, consumers generally express their concerns on food safety, yet relatively only a few of them appear to be changing their food buying and consumption behaviours in view of their concerns [8]. In recent years, consumers have become increasingly cautious about food safety; of the various items associated with food safety, food additives are among the most controversial [9]. However, food choice is a complex process influenced by a number of factors related to the product (intrinsic and extrinsic properties), the consumer (e.g. knowledge, beliefs, attitudes), and the consumption context (e.g. occasion, cultural environment) [10]. For instance, different studies present that, unsafe milk and milk products may be chosen by consumers under effect of different factors. There is an ongoing international debate about the risks vs. benefits of raw milk consumption [11] [12]. On the one hand, it is known that severe microbiological infections can potentially occur from raw milk and raw milk products and several outbreaks have taken place until recent years [13]. With the aim of minimizing milk-associated health hazards, restrictions and legislation on the marketing of unpasteurized milk have been introduced in most countries [3].

Consumer perception of food products is a very complex phenomenon that is influenced by a wide range of characteristics. The role of the consumer in determining the market success of a product is of maximum relevance [14]. The motivation for food choice may be influenced by an interest in health, weights concern, sensory pleasure, ideological reasons, convenience, price or familiarity [10]. Certainly, with the developments in technology, consumers also deal with the safe food production techniques and processes [8]. Over the past several years, investigators have assessed the concerns of consumers toward a variety of novel food technologies and other food-related safety issues [15].

Directing consumers to safe food may be possible by determining their current perceptions and revealing and analyzing the factors affecting their motivation preferences. While there is a continuing work in the field of food technology for the development of new techniques and methods, to make food safer and trying to bring sustainability to the safe food supply, it is interesting to note that some consumers prefer products made of conventional methods and even in some cases they are prepared to pay higher prices for these products. Therefore, there is a need that the preferences and perceptions of consumers for each type of food should be determined by taking into account regional factors. While these studies are being executed, it must be remembered that consumer perceptions and preferences are in motion and in change e.g. in the late 1970s and early 1980s, consumers of food products very quickly became convinced that additives were dangerous and should be avoided. By the mid-1990s, interest in organic and natural foods had begun to rise and consumers also started becoming more aware of some of the potential benefits of additives. However, although consumers were aware of the benefits additives could deliver, the automatic assumption that additives were 'bad' remained and consumers felt that additives should be reduced in our foods [16].

In Turkey, milk is consumed as farm milk (unpackaged fluid milk) and fluid milk (packaged fluid milk). In Turkey, farm milk is also called "street milk" (SM), which refers to milk that is produced on unregulated farms, and fluid milk refers to milk produced using technology, such as pasteurisation and UHT [17]. A previous study was conducted to analyse the Turkish urban consumers' (UCs) attitudes, behaviours, and perceptions with respect to SM. Although 23.6% of UCs prefer SM, the potential customer rate is 43.1% to 48.9%. These UCs tend to choose SM because the product is perceived to be "organic", "pure", and "natural" and because they are suspicious of packaged/processed milk [17]. This study, as second part of the related research, attempts to define what is the perception and attitude toward processed and packaged fluid milk (UHT and pasteurized fluid milk)

with respect to socio-economic factors, such as age and gender differences.

2. Materials and Methods

2.1. Sampling Method

The target population of this research study comprises consumers over the age of 18 from various socio-economic groups (AB, C1, C2, and DE) living in Turkish urban centres, including Adana, Ankara, Antalya, Aydin, Bursa, Erzurum, Gaziantep, Istanbul, Izmir, Kayseri, Kocaeli, Samsun, Tekirdag, and Trabzon; these consumers are the primary food-shoppers in their household. Taking into account the district and neighbourhood distributions of the cities inhabited by the sample populations, the sample size distribution was determined, and a total of 1222 questionnaires were utilised.

The following formula was utilised to determine the sample size:

$$n = \left(\frac{Z_{\alpha/2}}{d}\right)^2 p \cdot q \tag{1}$$

$$n = \left(\frac{1.96}{0.0283}\right)^2 0.5 \times 0.5 \cong 1200$$

n = sample size.

$Z_{\alpha/2}$ = confidence coefficient (a value of 1.96 was considered acceptable for a confidence of 95%).

p = number of food consumers residing in the urban centres of 14 cities in Turkey (centre; central locations with populations above 50,000). A value of 0.5 was assumed because there was no preliminary information concerning the availability of the behaviour to be measured within the population.

$$q = 1 - p = \text{rate of urban consumers} \tag{2}$$

d = acceptable sampling error margin.

A 2.83% sampling error (corrected error margin) was predicted for this study. In similar sampling, it was accepted that $q = p = 0.5$. Accordingly, the largest possible sample size with a fixed sampling error and reliability level was obtained.

2.2. Questionnaire Design

A questionnaire was designed to meet the research objectives, and it was pre-tested on academic, food marketing, and consumer populations. During the next stage, a pilot questionnaire was given in March 2012 to 60 consumers. The pilot survey indicated that no modification to the questionnaire was necessary.

The Survey Form had five chapters:

a) Quota (three questions)

b) Demographic information (five questions)

c) UHT and pasteurised fluid milk-related attitude and perceptions (three open-ended questions, two closed-ended questions, and eleven questions with a five-point Likert scale)

d) Participant profile (11 closed-ended questions)

To determine which consumers were sampled, a stratified random sampling method was employed. The necessary data were collected using a face-to-face questionnaire method. Interviews were conducted in houses and offices. The scope of this study included all of the consumers living in the urban centres of 14 cities; we determined that we needed to conduct 1200 questionnaires to achieve a 95% significance level and 2.83% margin of error. Consequently, 1222 questionnaires were administered between 27 April and 11 May 2012. Each interview took an average of approximately 10 minutes.

At the beginning of the interviews, the respondents were asked whether they shopped for food by themselves or with others, and the interviews with individuals that did not shop for food were discontinued. The next question eliminated the respondents who work or who have relatives that work in advertising, journalism, TV/radio marketing, market research, and foodstuff sales and marketing. Subsequently, the respondents who had participated in any other questionnaire concerning foodstuffs over the previous month were also removed from the

sample population. The first question, which inquired the consumer's age, was also intended to provide demographic information; the interviews with individuals under 18 years of age were discontinued.

2.3. Socio-Economic Statuses (SES) Determination

The socio-economic statuses (SES) of the consumers were determined using the method previously reported by Haspolat Kaya *et al*. [18]. The determination of various parameters, such as the education level, the years of education (whether higher education was received), and whether education was completed, was important for this categorisation. Four major groups (AB (high and high-mid), C1 (medium-high), C2 (medium-low), and DE (low and lowest) were constructed. To determine SES, TUAD method, which is based on education levels of consumers, was used in this study [17].

2.4. Statistical Analysis

The collected data were summarised using descriptive statistics. To analyse the differences between the consumer types, the respondents were divided into three groups using the demographic variables and socio-economic statuses (SES): age, gender, and SES. To determine the significance of the differences between the subgroups in the same consumer groups, a t-test was applied using the SPSS Quantum programme (IBM, New York US) ($P < 0.05$).

3. Results and Discussion

3.1. Demographic and Socio-Economic Statuses of the Sample Population

The demographic information of the consumers that provided the data used in this study is presented in Konar *et al*. [17]. Of the individuals interviewed, 51.3% were women (n = 627), and 48.7% were men (n = 595). Of all of the participants, the 45+ age group included the largest number of participants (31.7%), and the average age of the participants was 37.4 ± 13.7. The age group with the lowest number of participants was the "45 to 54" group (15.3%).

According to their socio-economic statuses (SES), the consumers were divided into four groups from high to low (AB: high, C1: medium-high, C2: medium-low, and DE: low). Although the data collected in 2012 by TUAD (Turkish Researchers' Association) divided the Turkish urban population into the socio-economic statuses groups A, B, C1, C2, D, and E, which accounted for 5.00%, 10.0%, 24.0%, 31.0%, 22.0%, and 8.00% (TUAD 2012) of the total population, respectively, the distribution of the participants in the study was 6.80%, 14.1%, 22.9%, 17.6%, 37.7%, and 0.90%, respectively [17].

3.2. Dairy Product Consumption Behaviours

As noted in the previous study [17], 23.6% of the UCs purchased SM for their household. Other consumers preferred boxed-(45.4%) and glass-packaged (7.50%) pasteurised fluid milk (total 52.9%) and UHT milk (23.4%). These choices did not differ significantly based on gender. Of the consumers that prefer UHT, the SES, age, and gender groupings did not reveal significant variations. However, as the age increases and the SES levels decrease, SM was chosen more frequently. This difference was inverted for the same groups with respect to pasteurised milk. The 23.6% of the UCs who chose SM increased to 34.1% within the 45+ age group, which demonstrates the severity of this difference [17].

3.3. UHT and Pasteurized Fluid Milk and Urban Consumers; Consumption, Perception and Attitude

Two separate questions were asked to all the participants involved: which milk they prefer to drink and what pasteurized fluid milk and UHT milk mean for them (**Table 1**). It is noteworthy that there is a high rate of participants (in total 68.4%) who identify pasteurized milk as "would-not-use" (36.6%), expensive (5.90%) and for containing milk powder. The total percentage of positive sense of what can be installed on the response to this question is below 30%. Considering these rates, it is possible to specify that urban consumers have negative attitude towards drinking pasteurized milk. It can be noted that this situation can be particularly due to the lack of product quality and reliability. The most striking finding is that only 2.30% of consumers define UHT as an

Table 1. Attitudes of urban consumers toward packaged milk in turkey.

	All (%)	Socio-economic statute (SES) (%)				Age (%)				Gender (%)	
		AB	C1	C2	DE	18 - 24	25 - 34	35 - 44	45+	Female	Male
		α	β	Γ	δ	A	B	C	D	X	Y
Types of milk preferred by households (n = 1222)											
Street milk	23.6	14.9	21.8$^{>\alpha}$	22.3$^{>\alpha}$	30.1$^{>\alpha\Gamma\delta}$	16.5	16.7	24.0$^{>AB}$	34.1$^{>ABC}$	23.1	24.2
Pasteurised daily milk—bottle	7.50	10.2$^{>\delta}$	6.40	8.80	6.10	9.00	7.90	5.60	7.50	7.70	7.40
Pasteurised daily milk—box	45.4	49.0$^{>\delta}$	48.2$^{\delta}$	48.4	40.5	48.3$^{>D}$	52.5$^{>D}$	44.4	38.2	45.8	45.0
UHT milk	23.4	25.9	23.6	20.4	23.3	26.2	22.9	26.0	20.2	23.5	23.4
Associations to pasteurised daily milk (n = 1222)											
Product that I would not use	36.6	42.0$^{>\delta}$	37.1	39.1	32.2	40.8	34.9	36.8	34.9	37.8	35.3
Packaged milk	32.7	32.5	32.9	30.7	33.5	33.7	32.4	34.8	30.7	33.5	31.8
Milk powder contained	25.9	25.9	27.9	21.9	26.7	26.6	28.0	23.2	25.6	27.8	24.0
Milk which is not contact with air	6.80	6.70	7.10	7.00	6.60	4.90	6.00	6.80	8.80	5.90	7.70
Expensive	5.90	5.50	8.20$^{>\Gamma}$	2.30	6.40$^{>\Gamma}$	5.60	5.70	5.60	6.50	6.50	5.20
Good for growth of children	4.70	9.00$^{>\beta\Gamma\delta}$	4.60	4.20	2.50	5.60	6.30$^{>D}$	4.00	3.10	2.90	6.60$^{>Y}$
Milk that I glad to use	4.70	6.30	4.60	5.60	3.40	4.10	5.30	4.80	4.40	3.50	5.90$^{>Y}$
Preserved milk	4.60	5.10	5.40	4.20	4.00	5.20	4.40	3.60	4.90	4.60	4.50
Fresh	4.30	3.10	3.90	7.00	3.80	3.40	5.00	4.80	3.90	3.80	4.70
Enduring	3.90	3.90	5.00	5.60 δ	2.50	4.10	4.70	3.60	3.40	3.20	4.70
Bottled milk	3.70	1.20	3.60	4.70$^{>\alpha}$	4.70$^{>\alpha}$	3.70	3.80	4.40	3.10	3.20	4.20
Preservation of nutritional value	3.40	2.00	5.00	3.30	3.20	3.40	4.70	2.80	2.60	3.30	3.40
Milk which is heated and cooled	2.50	1.20	2.10	1.40	3.80$^{>\alpha}$	1.10	1.60	2.40	4.10$^{>AB}$	2.60	2.40
Grocery	2.50	2.70	1.80	2.30	2.80	2.20	3.10	2.00	2.30	2.90	2.00
Associations to UHT milk (n = 1222)											
Reservable milk	55.1	54.1	58.2	57.2	52.8	61.0$^{>CD}$	58.8$^{>D}$	51.6	50.1	53.4	56.8
Heated/cooled	19.5	19.6	20.0	20.0	18.9	15.7	17.3	19.6	23.8$^{>AB}$	19.8	19.2
Prufied from microorganims	7.40	6.30	8.60$^{>\Gamma}$	3.30	9.30$^{>\Gamma}$	7.10	8.20	4.80	8.80	7.70	7.20
Useful	7.00	6.30	5.40	7.40	8.30	6.40	6.30	6.80	8.30	6.40	7.70
On sale in groceries	6.90	4.70	9.30$^{>\alpha}$	7.90	6.10	7.90	7.20	8.00	5.20	8.60$^{>X}$	5.00
Long shelf life	4.70	5.90	2.90	2.80	5.90	4.90$^{>B}$	1.90	5.20$^{>B}$	6.50$^{>B}$	3.80	5.50
Boiled milk	4.50	4.30	5.00	6.00	3.60	3.40	3.80	6.40	4.70	4.60	4.40
Packaged milk	3.80	5.90	3.20	4.20	3.00	3.00	3.80	5.60	3.40	3.80	3.90
Freezed milk	3.60	5.50	3.20	2.30	3.40	2.20	3.80	5.20	3.40	3.50	3.70
Long lasting	2.60	5.90$^{>\beta\Gamma\delta}$	1.40	0.50	2.50	2.60	3.80	1.60	2.30	2.60	2.70
Box milk	2.40	1.20	2.50	2.80	2.80	2.60	1.30	4.00$^{>B}$	2.10	2.40	2.40
Unreliable	2.30	3.10	2.90	1.90	1.70	1.50	3.50	2.40	1.80	3.00	1.50
Produced in good conditions	2.20	2.00	1.80	1.40	3.00	1.10	0.90	2.40	3.90$^{>AB}$	2.60	1.80

Continued

Do you think the components of milk have been changed by producing UHT and pasteurised daily milk (n = 1222)											
Yes	52.6	$56.9^{>\delta}$	54.3	54.0	48.7	45.7	$55.0^{>A}$	$54.4^{>A}$	$54.3^{>A}$	48.6	$56.8^{>X}$
No	47.4	43.1	45.7	46.0	$51.3^{>\alpha}$	$54.3^{>BCD}$	45.0	45.6	45.7	$51.4^{>Y}$	43.2
Changes in the components by producing UHT and pasteurised daily (n = 643)											
Presence of additives	51.3	57.2	50.0	50.0	49.1	54.1	50.3	46.3	53.8	49.2	53.3
Deterioration of naturality	14.3	13.1	12.5	12.9	17.0	17.2	12.0	13.2	15.2	14.1	14.5
Lose of nutrients, especially vitamins	12.8	$19.3^{>\Gamma\delta}$	11.8	9.50	10.9	13.9	13.7	9.60	13.3	10.2	15.1
Treatment for preservation	11.4	11.7	9.20	10.3	13.0	$17.2^{>D}$	9.70	12.5	8.60	8.90	13.6
Change in taste	10.3	8.30	11.8	12.1	9.60	12.3	10.3	7.40	11.0	12.1	8.60
Transformed to be long life	9.60	10.3	8.60	7.80	10.9	7.40	12.6	10.3	8.10	10.8	8.60
Do not know	6.70	4.80	7.20	8.60	6.50	7.40	5.70	6.60	7.10	7.20	6.20
Unhealthy	5.60	4.10	6.60	4.30	6.50	4.10	5.10	5.10	7.10	6.60	4.70
Purifying from germs	3.10	3.40	1.30	4.30	3.50	$6.60^{>BD}$	0.60	$6.60^{>BD}$	1.00	4.30	2.10
Removal fat	2.60	3.40	$4.60^{>\delta}$	2.60	0.90	4.10	1.70	2.90	2.40	2.00	3.30
Tasteless	2.60	3.40	3.30	1.70	2.20	0.80	2.30	2.90	3.80	2.30	3.00
Lose of mineral value because of high temperature	2.60	$4.80^{>\beta}$	0.70	2.60	2.60	2.50	2.30	$5.10^{>D}$	1.40	2.60	2.70
Chane in smell	2.30	2.80	2.60	$4.30^{>\delta}$	0.90	1.60	4.00	2.20	1.40	2.30	2.40
Healthy	2.30	2.80	1.30	4.30	1.70	1.60	$4.00^{>D}$	$3.70^{>D}$	0.50	3.00	1.80

Items below 2.00 % are not shown in the table. The superscripts show the significance of the differences (5% risk level) between the different SES (α, β, γ, δ), ages (A, B, C. D), and gender (X, Y) groups. *: People preferred pasteurised and UHT milk; (n = 643). Items below 2.00% are not shown in the table. The superscripts show the significance of the differences (5% risk level) between the different SES (α, β, γ, δ), ages (A, B, C. D), and gender (X, Y) groups. *: People who think components of milk have been changed.

"unreliable product" with a negative meaning. An important group of consumers (55.1%) define UHT milk as "reservable milk" which may be considered as a neutral expression. Though UHT milk has a much longer shelf life than pasteurized milk and keeping in mind that heat treatment applied to this product is more intense in nature, particularly the expression for pasteurized milk and attitude of being more negative can be evaluated as an indication of the lack of right and detailed information about the applied technology. Although neutral expressions cannot be interpreted as the existence of a consumer attitude in favor of UHT milk products, it can be interpreted that consumers have a more severe negative attitude towards pasteurized milk. It should be taken into account while examining these responses and their rates that the preferred food of consumers is pasteurized milk (52.9%).

A number of demographic variables such as household income, number of children, gender, or age influence an individual's perception of risk [9]. In this study, nearly half of the participants, especially the age group of 18 - 24, defines UHT milk as reservable ($P < 0.05$). However, the definitions both used for UHT and pasteurized milk, especially in expressions containing negative attitudes, no differences could be identified based on socio-economic group, age and gender. However, it can be specified that the highest socio-economic group is more prominent especially for positive expressions of pasteurized milk ($P < 0.05$).

Also, no differences have been found about whether there is any change in the composition of UHT and pasteurized milk during the production based on gender, age and socio-economic status (**Table 1**). Based on these differences, it can be stated that young people (18 - 24 age group), members of low socio-economic status (DE) and the women have less suspicion towards these foods ($P < 0.05$). Knowledge, beliefs and attitudes to food are the results of cultural background, eating habits established during childhood and the constant flow of information about food in daily life [10]. In general, however, a significant proportion of consumers (52.6%) consider that UHT and pasteurized milk composition is transformed during production. This approach of consumers can be caused by suspicion and distrust towards the production methods and technologies. However, the source of

this situation should be analyzed. The fact that the perceived potential risk of the technologies was the most important factor influencing consumer interest in their use, suggests that regardless of the actual risks of the technologies, the perceived risks are the critical determinants of the market success of these technologies [15].

Consumers tend to amplify the risk when a food or a technology is unknown, or to minimize the risk in familiar foods or home preparation [9]. From a consumer's perspective, innovation in foods may either imply real novelty or modifications of already existing products [19]. Lack of knowledge among consumers regarding innovative and emerging food technologies can serve as a major impediment to their acceptance [15]. In a qualitative study carried out with 12 focus groups in six European countries, Guerrero *et al.* [19] studied the acceptance of innovations in traditional products in terms of packaging, convenience, nutrition and sensory properties. These authors found that consumers are open to packaging and convenience-oriented innovations, on the condition that they do not modify the fundamental intrinsic characteristics of the product. Further, changes in sensory quality such as modified flavors are not welcome in traditional foods [19]. Corroborating these results, Vanhonacker *et al.* [20], observed that European traditional food consumers welcome innovations that highlight the authenticity and origin of traditional foods and improve their shelf-life, but reject innovations that may affect the sensory properties of the product [13].

Credence cues addressing production methods affect liking, while expectations are also affected by information and influence hedonic ratings. Cues signaling traditional production seem to affect liking in a positive direction, whereas signals of "modernity" or "industrialized food" seem to have a negative impact on liking [21]. French consumers tend to reject the convenient packaging, which may reduce the traditional image of the cheese. Consumers have a higher acceptance for organic production than for conventional production of traditional cheese. The same trend is observed in Norway for special occasion consumption [13]. However, depending on the characteristics of the information about production method, the weight of the attributes may differ, and the number of papers found here was rather too limited to generalize consumer responses to a wide array of production- related factors, especially in novel production technologies [21].

In this study, open-ended questions were asked to consumers (n = 643) stating that he believe a change occurs within the composition of UHT and pasteurized milk with the process. The main opinion of these consumers is that the addition of an additive to milk takes place (51.3%). Although this statement seems as a neutral approach or a diligence, it was analyzed by taking the negative perspective of the consumer towards "additives" into account. Because, if consumers who have strongly negative attitudes towards chemicals no longer equated synthetic with toxic and natural with safe, consumers would be able to judge food hazards more appropriately [9]. In addition, this consumer opinion also supported the opinion that has been said before; that the principal element of insecurity by consumers is thought to arise from the doubts against the applied process technology used for this food. Studies focusing on 'production method' show that consumers tend to trust traditional and natural production methods more than methods associated with modernity and industry [21].

These negative attitudes towards additives may be associated with health concerns. From a technological point of view, food additives play an important role in the development of complex foods. However, the use of additives is an emotional topic, which provokes consumer concern [9]. Signaling production method has strong effects on consumer perceptions, especially if combined with specific regional origins. These results might indicate consumer distrust in more industrial production systems [21]. Additive names, sometimes difficult to pronounce for layman persons, give rise to the impression of unfamiliarity, which in turn results in perceptions of higher health risk [9]. Looking specifically at the dairy industry, much of the innovative new product development has been carried out in the 'health and wellness' area. Besides the introduction of more natural dairy products with fewer additives, this has also included development of dairy products with less fat and less calories [16].

There are indeed indications from the scientific literature that pasture feeding would also improve the nutritional quality of milk and dairy products and would be beneficial for consumers' health [22]. However, it was determined as part of our study that some consumers have the opinion that naturalness is disrupted during the post-processing of UHT and pasteurized milk (14.3%) and the loss of nutrients especially vitamins occurs (12.8%). Opinion on whether there is the loss of nutrients or not can be associated with mistrust in technology and the belief that raw product is "better and more useful food". In addition, a smaller group of consumers think that mineral substances suffer a loss of due to high temperature. The opinions about deteriorating in naturalness can especially be associated with the trend manifested towards organic food in all countries and communities. It has been reported that health is a stronger consideration compared with animal welfare and environment for

consumers choosing organic dairy products [22]-[24] and it is likely, although not yet proven, that such health considerations would drive, at least partially, the choice of pasture based milk and dairy products as well [22]. When consumers make food purchasing decisions, health-related attributes of food have become as important as non-health related attributes such as taste or sensory appeal, familiarity, and convenience. This trend may contribute toward the growth of organic food sales because organic food is generally believed to have a higher nutritional content [25]. The credence of production method may contain different dimensions. On the one hand it may attribute to culture and tradition, meaning traditional production methods related to specific regions or cultures. As food systems have become more globalized and industrialized, consumers are increasingly aware of food from many different places, but as the 'link to nature' has eroded, they show an interest in dedicated rather than generic products [21]. In a previous study, Ergonul [8] noted that consumers generally reduce consuming high-fat foods, try to purchase safe foods free of hormones, pesticides and chemical residues, try to purchase packaged foods free of pathogenic microorganisms, try to consume foods free of toxic heavy metals, and they try to purchase much more organic foods for maintaining a healthier life in Turkey. Also, consumers' increasing demand for organic food may also be attributable to socially conscious consumerism [26]. More consumers are aware of the environmental, social, and economic impacts their choices may incur [25].

Consumers judge food quality on its sensory characteristics and on the nutritional value, health benefits, calorie content and vitamins, which determine the individual preferences for specific products [14] [27]. Like most food products, optimizing the sensory quality of these foods is critical to their success in the marketplace. However, optimal sensory quality, on its own, will not guarantee success. Consumer perceptions about the safety, cost, and risk/benefits associated with novel technologies can negatively influence consumer choice and purchase decisions [15]. It has been stated that urban consumers' anxiety and doubt for pasteurization and UHT processes is towards the sensory properties. A group of 10.3% think that a change in "taste" and the ratio of 2.30% consumer think that a change in "smell" occur and 2.60% of consumers identify that these foodstuffs are "tasteless". These negative perceptions of consumers in this direction can be seen as a reflection of the negative attitude towards the product. Taste is a major condition for acceptance, in addition to the trustworthiness of health claims [14] [28] [29]. According to Verbeke [30], numerous consumer studies have pointed to the primary role of taste in directing the food choices of consumers. This finding is in agreement with Carrillo *et al.* [31], who showed that the most important factors conditioning consumer food choice attitudes were that the item "tastes good", "is good value for money" and "keeps me healthy"; however, the "health" factor was not the most important factor [14]. The previous consumer studies showing the factor of taste to be a critical driver of consumer perceptions of food quality and acceptance [15]. The attitude toward to the raw milk consumer segment in France may have been driven by sensory aspects [13].

Of consumers who think that a change in UHT and pasteurized milk occurs during the process, only 25.4% is reported using different expressions stating they have become more secure and long life. Including the 6.70% consumer group stating a belief that a change occurs in the composition but do not know its characteristics, it is possible to state that three quarter of this group of consumers indicate a negative attitude. However, it seems that this negative attitude does not rely on scientific and technical data. This situation is thought to arise from the superficial and speculative information offered to consumers. If so, by which sources these information is delivered to consumers and how they are directed should be discussed. Consumers' food choice is believed to be greatly influenced by how they judge the available information; research on the effect of contradictory information on consumer choices is extremely important for both policy decision-makers and food producers [9]. In recent years, particularly sloppy and social networks have no knowledge of the scientific basis and forwarded to the consumer by the media and the very rapid spread of this information should be taken into account. Many studies have similarly examined the impact of news media on food demand in the wake of food safety concerns. Ample research on the demand for fluid milk and dairy products likewise exists [32]-[38]. The detail and accuracy of this "fast-knowledge" offered to consumers in "fast-food" style and rendered remarkable by using striking expression is not often questioned by consumers and shared with others in a rapid and uncontrolled manner.

Consumers rely on the mass media for relevant information, and the media affects their purchase decisions [38]. The mass media are often a source of conflicting information about food, nutrition and health, resulting in beliefs and attitudes about the healthiness of foods that may diverge from the established knowledge [10]. Advertising and media publicity have been found to affect consumers' reallocations of expenditure across different food groups. Advertising often conveys a positive effect on certain food purchases. However, media publicity is not always positive [38]. Recent years, TV and radio shows on nutrition, healthy diet, consumer protection and

Table 2. Level of agreement on statements related on processed milk (n = 1222).

Statement	n*	Mean										
		General	Socio-economic statute (SES)				Age				Gender	
			AB α	C1 β	C2 γ	DE δ	18-24 A	25-34 B	35-44 C	45+ D	Female X	Male Y
Pasteurization makes milk healthy	66 (%5.40)	3.50 (1.08)	3.57 (1.04)	3.45 (1.11)	3.56 (1.12)	3.47 (1.05)	3.54 (1.04)	3.60$^{>D}$ (1.05)	3.47 (1.10)	3.42 (1.10)	3.53 (1.04)	3.48 (1.12)
UHT or Pasteurized milk cause allergy, diabetes, asthma	84 (%6.90)	2.92 (1.15)	2.88 (1.13)	2.92 (1.15)	2.81 (1.22)	2.99 (1.13)	2.87 (1.12)	2.87 (1.20)	2.85 (1.14)	3.04 (1.14)	2.92 (1.12)	2.91 (1.19)
Milk loses its nutritional value once boiled	65 (%5.30)	3.22 (1.19)	3.29 (1.19)	3.23 (1.18)	3.24 (1.21)	3.18 (1.19)	3.27 (1.19)	3.30 (1.20)	3.20 (1.20)	3.14 (1.17)	3.23 (1.14)	3.22 (1.25)
UHT milks cause indigestion because sterilization process lead to the lose of some substances in milk that help digesting	262 (%21.4)	3.31 (1.06)	3.18 (1.08)	3.29 (1.01)	3.31 (1.13)	3.38$^{>a}$ (1.05)	3.36 (0.99)	3.24 (1.11)	3.23 (1.09)	3.37 (1.05)	3.29 (1.02)	3.33 (1.11)
Packaged yoghurts are unhealthy	84 (%6.90)	2.93 (1.21)	2.95 (1.22)	2.96 (1.22)	2.75 (1.19)	3.00$^{>\gamma}$ (1.19)	2.73 (1.10)	2.81 (1.24)	2.92 (1.23)	3.19$^{>ABC}$ (1.20)	3.01$^{>Y}$ (1.20)	2.85 (1.20)
Boxed milks are unhealthy	85 (%7.00)	2.66 (1.19)	2.56 (1.18)	2.68 (1.15)	2.59 (1.20)	2.74 (1.22)	2.61 (1.14)	2.53 (1.20)	2.56 (1.22)	2.88$^{>ABC}$ (1.22)	2.73 (1.18)	2.59 (1.20)
Pasteurized milk is not spoil and acetify	65 (%5.30)	3.04 (1.20)	2.90 (1.18)	2.99 (1.21)	3.05 (1.22)	3.14$^{>a}$ (1.19)	3.13 (1.17)	3.00 (1.26)	3.05 (1.20)	2.99 (1.16)	2.97 (1.19)	3.11 (1.20)
Pasteurized milk can be preserved as healthy for days	53 (%4.30)	3.35 (1.15)	3.35 (1.19)	3.36 (1.15)	3.26 (1.17)	3.37 (1.12)	3.45 (1.13)	3.36 (1.24)	3.33 (1.07)	3.27 (1.13)	3.31 (1.17)	3.38 (1.12)
Milk loses its nutritional value once boiled	120 (%9.80)	3.05 (1.12)	2.97 (1.09)	3.08 (1.11)	3.08 (1.16)	3.05 (1.13)	2.95 (1.13)	3.06 (1.12)	3.05 (1.13)	3.10 (1.12)	3.09 (1.11)	3.00 (1.13)
Non-natural substances are added to milk in order to preserve it	111 (%9.10)	3.64 (1.01)	3.56 (1.05)	3.75$^{>a}$ (0.96)	3.63 (1.02)	3.63 (1.03)	3.61 (0.98)	3.61 (1.06)	3.60 (1.09)	3.73 (0.94)	3.63 (1.00)	3.66 (1.03)
UHT milk is "dead milk"	151 (%12.4)	2.66 (1.34)	2.67 (1.36)	2.50 (1.31)	2.76$^{>\beta}$ (1.29)	2.70 (1.32)	2.61 (1.33)	2.58 (1.29)	2.70 (1.38)	2.73 (1.35)	2.63 (1.33)	2.68 (1.34)
It is unnecessary to make children drink milk	13 (%1.10)	1.61 (1.00)	1.52 (0.95)	1.58 (0.94)	1.61 (1.00)	1.68 (1.06)	1.68 (1.04)	1.53 (0.96)	1.69 (1.06)	1.58 (0.96)	1.68$^{>Y}$ (1.07)	1.54 (0.92)
Nowadays, milk and yoghurt are not as beneficiary as they used to be 20 years ago	89 (%7.30)	3.61 (1.19)	3.59 (1.16)	3.59 (1.14)	3.72 (1.18)	3.58 (1.24)	3.62$^{>B}$ (1.14)	3.41 (1.20)	363$^{>B}$ (1.16)	3.75$^{>B}$ (1.21)	3.59 (1.21)	3.64 (1.18)
Boxed milks are expensive for making high profits	60 (%4.90)	3.46 (1.05)	3.36 (1.02)	3.38 (1.04)	3.50 (1.06)	3.54$^{>\alpha\beta}$ (1.05)	3.46 (1.04)	3.33 (1.05)	3.50 (1.04)	3.53$^{>B}$ (1.05)	3.39 (1.04)	3.53$^{>X}$ (1.05)
Dairy products are rottened later than they used to be	112 (%9.20)	3.74 (0.96)	3.74 (0.97)	3.78 (0.93)	3.85$^{>\delta}$ (0.97)	3.66 (0.96)	3.65 (0.97)	3.79 (0.89)	3.73 (1.01)	3.75 (0.96)	3.71 (0.94)	3.76 (0.97)

1: Strongly disagree, 2: Disagree, 3: Neither agree nor disagree, 4: Agree, 5: Strongly agree. *: n*: number and fraction (in parentheses) of consumers who stated "no idea". The values reported represent the mean. The superscripts show the significance of the differences (5% risk level) between the different SES (α, β, γ, δ) ages (A, B, C, D), and gender (X, Y) groups Columns Tested (5% risk level) for each break as SES (α, β, γ, δ) Age (A, B, C, D) and Gender (X, Y) groups. SM: Street milk. The standard deviations of each mean value are displayed in parentheses.

food safety became so popular in Turkey. Many professors and specialists from universities are invited to these programs and they share their opinions on these subjects with consumers and they give several advices. Consumers expressed that they found scientists and professors extremely reliable, and they thought that scientists were giving important and useful advices to consumers about food safety and consumer health [8].

In this study, a 5-point Likert scale was used to analyze the UCs' perception and behavior toward UHT and pasteurized fluid milk (Table 2). Gender, age, social class and income are often underlying factors explaining these food choice motives. For instance women seem more concerned with their diet, weight and health control and associate "food" with "fat", while men have a tendency to focus more on pleasure and sensory perception. Also, compared to elder consumers the young consumers seem to be less health conscious and more biased in their healthiness expectations related to foods [10]. Higher socioeconomic groups seem to be more motivated by ideological factors, while lower socioeconomic groups focus on convenience, price and familiarity [39]. However, no significant differences could be determined ($P < 0.05$) among the consumers responding to the questions prepared according to the 5-point Likert scale as well as the questions posed to consumers stating that a change occurs in the composition of UHT and pasteurized milk based on age, socioeconomic groups and gender.

It is remarkable that validation level of expressions in the 5-point Likert scale is below 3.74 points and standard deviation values were found to be above 0.96. Although consumers approve that pasteurization make milk healthy (3.50 ± 1.08), statements such as that non-natural compound is participated in the milk (3.64 ± 1.01), products prior 20 years were more nutritious (3.61 ± 1.19), and these products are not deteriorated immediately were approved by the consumers more severely. Except the approval of the statement that milk is unnecessary for children (1.61 ± 1.00) they are not sure about the accuracy of other statements within the scope of the consumer. It can be indicated that the results obtained in this section is compatible with other sections of this study.

4. Conclusions

It is possible to assert that the main motivation factor for the negative attitudes of consumers towards UHT and PFM is the distrust of the technology in use during process and packaging of the raw milk. Because it is claimed that these processes interfere with the structure of the product and therefore there is a risk to the health of the consumer. This negative perception towards "pasteurization" can be described as a tragic case as it is a vital process in terms of the development of food science and technology and food security-based applications. It can be asserted that consumers are faced with a pollution and confusion of information. However, preferences based on health and safeties are carried out in this pollution and confusion. Consumers should be gained consciousness that their preference of "safe food" can be carried out with the use of "safe" and "objective" knowledge.

Negative perception towards pasteurized milk is more severe than UHT milk. The fact that there is a higher-level utilization of pasteurized milk may be considered in the evaluation of these results. In a large part of responses, no significant differences can be determined statistically on the basis of socio-economic groups, age and gender. Therefore, it is considered that communication tools and visual media available to the entire community are more effective than some factors such as the level of education and the level of income in determining attitudes towards products. The social networks and media appropriate to today's lifestyle and habits should be the main tool to be used to inform consumers and increase their awareness.

Acknowledgements

Conflicts of Interest

The author declares no conflict of interest.

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