

An Investigation of Consumers' Consciousness Level About Food Safety in Milk and Dairy Consumption in Urban Area of Niğde Province

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Abstract

This study examined consumers' food safety consciousness and purchasing behavior for milk and dairy products. The data was gathered through the application of a questionnaire developed for food safety in milk and dairy products and purchasing preferences of consumers via face-to-face questionnaires with 272 consumers residing in the urban area of Niğde province. As a result of this study, the milk and dairy products purchased by the majority of consumers were reported, such as cow milk, cow milk products, and butter. It was determined that consumers buy an average of 13.5 liters of milk, 3 kg of cheese, about 10.5 kg of yogurt, and 1.5 kg of butter per month. It was found that 82% of consumers know the concept of food safety, and they stated that they were familiar with the Ministry of Agriculture and Forestry and the Ministry of Health as the food safety supervisory organizations. The almost half of consumers purchased sheep and goat milk and dairy products directly from farmers or at open-air markets. This means that the consumers are more vulnerable in consuming for sheep and goat unsafe dairy products. In the study, it was concluded that consumers consider the good for the product's health to be purchased as the most important criterion when purchasing milk and dairy products.

Keywords: Food safety, milk and dairy products, food safety in dairy products, consumer

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INTRODUCTION

Today, society has become more conscious about healthy lifestyles and safe diets. Consumers demand healthy and safe foods because they will be more effective in achieving a good quality of life than measuring the calories and basic needs of the body. Therefore, food safety, which has become one of the determining factors in the demand for all food products due to increasing the sensitivity of consumers to food production and consumption, is also constantly on the agenda. Generally, food safety includes particular assays to ensure the foods that reach consumers are healthy and safe, preserving their physical, biological, chemical, and sensory qualities for consumption (farm to fork) after production. Hence, food safety requires proper control from production to consumption.

Some factors negatively affect food safety in Turkey. These factors are the high population, the high number of small-scale agricultural farms, risky food consumption habits and socio-economic structure of consumers (Anonymous, 2017). Consumers constitute the latest link in the food safety chain. Consumer purchasing power and awareness level are important factors in ensuring food safety. Low purchasing power and low education level of most of the consumer potential, the lack of consumer awareness, and insufficient knowledge of food safety are also seen as important social weaknesses in ensuring food safety. This adversely affects public health and its industry's quality and safe food production (Alpoğuz et al., 2009).

Besides, food safety issues are determined by the behavior and actions of various stakeholders, such as farmers, food handlers and distributors, food manufacturers, and food service operators. Moreover, they are also affected by consumer awareness and practices. In return, consumers' demand for food safety depends on their food safety consciousness (Thapa et al., 2020). Comprehension of consumers' knowledge regarding food safety and their food preparation practices has become an important subject for food producers, retailers, politicians, and health promoters (Wilcock et al., 2004).

Milk is one of the nutrients which is necessary for the growth and development of the human body, which has an important place in the entire life period of a person from infancy to old age, contains protein, fat, lactose, vitamins, and minerals of animal origin, and it is necessary for adequate and balanced nutrition. While many foodstuffs can meet only a part of the nutritional elements of human being, milk, with its unique composition, is the only nutrient that contains all the factors of nutrition, namely protein, fat, carbohydrate and mineral substances, enzymes, antibodies, vitamins in a balanced and sufficient amount (Pereira, 2014). Nevertheless, food safety of milk and dairy products has been an increasing concern in Türkiye. There are food safety challenges in milk production because milk has a very favourable nature for growth of microorganisms in it. Therefore, because of reaching the safe dairy products from the production process to consumers, dairy industries began to implement global food safety management systems and standards such as HACCP (Hazard Analysis and Critical Control Points), G.A.P (Global Good Agriculture Practices), G.M.P (Good Manufacturing Practice), ISO 22000 (International Organization for Standardization).

Although Turkey has made significant strides in food safety in recent years and progress has been made in the awareness level of the society, unfortunately not all segments of the society have food safety awareness. Accordingly, many research and studies have been carried out on the purchasing behavior and knowledge of consumers on food safety in the world (Bruhn and Schutz, 1999; Mutlu, 2007; Gündüz and Aydoğan, 2015; Sopi et al., 2015; Eryılmaz et al., 2018; Öztürk et al., 2019; Yüksel, 2019; Kırmacı and Özçelik, 2021). Studies have become widespread with the increasing importance of the subject. Especially, there are some studies about consumers' knowledge of food safety and purchasing attitude toward milk and dairy products in Turkey according to different consumers' segment and region (Mutlu and Berk, 2004; Bozoğlu et al., 2014; Can, 2020; Başer et al., 2022). However, no study has been found to determine consumers' consciousness regarding food safety in milk and dairy products in Niğde province.

The main objective of this study is to determine the effective factors of consumers' purchasing milk and dairy products and focus on food safety knowledge of consumers in the case of Niğde, Turkey. Besides, the specific objectives of this study include to determine the milk and dairy products consumption level of consumers in the urban area of Niğde province and to determine what is the level of consumers' food safety consciousness and purchasing preferences in terms of dairy products.

MATERIAL and METHOD

The study's primary data were obtained from surveys using a structured questionnaire. The research was conducted among the urban residents of Center and Bor districts of Niğde province of Türkiye, which constitute 91,7% (199.545 persons) of total urban population (217.640 persons) in Niğde (TURKSTAT, 2020). The survey was conducted in July 2021.

The number of consumers to be surveyed was determined with the "Proportional Sample Size" formulated by Newbold et al (2013), and as a result of the calculation a 90% confidence level, and 5% margin of error, it was found that 272 surveys were required. The unit of analysis for the study was the household, with the assumption that the household is where one can get most of information with regard to the study objectives. The sample size was calculated using the following formula:

$$n = \frac{Np(1-p)}{(N-1)\sigma_{px}^2 + p(1-p)} \quad (1)$$

Where n = sample size, N = population (consumer numbers), p = proportion of sampled consumer, σ_{px}^2 = variance attribute of interest). Because the general prevalence rate of the key variable was not known, the value of p was set at 50% (0.5) to maximize the impact of this variable on the sample size.

Within the scope of the research, characteristics of consumers and consumption were measured with basic statistical methods (frequency distribution and average). Besides, the opinions of the consumers within the scope of the research on the factors affecting their purchases of milk and dairy products were determined using a 5-point Likert Scale. In this study, taking into account income groups, whether there was a difference between the data series showing the scaling of a certain expression depending on the subcategories/groups was determined with the Kruskal-Wallis test (Laerd Statistics, 2014), which is the non-parametric equivalent of one-way ANOVA.

RESULTS and DISCUSSION

Socio-demographic and economic characteristics of households

Socio-demographic and economic characteristics of the consumers were evaluated for comprehension relationship between consumers' purchasing behavior and food safety awareness. Statistics describing the socio-demographic characteristics of the individuals interviewed were given in Table 4.1. According to the table, of the 272 individuals, 148 (54.41%) were males, and 124 individuals (45.59%) were females. In addition, the average age of individuals was 31 years, and the majority (62.5%) were between 18 ages and 34 ages. In this study, it was found that 52.2% of interviewed individuals were single and 36.8% of individuals had bachelor's education level. In the households interviewed, 24.3% of the individuals were students, 17.6% were freelancers, and 16.3% were employed. This was followed by unemployed individuals with 12.5%. Proximately 5% of individuals in the position were retired, and approximately 10% were civil workers. 27% of males were student, while 29.8% (37 Persons) of females were housewife. The average number of individuals living in a household was about 4.46 persons, and the average number of children was 1.62. In a similar study which conducted in Tekirdağ province, 11.8% of consumers had bachelor's degree, the average number of people living in a household was 3, and 2.9% of individuals were unemployed, and 28% of them were housewife (Can, 2020).

Table 1. Socio-demographic characteristics of the interviewed households

| Socio-demographic factors | Categories for variables | Male | | Female | | Overall | |
|---|--------------------------|------|-------|--------|-------|---------|-------|
| | | n | % | n | % | n | % |
| Age | 18-24 | 53 | 36 | 31 | 25 | 84 | 30.9 |
| | 25-34 | 46 | 31 | 40 | 32 | 86 | 31.6 |
| | 35-44 | 24 | 16 | 26 | 21 | 50 | 18.4 |
| | 45-54 | 16 | 11 | 17 | 14 | 33 | 12.1 |
| | 55-64 | 4 | 3 | 8 | 6 | 12 | 4.4 |
| | 65 and older | 5 | 3 | 2 | 2 | 7 | 2.6 |
| | Total | 148 | 100 | 124 | 100 | 272 | 100.0 |
| Marital status | Married | 64 | 43 | 66 | 53 | 130 | 47.8 |
| | Single | 84 | 57 | 58 | 47 | 142 | 52.2 |
| | Total | 148 | 100.0 | 124 | 100.0 | 272 | 100.0 |
| Education level | Literate | 6 | 4 | 7 | 6 | 13 | 4.8 |
| | Primary education | 7 | 5 | 12 | 10 | 19 | 7.0 |
| | Secondary education | 17 | 11 | 11 | 9 | 28 | 10.3 |
| | High School | 43 | 29 | 34 | 27 | 77 | 28.3 |
| | Bachelors | 62 | 42 | 38 | 31 | 100 | 36.8 |
| | Postgraduate | 13 | 9 | 22 | 18 | 35 | 12.9 |
| | Total | 148 | 100.0 | 124 | 100.0 | 272 | 100.0 |
| Occupation | Freelancer | 39 | 26 | 9 | 7 | 48 | 17.6 |
| | Civil Worker | 15 | 10 | 13 | 10 | 28 | 10.3 |
| | Employee | 26 | 18 | 19 | 15 | 45 | 16.5 |
| | Student | 40 | 27 | 26 | 21 | 66 | 24.3 |
| | Housewife | 0 | 0 | 37 | 30 | 37 | 13.6 |
| | Retired | 11 | 7 | 3 | 2 | 14 | 5.1 |
| | Unemployed | 17 | 11 | 17 | 14 | 34 | 12.5 |
| | Total | 148 | 100.0 | 124 | 100.0 | 272 | 100.0 |
| Number of household members (average) | | | | | | 4.46 | |
| Number of children in the household (average) | | | | | | 1.62 | |

In this study, household income levels may differ. For this purpose, consumer income groups were created, and monthly total household incomes were calculated from the smallest to the largest. According to the income levels of the households they ranked into 3 groups: high-income, middle-income, and low-income groups. Accordingly, households with a monthly income of up to 3000 TL were low-income households. Those with an income between 3000 TL- 4999 TL were called the middle-income group and those with more than 5000 TL income were called high income households. Monthly household income varied between 900 TL and 20000 TL, and the average monthly income of households was determined as 4221.5 TL in the study. Households with low income constituted 30.1% of the total sample, middle income households constituted 39.0% of the total, and 30.9% were high income households.

Besides, the average monthly food expenditure for the total sample was calculated as 1591.07 TL, and the share of monthly food expenditures in monthly income was 37.69%. The share of food expenditure in total income was the highest with 41.23% in the middle-income group, while it was the lowest with 34.55% in the high-income group. Furthermore, the share of total dairy products expenditures in total food expenditures was 23.68% (28.57% in the low-income group, 25.18% in the middle-income group, and 20.84% in the high-income group) (Table 2).

Relationship of average monthly food expenditure of households and average monthly dairy products expenditure along with income groups were investigated using Kruskal Wallis Test. There were statistically significant differences between income groups on the average monthly food expenditure and average monthly dairy expenditure (p-value = 0.000).

Table 2. Economic status of households by income groups (monthly average)

| Income Groups | Average of Monthly Income (TL) | Average of Monthly Food Expenditure (TL) * | % of Monthly Income | Average of Monthly Dairy Expenditure (TL) * | % of Monthly Food Expenditure |
|---------------|--------------------------------|--|---------------------|---|-------------------------------|
| Low Income | 2073.47 | 838.41 | 40.44 | 239.51 | 28.57 |
| Middle Income | 3680.37 | 1517.36 | 41.23 | 382.12 | 25.18 |
| High Income | 7001.19 | 2418.81 | 34.55 | 504.05 | 20.84 |
| Total | 4221.48 | 1591.07 | 37.69 | 376.78 | 23.68 |

*According to the Kruskal Wallis Test, the difference between the means was statistically significant (p<0.05)

Food safety knowledge and consciousness of consumers

Among surveyed consumers, approximately 82% admitted that they are aware of food safety concept, while about 18% of respondents did not know about food safety. In accordance with a study investigated in Samsun province of Turkey, it has been reported that 84% of the consumers who participated in the survey stated that they had heard of the concept of food safety; however, 16% stated that they had not heard of the concept of food safety (Yalçın and Kızılaslan, 2013).

The definition of food safety was asked to the consumers in the study. Accordingly, while 82% of the respondents answered the question about the definition of food safety, 18% of them did not answer the question. It has been demonstrated that 16.3% of consumers defined the concept of food safety as safe food in terms of health with nutritionally value, 12.8% as food produced with hygienic and safety quality standards, 8.7% as food that compliance with essential food safety regulations, and 40.4% of consumers responded as all the definitions given. At this point, it appears that the concept of food safety has been widely considered.

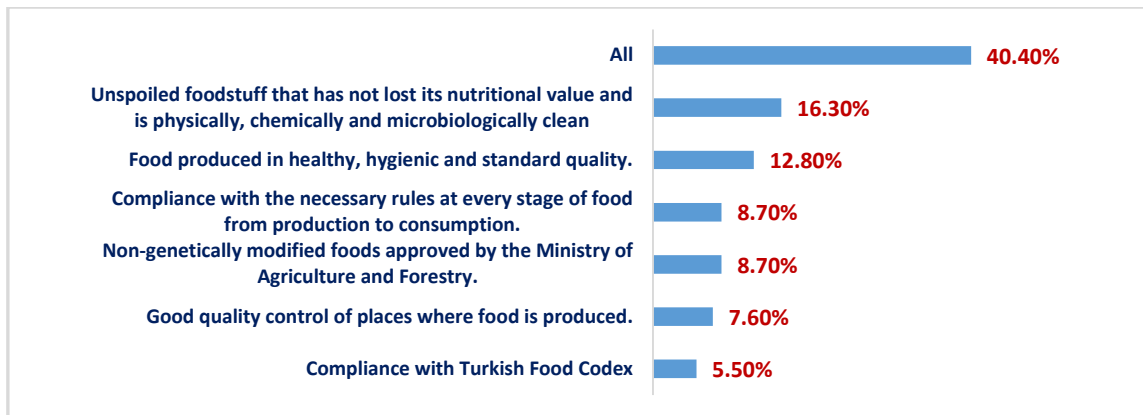


Figure 1. Definition of food safety according to the consumers

Consumers were asked which food safety assurance systems they were familiar. As a result, 88% of surveyed individuals responded to this question, and 12% did not answer, since they did not have knowledge of food safety systems. Though, the food safety system most recognized by consumers was TSE (Turkish Standards Institution) with a rate of 24.8%. Organic or Ecological Products Certificate has the second rank with an 18.8% rate, which was followed by HALAL Islamic standards with 18.1% and by Standards of the International Standards Organization (ISO) with 17.1%. HACCP (Hazard Analysis at Critical Control Points for Processed Agricultural Products) ranked 5th with at 11.1% and European Good Agricultural Practices Document (EUROGAP) ranked the last one with at 10%.

The most well-known food safety supervisory organization by consumers was stated as the Ministry of Agriculture and Forestry with 23.70%, which was followed by the Ministry of Health with 22.70%. 15.50% of individuals claimed that they were aware of the Turkish Standards Institute (TSE) as safety supervision competent of foodstuff. Moreover, municipalities (15.4%) and Alo 174 Food Line (15.4%) were equally rated as the responsible institutions for food safety by consumers. Provincial Hygiene Centers were found to be the least known institution responsible for food safety with 7.40%.

Food safety perceptions of consumers on milk and dairy products

The consumers' purchasing behaviors for milk and dairy products were investigated in terms of average consumption quantity according to income groups, and the places they prefer to buy, and the factors affecting the choice of the consumers' purchasing place. Besides, consumers' preferences in choosing drinking milk and packaging types for milk and dairy products were examined.

As a result of the consuming amounts of dairy products, cow milk products were found higher than other milking animals' products, this proves that cow milk and cow milk products are quite accessible and commonly used in individuals' daily life. The average monthly cow-milk, cow-cheese and cow-yogurt households interviewed within the scope of the study consumption was found as 11.23 kg, 2.31 kg, and 8.31 kg, respectively (Table 3). The consumption quantity of milk and dairy products differs in accordance with individuals' diet preferences, availability of milk products in their neighborhood, and lifestyle. In line with the study of Can (2020), the average for monthly milk consumption was found as 9.5 liters in Tekirdağ province.

Table 3 indicates that the consumption amount of milk and dairy products of the households increase as the income levels increases. It has been determined that there is a considerable difference in the amount of cow milk and cow milk products in the surveyed households; those had consumed more than other milk products. Pursuant to the Kruskal Wallis Test statistic between consumption and income groups in milk and dairy products, a significant difference was found between the average consumption amounts of cow milk (p-value= 0.013) and goat milk (p-value= 0.009), and households income groups.

Table 3. Average amounts of milk and dairy product consumption from different source of households considering the income groups (kg/month)

| Products | Low Income | Middle Income | High Income | Overall |
|--------------|------------|---------------|-------------|---------|
| Cow Milk* | 9.56 | 11.06 | 13.07 | 11.23 |
| Sheep Milk | 1.00 | 1.49 | 1.15 | 1.23 |
| Goat Milk* | 0.35 | 1.59 | 1.12 | 1.07 |
| Cow Cheese | 1.98 | 2.38 | 2.53 | 2.31 |
| Sheep Cheese | 0.35 | 0.40 | 0.73 | 0.49 |
| Goat Cheese | 0.16 | 0.31 | 0.42 | 0.30 |
| Cow Yogurt | 7.60 | 8.10 | 9.25 | 8.31 |
| Sheep Yogurt | 0.71 | 0.73 | 1.56 | 1.00 |
| Goat Yogurt | 0.52 | 1.37 | 1.74 | 1.23 |
| Butter | 1.25 | 1.65 | 1.58 | 1.51 |
| Cream | 0.72 | 0.73 | 0.79 | 0.74 |
| Kefir | 0.13 | 0.32 | 0.22 | 0.23 |

*According to the Kruskal Wallis Test, the difference between the means was statistically significant (p<0.05)

Consumers preferences of drinking milk preferences according to processed types were given in Table 4. It has shown that households mostly consider sterilized by boiling type in total which has the highest rank 41.5%. This determines that consumers are willing to sterilize milk they bought at home. Approximately 30.5% of consumers prefer UHT (Ultra-high temperature/ ultra-pasteurized) milk and followed by 27.9% pasteurized milk. It was interested in whether the drinking milk processed type was related to the income groups of respondents. This relationship was verified by a Chi-square test. Although there was an insignificant association at 5% significance level according to test results ($\chi^2 = 6.013$; p-value = 0.198), it was found that sterilization of milk by boiling at home was less preferred in high-income households (34.5%) compared to low-income (50.0%) and middle-income (40.6%) households.

Table 4. Drinking milk preferences of consumers according to income status (%)

| Income Groups | Pasteurized | UHT | Sterilized By Boiling |
|---------------|-------------|------|-----------------------|
| Low Income | 28.0 | 22.0 | 50.0 |
| Middle Income | 28.3 | 31.1 | 40.6 |
| High Income | 27.4 | 38.1 | 34.5 |
| % of Total | 27.9 | 30.5 | 41.5 |

As shown in Figure 2, consumers regularly preferred cardboard boxes in milk packaging types which have 32.4%, while glass bottles are almost 30% and plastic bottles with 11.4%. However, 21.7% of individuals evident that they do not consider specific milk packaging during purchasing milk, and the lowest preferred milk package types were the plastic bags with lids (2.6%) and cut open plastic bags (2.2%).

The reason of less preferences of those were being not secure and safe as much as other packages are and challenging to carry and keep it through consumption time.

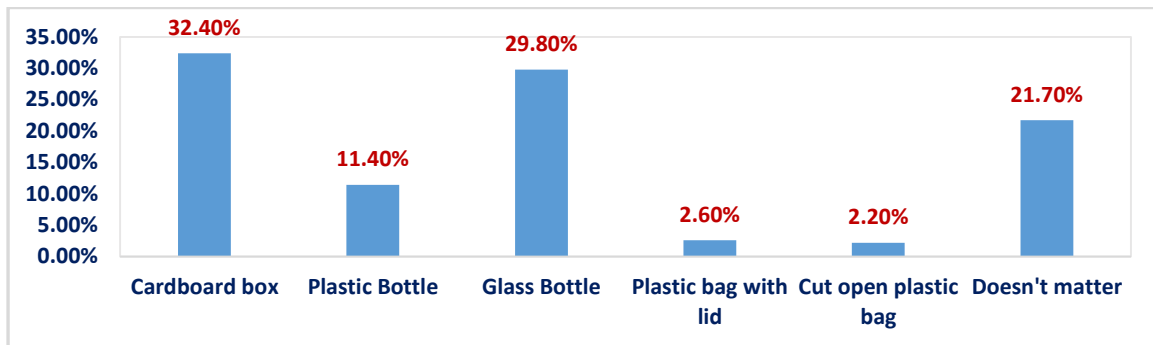


Figure 2. Preferences of milk package types by consumers

Within the scope of consumer behavior, it is also considerable to elaborate the consumers purchasing place preferences. The places they use to buy dairy products regularly are examined in Table 5. Supermarkets and hypermarkets got first rank (cow milk, cow cheese, goat cheese, cow yogurt, butter, and cream) almost in all dairy products, while for purchasing fresh milk they still prefer directly from producers and traditional retailers such as delicatessens and street milkmen. However, purchasing sheep milk directly from producers rated first, and street milkman for goat milk, due to the rarity of these products in supermarkets and hypermarkets. This shows that in the urban population, consumers mostly prefer to purchase milk and dairy products from supermarkets, the following directly from the producers, and delicatessens, street milkmen are preferred by consumers. As determination in similar investigation, it has also indicated that consumer preferred the supermarket for purchasing all the dairy products, while none of consumers prefer purchasing milk and dairy products from internet (Can, 2020).

Table 4.5. Consumers purchasing place preferences in milk and dairy products

| Products | Hyper/Super Market | Grocery Shop | Delicatessen Dairy | Street Milkman | Directly from Producer | Total |
|--------------|--------------------|----------------|--------------------|----------------|------------------------|---------------|
| Cow Milk | 112 (41.95%) | 47 (17.60%) | 31 (11.61%) | 28 (10.49%) | 49 (18.35%) | 267 (100%) |
| Sheep Milk | 16 (13.68%) | 18 (15.38%) | 25 (21.37%) | 25 (21.37%) | 33 (28.21%) | 117 (100%) |
| Goat Milk | 17 (17.53%) | 13 (13.40%) | 20 (20.62%) | 28 (28.87%) | 19 (19.59%) | 97 (100%) |
| Cow Cheese | 125 (52.30%) | 28 (11.72%) | 41 (17.15%) | 13 (5.44%) | 32 (13.39%) | 239 (100%) |
| Sheep Cheese | 30 (27.52%) | 11 (10.09%) | 31 (28.44%) | 12 (11.01%) | 25 (22.94%) | 109 (100%) |
| Goat Cheese | 22 (26.19%) | 9 (10.71%) | 19 (22.62%) | 16 (19.05%) | 18 (21.43%) | 84 (100%) |
| Cow Yogurt | 108 (49.77%) | 32 (14.75%) | 28 (12.90%) | 17 (7.83%) | 32 (14.75%) | 217 (100%) |
| Sheep Yogurt | 21 (26.25%) | 12 (15.00%) | 15 (18.75%) | 11 (13.75%) | 21 (26.25%) | 80 (100%) |
| Goat Yogurt | 14 (17.50%) | 11 (13.75%) | 20 (25.00%) | 13 (16.25%) | 22 (27.50%) | 80 (100%) |
| Butter | 105 (44.49%) | 29 (12.29%) | 37 (15.68%) | 19 (8.05%) | 46 (19.49%) | 236 (100%) |
| Cream | 62 (38.04%) | 26 (15.95%) | 32 (19.63%) | 15 (9.20%) | 28 (17.18%) | 163 (100%) |

The factors affecting the choice of the consumers' purchasing place of milk and dairy products were evaluated in Figure 3. Accordingly, the sale places hygiene conditions, having a good relationship between quality and price, and having a quality warranty were the main criterions. Furtherly, in other side being close to the consumers' home and workplace, as well as the advertising and promotion have not much effect on consumers' choices. In many studies, in general, for food purchasing, choosing the place to buy the products; proximity, advertisement, price and shopping hours were important in milk and dairy products were found as factors (Okumuş and Bulduk, 2003). In dairy products, health and quality are the prioritized criteria.

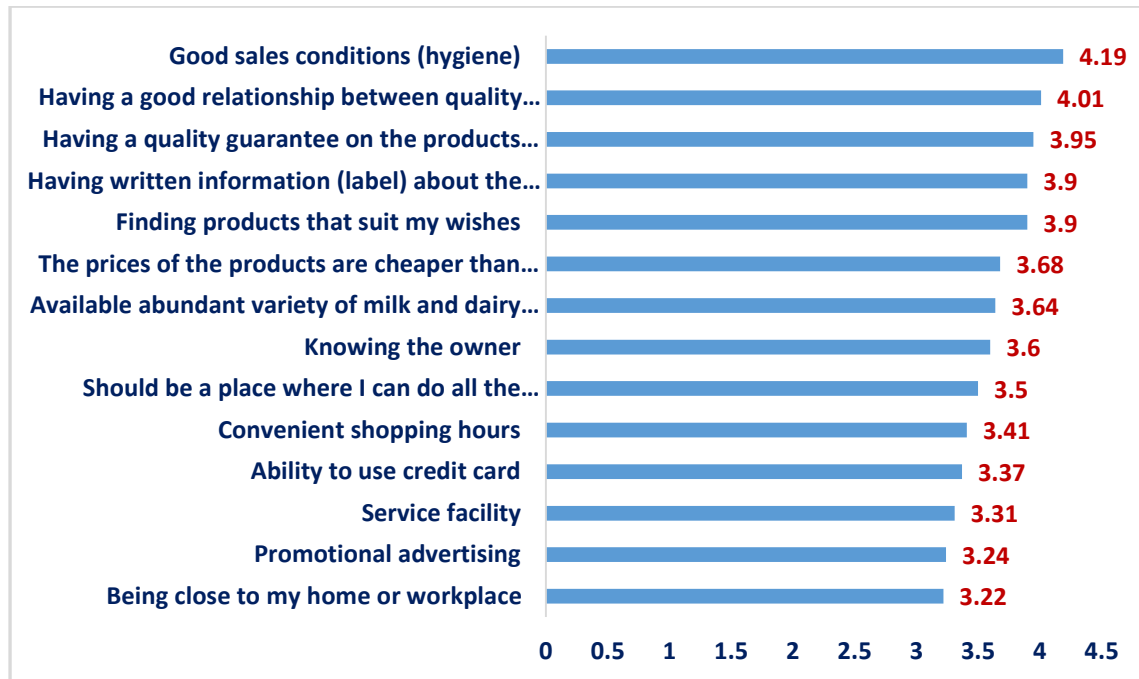


Figure 3. Factors affecting the choice of the consumers' purchasing place of milk and dairy products (1= not important, 5= very important)

An investigation of consumers' attitudes about milk and dairy products' reliability and safety compared to the previous years, it has been observed that almost 40% of answers given by individuals were less reliable than in previous years, regarding increasing the number of additives in dairy products and medicines taken by animals. At the same time, some of them complained about the water addition to the unpacked milk. On the other hand, around 31% of consumers believed that the reliability of dairy products had not differed from past years, followed by near to 28% responses over more reliable and safer than in previous years, owing to the yearly up-to-dates in food safety regulations and expansion of food safety importance. In this study, consumers' awareness of food safety news and the consequences of food safety news about dairy products on the consumption habits of consumers were investigated. Approximately 62% of surveyed citizens declared that food safety news affected their dairy products consumption, whereas about 38% did not notice any changes recently caused by food safety news. 62.5% of surveyed individuals answered the consequences of food safety news regarding milk and dairy products which were heard. Accordingly, 32% of consumers claimed that food safety news had a positive effect, and their dairy consumption increased; however, almost 16.2% of consumers reported that no variation occurred in their dairy consumption habit, and particularly 14.4% of those stated a decrease as a result the convenient news influence their dairy consumption.

It was determined from which sources consumers obtained food safety information about milk and dairy products in the last six months. Accordingly, it was determined that 23.3% of consumers asked for information from where they purchased, followed by 20.1% from media, magazines, internet and television. While 16.8% of those got information from their close circle and friends, 15.4% followed on social media and 14.7% of reading product labels. Following expert' recommendations by consumers was observed as only 9.7%.

78.3% of consumers stated that they made a complaint to the competent authorities when they encountered a spoiled dairy product, while 21.7% stated that they did not make a complaint. Among 78.3% of consumers who had made a complaint, 73% obtained result, and 27% did not. Here, it has emerged that there is a need to create a public opinion to report a defective product intended for consumers to the competent authorities.

Approximately 21.7% of consumers did not make a complaint to the competent authorities when they encounter spoiled dairy products, as a reason for not applying the competent authorities, 31% of those stated that they did not want to deal with, 25% stated that they would not get any results, and 19% did not make a complaint instead they preferred to change the place of purchase, while 17% of consumers believed that there were no sufficient controls, 8% of consumers claimed, they did not know the relevant authorities to the registration of complaints. In a study investigated in Tokat Province, it was determined that 49% of consumers had thought of not obtaining the result, 46% stated that they did not want to deal with it, while 4% did not make a complaint about the concept of giving harm to producers (Can, 2020).

The food chain consists of production and its components up to consumption, such as production, processing, distribution, packaging, storage, and preparation of successive steps and processes. Food can have contaminated at every stage of production till consumption. While the primary food safety responsibility belongs to food producers, many food-borne diseases are caused by improperly prepared or mishandled food at home, in food service establishments, markets or even on farms (WHO, 2002). In the study, it was determined that consumers generally found all processes applied as moderately reliable from milk and dairy products were milked to processed. All the processes of packaging, storage, selling places, and keeping the milk at home were generally considered as quite reliable by consumers.

Table 4.6. Food safety at production chain of dairy products

| Criteria | Percentage (%) | | | | | | Mean |
|---------------------------------|----------------|------|-------------|-------|-------------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| Production of milk | 10.3 | 21.7 | 29.4 | 12.9 | 15.8 | 9.9 | 3.32 |
| Milking (by hand, with machine) | 4 | 21.3 | 26.8 | 21 | 16.9 | 9.9 | 3.55 |
| Transportation of milk | 4.8 | 14.7 | 27.6 | 19.99 | 21.3 | 11.8 | 3.74 |
| Processing of milk | 9.6 | 13.6 | 24.3 | 17.6 | 21 | 14 | 3.69 |
| Packaging | 6.3 | 11 | 22.4 | 20.6 | 24.6 | 15.1 | 3.92 |
| Storage | 6.3 | 11.8 | 23.5 | 16.9 | 25.4 | 16.2 | 3.92 |
| Sale places | 3.7 | 11.4 | 22.8 | 19.9 | 32.4 | 9.9 | 3.96 |
| Keeping inside house | 3.7 | 7 | 17.3 | 21.7 | 41.2 | 9.2 | 4.17 |

1: Not Safe, 2: Less Safe, 3: Moderately Reliable, 4: Quite Reliable, 5: Very Reliable, 6: Do not have any idea

Consumers' attitudes toward hygiene and safety of milk and dairy products sale places were examined in Figure 4. As a result of this examination, consumers believed that sale places were moderately sufficient with 27.8%, followed by 26.8% fairly sufficient and 20.6% very sufficient rates, even though on the other hand about 14.0% were not sure about sufficiency and 10.7% of interviewers pointed out that sale places were not sufficient at all.

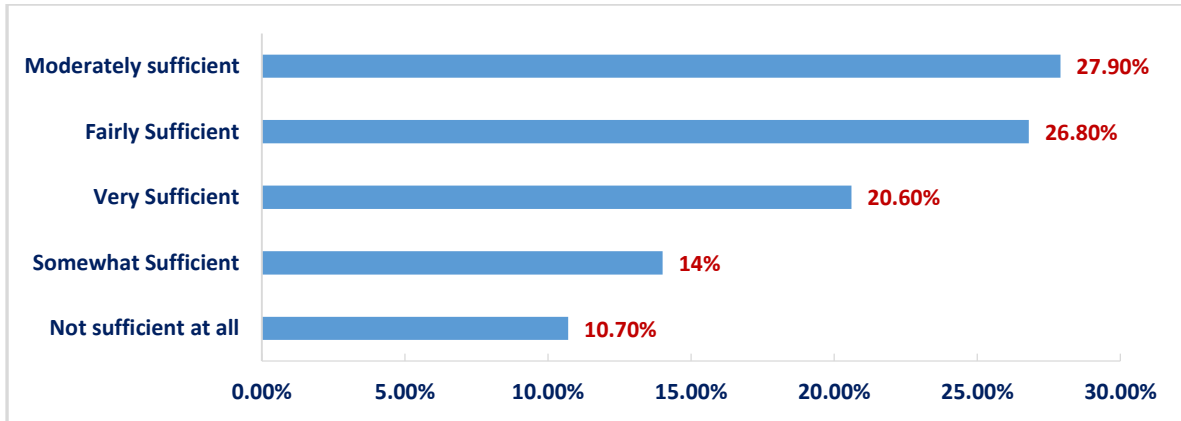


Figure 4. Consumers’ attitudes toward hygiene and safety of milk and dairy products sale places

Consumers who had admitted that milk and dairy product production processes are not safe enough due to food safety standards were asked what the reason for this opinion was. In the Figure 5, consumers’ answers are demonstrated. Approximately 38.6% of consumers stated that dairy products contain additives, followed by about 25.7% lack enough hygiene in the place of production, and 21.6% claimed the chemical includes either chemical contamination and lastly microbiological development, rated 14.1%. In some studies, up to a third of all raw milk samples contained pathogens, even when they were sourced from clinically healthy animals or from milk that appeared to be of good quality.

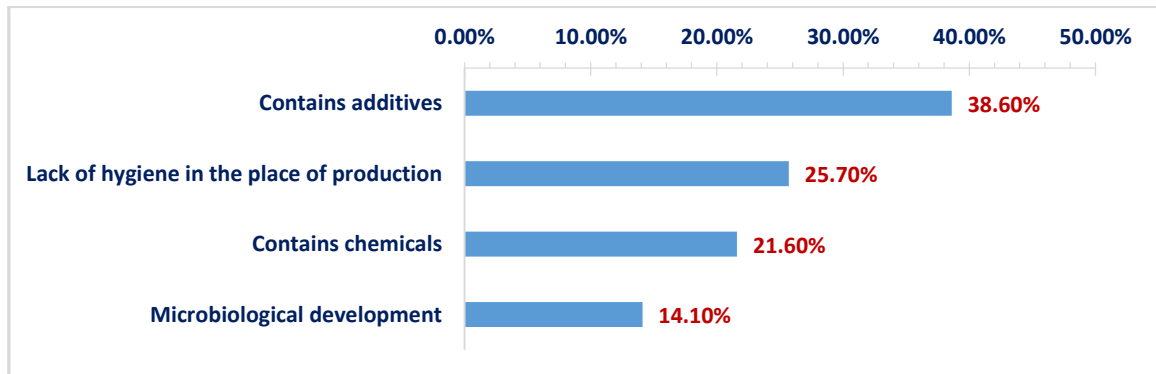


Figure 5. Reasons why the dairy production chain is not safe

Consumers were asked about their considerations regarding milk and dairy products producing manufacturers, which sold in markets sufficiently controlled by supervisory institutes. 49.6% of consumers stated that enough controls and supervision are applied in producing milk and dairy products, and on the other side, 50.4% of individuals admitted there is no appropriate supervision from dairy production companies. Furtherly, consumers were asked about the reason for this opinion in terms of dairy production companies; 27.4% of consumers thought that the penalties were not a deterrent, while 22.6% of consumers thought there were deficiencies in the legislation for supervision. Besides, 19.1% of consumers thought that those working in supervisory institutions abused this issue, 16.6% thought that the authorities of those working in supervisory institutions were limited. 14.3% of consumers thought the laboratory facilities were limited for controls.

Food safety is everyone’s business and responsibility. Food safety is not the only duty of government or food producers (WHO, 2019). Food businesses are responsible for complying with food safety legislation, regulations, and standards. Who is the most responsible one in the matter of food safety, as a result of consumer rates, among the first three, the business owners or production employees have a 31%, the Ministry of Agriculture and Forestry has almost 28%, and municipalities with approximately 19% come (Figure 6).

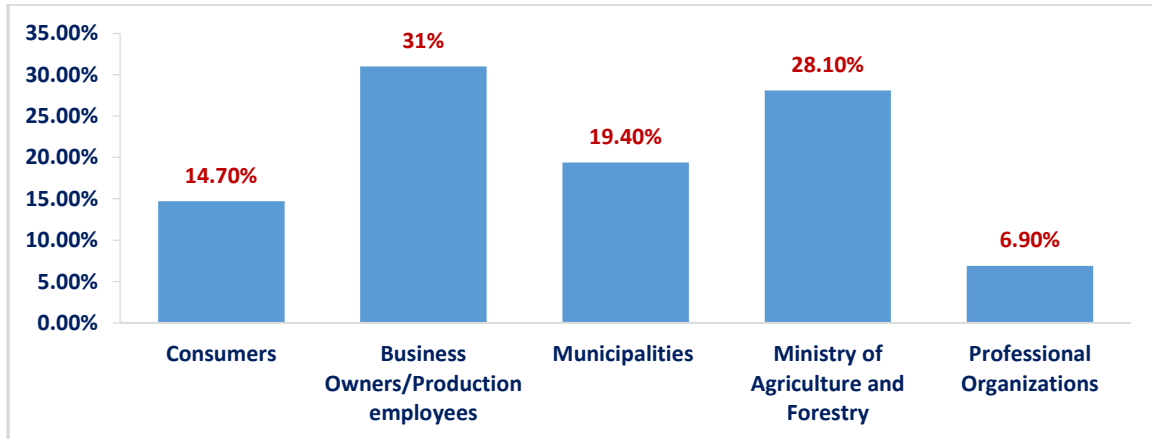


Figure 6. Responsible for food safety of foodstuffs

When shopping for food, consumers were asked which products were important in terms of food safety. According to the data given in Table 7, milk and dairy products took first place with a rate of 32.9%, meat and meat products ranked second with a rate of 22.6%, and bakery products were in third grade with 12.5%. In a similar study regarding the collected data, meat and meat products rated 92.1%, while milk and dairy products ranked 79.1% (Can, 2020).

Table 4.7. Importance of food safety while purchasing foodstuffs

| In which products is food safety important to you when shopping for food? | N | % |
|---|-----|------|
| Meat and meat products | 125 | 22.6 |
| Milk and dairy products | 182 | 32.9 |
| Dried Legumes | 53 | 9.6 |
| Bakery products | 69 | 12.5 |
| Dried Fruits and Vegetables | 45 | 8.1 |
| Spices | 33 | 6.0 |
| Hot and cold Drinks | 47 | 8.5 |

CONCLUSION

Within the scope of this study, the consumers in Niğde province’s purchasing tendencies of milk and dairy products and their perceptions of food safety of these products were examined. As a result, it was determined that cow's milk and products ranked first in the preference of consumers for milk and dairy products in the province of Niğde, while the healthiness of the product was the first reason for the consumers' purchasing preference. It was concluded that consumers consider the healthiness of the product as main factor affecting the choice of purchasing place for milk and dairy products, which were the sale places hygiene conditions, having a good relationship between quality and price, and having a quality warranty as main criterion.

An important finding of this study is that the almost half of consumers purchased sheep and goat milk and dairy products directly from farmers or at open-air markets. This means that the consumers are vulnerable in consuming of unsafe dairy products. Therefore, it is important to educate and convince people who are used to open-air markets or purchasing dairy products directly from farmers to switch to shopping in markets or supermarkets, where they can get dairy products that are safer.

The vast majority of consumers stated that they know the concept of food safety with a rate of 82%, and that they know the Ministry of Agriculture and Forestry and the Ministry of Health the most among the food safety supervisory organizations. Consumers stated that they know the TSE (Turkish Standards Institution) standards and Organic or Ecological Product Certificate the most among the food safety assurance systems. It was determined that consumers consider food safety the most when purchasing milk and dairy products and meat and meat products.

The rate of consumers in Niğde province looking for the HACCP certification when purchasing milk and dairy products was found to be 11%. This situation shows that consumers in the province do not pay much attention to the HACCP certification criteria for purchasing dairy products. The government is in a regulatory and supervisory position with the power of law for people's access to safe food within the scope of food security. In this respect, the most important duty of the state is to implement the legal regulations that will ensure food safety and to supervise the applicability of these activities through supervisory institutions.

The government is also responsible for raising public awareness about food safety. It should also ensure that people prioritize food safety in food shopping. In this regard, activities such as organizing seminars, preparing brochures, providing food safety training in schools, as well as preparing advertisements such as public service ads can be implemented.

However, as food safety is the responsibility of the government and food producers, it is also the responsibility of consumers and households. Therefore, everyone is responsible in terms of food safety for reducing food borne diseases and food poisoning. However, it has been observed that consumers' priorities regarding food safety are not sufficient. This situation shows that consumers should be more informed about food safety through activities such as seminars, congresses, and workshops.

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