IZMIR DEMOCRACY UNIVERSITY HEALTH SCIENCES JOURNAL
IDUHES
e-ISSN:2651-4575

IDUHeS, 2023; 6(1): 82-102

doi: 10.52538/iduhes.1215432

Araştırma Makalesi– Research Paper

EVALUATION OF CONSUMERS' PERCEPTIONS AND PURCHASE DECISIONS REGARDING PLANT-BASED MILK ALTERNATIVES IN TURKEY

TÜKETİCİLERİN BİTKİSEL BAZLI SÜT ÜRÜNLERİNE İLİŞKİN ALGI VE SATIN ALMA KARARLARININ DEĞERLENDİRİLMESİ

Nihan CAKIR BICER[1*], Dilsat BAS[2], Selda SECKINER[3], Meryem KAHRIMAN[4], Murat BAS[5]

Özet

Globalleşen dünyada bitkisel bazlı süt ürünleri, gıda endüstrisinde önemli bir yer edinmiş ve tüketicilerden büyük ilgi görmüştür. Bu araştırma, yetişkinlerin bitkisel bazlı süt ürünlerini tercih etmelerindeki temel nedenleri ve bu ürünlere yönelik satın alma davranışlarını etkileyen itici faktörleri belirlemek amacıyla yapılmıştır. Bu amaçla 895 katılımcının sosyodemografik özellikleri ve genel beslenme alışkanlıkları, son bir yılda bitkisel bazlı süt ürünlerini tüketme durumları, bu ürünleri tükettiğini bildirenlerin satın alma kararları ve bu ürünleri almaya iten faktörler değerlendirilmiştir. Araştırmaya 796 kadın (%88,9), 99 erkek (%11,1) katılmıştır. Katılımcıların yaş ortalaması 31,17±9,62 yıldır. Katılımcıların çoğu (kadınların %36,4'ü ve erkeklerin %72,7'si) bitkisel bazlı süt ürünlerini hiç tüketmediklerini bildirmiştir. En sık tüketilen bitkisel bazlı süt ürünleri; badem sütü (%80,9), hindistancevizi sütü (%60,2) ve soya sütü (%51,2)'dür. Tüketiciler, en sık "yağ içeriğinin daha iyi olması" nedeniyle bitkisel bazlı süt ürünlerini tercih ettiklerini, tercihlerinde en çok diyetisyenlerin etkili olduğunu ($\bar{x}$=3,35±1,27), bu ürünleri en sık süpermarketten ve çevrimiçi olarak satın aldıklarını belirtmişlerdir. Bitkisel bazlı süt ürünlerinin sağlığa yararlı olduğunu düşünme (OR=1,978; 95% CI= 1,463-2.674; p<0,001) ve düzenli egzersiz yapma (OR=1,337; %95 CI=1,113-1.607; p=0,002), bu ürünleri düzenli olarak tüketme olasılığını artırmaktadır. Tüketicilerin bitkisel bazlı süt ürünlerini tercih etme durumunun, tüketicinin sağlıklı gıda algısından, pazarlama stratejilerinden ve tüketici beklentilerinden etkilendiği tespit edilmiştir.

Anahtar Kelimeler: Tüketici algısı, Satın alma kararı, Bitkisel bazlı süt ürünleri, Bitkisel bazlı içecekler

Abstract

In the global world, plant-based milk alternatives have taken an important place in the food industry and have attracted great interest from consumers. This study was conducted to determine the main reasons why individuals prefer plant-based milk alternatives and the driving factors affecting their purchasing behavior towards plant-based milk alternatives. For this purpose, the sociodemographic characteristics, and general nutritional habits of 895 participants were questioned. In addition, the status of consuming plant-based milk alternatives of the participants in the last year was questioned and the purchasing decisions of the participants who reported that they consume these products and the factors that drive them to buy these products were evaluated. 796 women (88.9%) and 99 men (11.1%) participated in the study. The mean age of the participants is 31.17±9.62. Most of the participants (36.4% of women and 72.7% of men) reported that they never consumed plant-based milk alternatives. The most consumed plant-based milk alternatives were determined as almond milk (80.9%), coconut milk (60.2%), and soy milk (51.2%). The most frequent reason why consumers choose plant-based milk alternatives is determined as "Non-dairy milk contains good fat". The participants reported that dieticians have the most influence on their choices ($\bar{x}$=3.35±1.27) and these products were mostly purchased from supermarkets and online channels. In addition, considering that drinking plant-based milk is beneficial for health (OR=1.978, 95% CI= 1.463-2.674, p<0.001) and exercising regularly (OR=1.337, %95 CI=1.113-1.607, p=0.002) increases the odds of being a regular consumer. In conclusion, it is determined that consumer acceptance of plant-based milk alternatives is affected by the consumer's perception of healthy food, marketing strategies, and consumer expectations.

Geliş Tarihi (Received Date): 07.12.2022, Kabul Tarihi (Accepted Date): 25.04.2023, Basım Tarihi (Published Date): 26.05.2023, [1] Acıbadem Mehmet Ali Aydınlar University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Istanbul, Turkey. [2] Istanbul Galata University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Istanbul, Turkey. [3] Ege University, Health Application and Research Center, Department of Internal Medicine, Izmir, Turkey. [4] Acıbadem Mehmet Ali Aydınlar University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Istanbul, Turkey. [5] Acıbadem Mehmet Ali Aydınlar University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Istanbul, Turkey. **E-mail:** nihancakir@gmail.com, **ORCID ID's:** N.C.B.; http://orcid.org/0000-0002-7581-9083, D.B.; http://orcid.org/0000-0002-2991-7774, S.S.; https://orcid.org/0000-0002-5899-4998, M.K.; https://orcid.org/0000-0002-6908-7381, M.B.;.http://orcid.org/0000-0002-0494-301X.

1. INTRODUCTION

New forms of production and consumption have become possible because of commercial advancements, globalization, and factors including acclimatization to city life (Johns and Sthapit, 2004, p. 145). While conscious people continue to engage in activities that are good for their health, they also expect the foods they consume to be healthy and functional. The desire to meet the changing consumer demands brings new trends to the food industry and functional products gain importance due to their features. Consumers' food preferences and purchase habits are influenced by recent nutritional and consumer trends. Consumers' growing awareness of health and healthy foods force companies to develop new beneficial products known as "functional foods" (Vicentini et al, 2016, p. 340-341). Because of the presence of health-promoting components such as dietary fibers, minerals, vitamins, and antioxidants, plant sources (grains and legumes) have accepted as functional foods and nutraceuticals in recent years. These foods offer additional benefits to customers as they are known for their capacity to reduce the risk of nutrition-related disorders and improve consumers' health. Due to its advantages for the consumer, plant-based milk replacements might be seen as one of those functional foods (Das et al, 2012, p. 665-666).

The global dairy alternatives market was valued at 20.50 billion USD in 2020 and it is expected to grow at a compound annual growth rate (CAGR) of 12.5% from 2021 to 2028. Due to changes in consumer eating habits and diet trends, the industry is expanding and experiencing increasing demands. The rising number of milk allergies and lactose intolerance cases among years is expected to increase the demand for dairy alternatives (Grand View Research, 2022). Recently, commercially available plant-based milk alternatives have also been made from several foods, including legumes, seeds, nuts, cereals, and pseudo-cereals (Mäkinen et al, 2016, p. 339-349). During the forecast period, the Asia Pacific dairy alternative market is expected to grow at a CAGR of 12.7% (Mordor Intelligence, 2022). Plant-based milk alternatives are moving out of their niche market in Europe. Since an estimated 15% of Europeans no longer consume dairy, the market share for plant-based milk in Europe is only 4%, which is still a small amount (Mäkinen et al, 2016, p. 339-349). However, sales have more than doubled in the past ten years, especially for non-soy beverages, which went from 17% to 40% share in the category of plant-based milk alternatives (Haas et al, 2019, p. 3). This shift to plant-based dairy products has led to a serious regression in the traditional roles and stability of the dairy industry, especially in dairy-producing Western countries (Park, 2021, p.8). Although there is not any market information about the consumption frequency of plant-based milk alternatives in Türkiye , the diversity, and advertisements of these products on different platforms have increased remarkably in recent years.

People who prefer plant-based milk alternatives compare non-dairy milk with animal milk in terms of flavor, texture, and other sensory qualities, as well as nutritional value and health benefits (Bridges, 2018, p. 20-27). Plant-based milk alternatives are rich in health-

promoting beneficial compounds, and they have been recognized as functional foods and food extracts with health benefits in the treatment or prevention of disease (Das et al, 2012, p. 666-668) and also, can have several harmful impacts on health, such as a lack of protein, low bioavailability of vitamins and minerals, and oral health issues when additional sugar is present (Dubey and Patel, 2018, p. 59-69; Aydar et al, 2020, p. 2).

Lactose is a type of sugar found in milk and dairy products. Lactose intolerance is a widespread medical condition that affects many people globally. The prevalence of lactose intolerance in Türkiye has been reported to be 70-80% (Yılmaz Köse and Ölmez, 2016, p. 245-252). Individuals with lactose intolerance experience symptoms such as cramps, bloating, flatulence, and diarrhea after consumption due to lack of lactase enzyme (National Health Services, 2022). Recently, lactose-free products are available in most markets as well as plant-based milk alternatives. Additionally, some people have an allergy to the protein in cow's milk. Symptoms can include urticaria and edema on the skin, respiratory issues, anaphylaxis, and gastrointestinal issues such as vomiting, diarrhea, and bloody stools (Vandenplas et al., 2007, p. 902-908). Regarding this issue, it is reported that plant-based milk consumers find these products better digestible and allergy-free (Haas et al., 2019, p. 1) Therefore, the use of these products is encountered in these pathologies.

Due to numerous dietary options such as vegetarianism and diets low in cholesterol, fat, and energy, customers around the world accept plant-based milk substitutes and foods (Aydar et al, 2020, p. 1-7). The popularization of vegan nutrition as a healthier diet, research on the adverse effects of polluting factors caused by animal farming, and increased awareness of ethics and rights have increased the orientation of plant-based products (Sexton et al., 2022, p. 606-608). As well as environmental impact, it is reported that parental attitude has a dual effect in this market by influencing to the preferences of children (Boaitey and Minegishi, 2020, p.639-653). It is also emphasized that there is a trend towards plant-based proteins due to health impact, weight control and social aspects (Vainio et al., 2016, p. 92-100). It is important to investigate all these factors, which are considered from the socioeconomic, environmental, health and individual perspectives, as they shape the market of plant-based milk alternatives.

In Türkiye , there is a lack of data about purchasing behavior and motivation that influences the consumption of plant-based milk alternatives. This study aimed to identify the primary justifications for selecting plant-based milk substitutes as well as the driving forces influencing consumers' decisions to buy these products.

2. MATERIAL AND METHODS

2.1.Participants

In this cross-sectional study, 895 individuals aged 18-75 [mean±standard deviation (SD)=31.17±9.62 years] participated voluntarily. The study was carried out between May and July 2022 and applied via questionnaire through an online environment. The survey was shared on a digital platform (Instagram) followed by over 15.000 consumers on social media. Ethical

approval for this study was obtained from Acıbadem Mehmet Ali Aydınlar University and Acıbadem Healthcare Institutions Medical Research Ethics Committee with project number 2022/07 on 22.04.2022. The study was carried out with the informed consent of the participants and in accordance with the Principles of the Declaration of Helsinki.

2.2. The Data Collection Form

The data collection form consists of three sections. In the first section, all participants were asked about their demographic characteristics (age, sex, educational status, occupation, marital status, income), anthropometric measurements (weight, height), presence of lactose intolerance, and complaints after cow's milk consumption. The body mass index (BMI) was calculated by dividing the body weight (kg) by the square of body height (m^2) and it was classified according to the World Health Organization (World Health Organization, 2010). In addition, the participants' lifestyle profiles were questioned with the 12 items (such as “I exercise regularly”, “I like to have a beverage as a snack during the day”, “I like to try new things”, and “I choose low-calorie beverages” etc.). A five-point Likert-type scale was used for these questions and included options ranging from "1-strongly disagree" to "5-strongly agree" and the Cronbach alpha value was found to be 0.788.

In the second section, the participants were asked about their consumption of plant-based milk alternatives in the last year. While the data collection form of the participants who answered "never" to this question (non-consumer, n=363) was terminated, the participants who had consumed plant-based milk alternatives in the last year were directed to the third section of the questionnaire. Participants consuming plant-based milk alternatives were divided into two groups: consumed 1-3 times a week or more frequently as "regular consumers" (n=196) and 2-3 times a month and less frequently as "irregular consumers” (n=336).

In the third section of the questionnaire, there were questions about the plant-based milk alternatives consumption of the “regular consumer” group and the “irregular consumer” group (n=532). The participants were asked about their previous consumption of 9 plant-based milk alternatives (such as almond milk, soya milk, etc.), which are prominent in the digital platforms examined by the authors during the design of the study, and which are estimated to be more widely known by consumers.

The consumers' reasons for preferring plant-based milk alternatives were evaluated in 9 statements (such as “Drinking plant-based milk alternative is beneficial for health”, “I don’t like to drink cow milk”, “Plant-based milk alternatives contains a low amount of fat.” etc.). A five-point Likert scale was utilized for these items and included options ranging from “1-strongly disagree” to “5-strongly agree” and the Cronbach alpha value was found to be 0.785. In addition, the people who influenced the consumers' purchasing decision of plant-based milk alternatives (such as family, friends and colleagues, food bloggers, etc.) were also questioned and a five-point Likert scale was utilized for these items and include options ranging from “1-not influenced at all” to “5-extremely influential” and the Cronbach alpha value was found to be 0.822. Moreover, product-related factors that affect consumers' decision to purchase plant-

based milk alternatives were also evaluated. Statements to complement the item "Generally, I buy non-dairy milk that..." were asked to evaluate the features that affect the purchasing decisions of the participants. A five-point Likert scale including options ranging from "1-strongly disagree" to "5-strongly agree" was utilized for these items and the Cronbach alpha value was found to be 0.729. Additionally, it was asked how important factors such as the brand, taste, price, and health benefits of the product are in the consumers' decision to buy plant-based milk. A five-point Likert scale including options ranging from "1–not important at all" to "5-very important" was utilized and the Cronbach alpha value was found to be 0.815. Finally, consumers were asked from which sources (television, blogger, social media, billboards, etc.) they got information about plant-based milk alternatives and where they bought plant-based milk alternatives.

2.3.Statistical Analysis

SPSS software version 21 was used for statistical analysis. The distribution of the variables was evaluated with the Kolmogorov-Smirnov/Shapiro-Wilk's test. Mean and SD in descriptive analyses, number (n) and, ratio (%) in categorical variables were used. The comparison of the non-normally distributed variables was performed with the Mann-Whitney U test, and the Chi-square test was used for the comparison of the distributions.

Multiple logistic regression analysis was performed with independent variables assumed to be associated with two-category dependent variables (use class). First, the independent variables (demographic characteristics, lactose intolerance, lifestyle profiles, consumers' reasons for the preference, influencers to purchasing decisions, and product-related factors) that were thought to be related within themselves were analyzed with separate models. In these analyzes, a new model was tested with independent variables (24 items/variables) with a p value below 0.20 and demographic characteristics (sex, age, education, BMI, income, lactose intolerance, and gas complaint from milk consumption). The backward LR method is preferred in this model. In the backward stepwise model, after the variable with the lowest contribution to the model established with all independent variables (with the highest p value greater than 0.10) is removed from the model, the model is retested with the remaining independent variables, and this process is carried out by removing individual variables until there is no p value higher than 0.10 in the model. The model obtained in the last step is reported and the Odds Ratio (OR) statistic is interpreted. A p value of less than 0.05 was considered statistically significant.

3. RESULTS

The demographic characteristics of participants are provided in Table 1. The total number of participants was 895 and most of the population was female (n=796, 88.9%). The mean age of participants was 31.17±9.62 years. 66.8% of the participants had bachelor's degrees and 24.2% of them had master's and doctorate degrees. 58.9% of the participants have

a personal income less than expenses 16.6% of them have equal to expenses, and 24.5% of them have more than expenses. Also, most of the participants were single (63.2%).

Table 1. Demographic characteristics of participants

Demographic variables (n=895)	**Mean**	**SD**
Age (year)	31.17	9.62
	n	**(%)**
Sex		
Female	796	88.9
Male	99	11.1
Education		
High school	80	9.0
Bachelor's degree	598	66.8
Master's and Doctorate	217	24.2
Personal income (monthly)		
Less than expenses	527	58.9
Equal to expenses	149	16.6
More than expenses	219	24.5
Marital status		
Single	566	63.2
Married	329	36.8
Lactose intolerance		
Yes	166	18.5
No	473	52.8
Not sure	256	28.6
Gas complaints after milk consumption		
Yes	556	62.1
No	339	37.9

12.1% of female participants reported that they consumed plant-based milk alternatives 2-3 times a month, 11.4% that 1-3 times a week, 6.9% that 4-6 times a week, and 5.0% that every day. 40.5% of the all participants stated that they had never consumed plant-based milk alternatives in the last year (36.6% for female and 72.7% for male) (Table 2). 81.2%, 60.2%, and 51.3% of the consumers who have consumed plant-based milk alternatives in the past year (n=532) stated that they had previously preferred almond milk, coconut milk, and soy milk, respectively. This was followed by oat milk (40.8%) and hazelnut milk (31.4%) while the other types of plant-based milk alternatives were consumed less by consumers (Table 2).

Table 2. Distribution of consumption frequency and types of plant-based milk alternatives

Consumption frequency	Female (n=796)		Male (n=99)		Total (n=895)		p
	n	%	n	%	n	%	
Never	291	36.6	72	72.7	363	40.5	0.000*
Everyday	40	5.0	1	1.0	41	4.6	
4-6 times/week	55	6.9	2	2.0	57	6.4	
1-3 times/week	91	11.4	7	7.1	98	11.0	
2-3 times/month	96	12.1	7	7.1	103	11.5	
Once a month or less	223	28.0	10	7.1	233	26.0	
Plant-based alternatives (n=532)**							
Almond milk	413	81.8	19	70.4	432	81.2	0.648
Coconut milk	302	59.8	18	66.7	320	60.2	0.247
Soy milk	258	51.1	15	55.6	273	51.3	0.524
Oat milk	204	40.4	13	48.1	217	40.8	0.263
Hazelnut milk	155	30.7	12	44.4	167	31.4	0.220
Rice milk	31	6.1	6	22.2	37	7.0	0.001
Walnut milk	16	3.2	3	11.1	19	3.5	0.437
Other***	22	4.4	2	7.4	24	4.5	0.795

** Pearson Chi-square, p<0.05*
*** Multiple responses*
****Other: Pistachio milk, corn milk, tahini milk, cashew milk, hemp milk, melon seed milk*

Table 3 indicated the participants' lifestyle profiles. The variables were measured by a five-point scale ("1-strongly disagree" to "5-strongly agree"). The mean score of "I like to have healthy/clean food" was the highest lifestyle item with a mean score of 4.31±0.76 for regular consumers and 4.06±1.08 for non-consumer ($p<0.05$). Followed by this item; "I like to try new things.", "I like to use the internet to access health information.", "I like to have a beverage as a snack during the day." and "I like to spend time in the supermarket." with the mean scores of 4.25±0.93, 3.96±1.06, 3.84±1.11, and 3.82±1.22, respectively for consumers and 3.69±1.16, 3.64±1.29, 3.81±1.14, and 3.33±1.33 for non-consumers. For all items about lifestyle profiles, total mean scores were 3.63±0.59 for consumers and 3.37±0.69 for non-consumers ($p<0.05$). There was no significant difference between the total mean score of female and male participants (unshown data) ($p>0.05$).

Table 3. Lifestyle profiles of the regular consumers and non-consumers

Item scores about lifestyle profiles	Consumer (n=532)		Non-consumer (n=363)			Total (n=895)	
	Mean	SD	Mean	SD	p	Mean	SD
I like to have healthy/clean food.	4.31	0.76	4.06	1.08	0.014*	4.21	0.91
I like to try new things.	4.25	0.93	3.69	1.16	0.000*	4.02	1.06
I like to use the internet to access health information.	3.96	1.06	3.64	1.29	0.001*	3.83	1.17
I like to have a beverage as a snack during the day.	3.84	1.11	3.81	1.14	0.782	3.83	1.12
I like to spend time in the supermarket.	3.82	1.22	3.33	1.33	0.000*	3.62	1.29
I like to eat or drink sweet things.	3.78	1.10	3.70	1.16	0.435	3.75	1.13
I like to have healthy food or a beverage before exercising.	3.78	1.17	3.44	1.17	0.000*	3.64	1.18
I follow the trend.	3.36	1.23	2.89	1.20	0.000*	3.17	1.24
I choose low-calorie beverages.	3.36	1.27	3.14	1.30	0.012*	3.27	1.29
I exercise regularly.	3.18	1.23	2.98	1.23	0.014*	3.10	1.24
I like to do outdoor activities.	2.97	1.21	2.85	1.14	0.143	2.92	1.18
I check calories.	2.88	1.26	2.83	1.22	0.531	2.86	1.24
Total score	3.63	0.59	3.37	0.69	0.000*	3.52	0.65

* *Mann Whitney U test, $p<0.05$*

Table 4 indicated the consumers' reasons and influencers to for preferring plant-based milk alternatives. For consumers (n=532) "Non-dairy milk contains good fat." is the item with the highest score among the reasons for preference with a mean of 4.02±0.84. Items of "Drinking plant-based milk alternatives is beneficial for health.", "Plant-based milk alternatives taste good." and "Plant-based milk alternatives are trendy." followed this by the mean scores of 3.81±0.92, 3.72±1.11, and 3.52±1.26, respectively. Participants agreed with the statement in most items. According to the results, participants agreed that plant-based milk alternatives contain good fats the most and a total of 272 participants (51.1%) agreed and 153 participants (28.8%) strongly agreed with this statement. A large proportion of participants also think that plant-based milk alternatives are beneficial for their health (n=225, 42.3% agree and n=129, 24.2% strongly agree).

The participants were asked about the people who influenced purchasing decisions on plant-based milk alternatives by using a five-point Likert scale. The most influencer for consumers was dietitians (24.6% extremely influenced) followed by doctors (16.7% very influenced), health-related authors (16.7% very influenced) (Table 4).

Table 4. Distribution of consumers' reasons and influencers to for preference for plant-based milk alternatives

Reasons for preference (n=532)	Strongly disagree		Disagree		Undecided		Agree		Strongly agree		Item scores	
	n	%	n	%	n	%	n	%	n	%	Mean	SD
Plant-based milk alternatives contains good fat.	7	1.3	18	3.4	82	15.4	272	51.1	153	28.8	4.02	0.84
Plant-based milk alternatives is beneficial for health.	8	1.5	33	6.2	137	25.8	225	42.3	129	24.2	3.81	0.92
Plant-based milk alternatives taste good.	29	5.5	46	8.6	113	21.2	199	37.4	145	27.3	3.72	1.11
Plant-based milk alternatives are trendy.	49	9.2	75	14.1	90	16.9	182	34.2	136	25.6	3.52	1.26
Plant-based milk alternatives contains a low amount of fat.	27	5.1	95	17.9	144	27.1	194	36.4	72	13.5	3.35	1.08
I don't like to drink cow's milk.	84	15.8	138	25.9	49	9.2	87	16.4	174	32.7	3.24	1.51
Plant-based milk contains high calcium.	42	7.9	75	14.1	218	41.0	133	25.0	64	12.0	3.18	1.07
Plant-based milk contains high protein.	42	7.9	116	21.8	162	30.5	153	28.8	59	11.0	3.12	1.12
Plant-based milk helps reduce weight.	65	12.2	143	26.9	191	35.9	97	18.2	36	6.8	2.80	1.08
Influencer (n=532)	**Not at all**		**Slightly**		**Moderately**		**Very**		**Extremely**			
Dietitians	59	11.1	62	11.7	174	32.7	106	19.9	131	24.6	3.35	1.27
Doctors	105	19.7	91	17.1	185	34.8	89	16.7	62	11.7	2.83	1.25
Health-related authors	113	21.2	121	22.7	161	30.3	89	16.7	48	9.0	2.69	1.23
Food bloggers	201	37.8	138	25.9	133	25.0	44	8.3	16	3.0	2.12	1.10
Sports trainer	243	45.7	109	20.5	125	23.5	38	7.1	17	3.2	2.01	1.12
Friends and colleagues	259	48.7	143	26.9	97	18.2	27	5.1	6	1.1	1.83	0.97
Family	294	55.3	104	19.5	93	17.5	24	4.5	17	3.2	1.81	1.07
Social media phenomena	385	72.4	85	16.0	42	7.9	14	2.6	6	1.1	1.44	0.83
Celebrities	419	78.8	65	12.2	34	6.4	9	1.7	5	0.9	1.33	0.75

Table 5 shows product-related factors that affect consumers' decision to purchase plant-based milk alternatives. The most prominent factors for consumers were being able to taste before purchase ($\bar{x}$=4.13±0.94) followed by being unsweetened ($\bar{x}$=3.96±1.16), promotion ($\bar{x}$=3.82±1.25), high protein content ($\bar{x}$=3.45±1.19), same branded ($\bar{x}$=3.44±1.11) and low price ($\bar{x}$=3.38±1.35). In addition, the most important product-related factors for consumers were freshness ($\bar{x}$=3.95±0.91) followed by flavor ($\bar{x}$=3.91±0.91), price ($\bar{x}$=3.78±1.04), nutrient content ($\bar{x}$=3.75±0.96) and plant which is made from ($\bar{x}$=3.73±0.99).

Participants buy plant-based dairy alternatives most frequently from supermarkets (the sum of the "often" and "always" options are 47.6% of the participants) and online channels (the sum of the "often" and "always" options are 25.7% of the participants). Also, information sources about plant-based dairy products were asked. 75.9% of the participants use social media, 49.1% use websites, and 26.4% use sales points as sources of information about plant-based dairy products (unshown data).

Table 5. Product-related factors that affect consumers' purchasing decision

"Generally, I buy plant-based milk alternatives that …" (n=532)	**Item scores**		**"… influences my purchase decision." (n=532)**	**Item scores**	
	Mean	**SD**		**Mean**	**SD**
I can taste before purchase	4.13	0.94	Freshness	3.95	0.91
is unsweetened	3.96	1.16	Flavor	3.91	0.91
is promotion	3.82	1.25	Health benefit	3.82	1.03
has high protein	3.45	1.19	Price	3.78	1.04
is the same brand	3.44	1.11	Nutrient content	3.75	0.96
is low price	3.38	1.35	The plant which is made from	3.73	0.99
has high calcium	3.23	1.22	Comments I read about the product	3.35	1.15
has a low amount of fat	3.10	1.20	Brand	3.11	1.01
is pasteurized	3.10	1.17	Promotion	2.90	1.33
has low calories	2.98	1.22	Sales channel (such as an online, market)	2.70	1.26
is interesting packaging	2.09	1.13	Package	2.48	1.13
is flavored (e.g., chocolate, strawberry, green tea, etc.)	2.07	1.18	Being fashionable	1.36	0.74

The final model obtained as a stepwise multiple logistic regression analysis is presented in Table 6. The odds (probability) of being a regular consumer for each categorical level increase in those who exercise regularly by 1.337 times (33.7%) times compared to the odds (probability) of irregular consumer. Similarly, considering drinking plant-based milk beneficial for health (OR=1.978, 95% CI= 1.463-2.674, p<0.001), thinking that plant-based milk alternatives contain a low amount of fat (OR=1.251, 95% CI=1.010-1.549, p=0.041), thinking that plant-based milk alternatives taste good (OR=1.488, %95 CI=1.157-1.914, p=0.002), giving importance to the opinions of sports trainers (OR=1.237, 95% CI=1.012-1.513, p0.038) and the behavior of buying the same brand (OR=1.414, 95% CI=1.148-1.740, p=0.001) increase the odds of being a regular consumer compared to the probability of being an irregular consumer.

Table 6. Logistic regression analysis of the regular and irregular consumers' purchasing criteria

	B	S.E.	Wald	df	p	OR	95% C.I. for OR Lower	Upper
Education	0.356	0.197	3.268	1	0.071	1.427	0.970	2.099
I exercise regularly.	**0.291**	**0.094**	**9.590**	**1**	**0.002**	**1.337**	**1.113**	**1.607**
I like to have healthy food or a beverage before exercising.	-0.374	0.162	5.346	1	0.021	0.688	0.501	0.945
I like to try new things.	0.260	0.134	3.772	1	0.052	1.298	0.998	1.688
Drinking plant-based milk alternatives is beneficial for health.	**0.682**	**0.154**	**19.647**	**1**	**<0.001**	**1.978**	**1.463**	**2.674**
I don't like to drink cow milk.	0.146	0.078	3.457	1	0.063	1.157	0.992	1.349
Plant-based milk alternatives contain a low amount of fat.	**0.224**	**0.109**	**4.193**	**1**	**0.041**	**1.251**	**1.010**	**1.549**
Plant-based milk alternatives taste good.	**0.398**	**0.128**	**9.591**	**1**	**0.002**	**1.488**	**1.157**	**1.914**
Drinking plant-based milk alternatives are trendy.	-0.196	0.091	4.680	1	0.031	0.822	0.688	0.982
Sports trainer	**0.213**	**0.103**	**4.297**	**1**	**0.038**	**1.237**	**1.012**	**1.513**
Generally, I buy plant-based milk alternatives that is the same brand.	**0.346**	**0.106**	**10.661**	**1**	**0.001**	**1.414**	**1.148**	**1.740**
Generally, I buy plant-based milk alternatives that is pasteurized.	-0.359	0.102	12.370	1	<0.001	0.698	0.572	0.853
Generally, I buy plant-based milk alternatives that is low in price.	-0.234	0.094	6.168	1	0.013	0.791	0.658	0.952
The plant which is made influenced my purchase decision.	0.247	0.135	3.373	1	0.066	1.280	0.984	1.667
Health benefits influence my purchase decision.	-0.366	0.137	7.169	1	0.007	0.693	0.530	0.906
Promotion influences my purchase decision.	0.161	0.095	2.828	1	0.093	1.174	0.974	1.416
Comments I read about the product influence my purchase decision.	-0.271	0.106	6.515	1	0.011	0.763	0.619	0.939
Constant	-5.424	1.240	19.140	1	<0.001	0.004		

4. DISCUSSION

The production of plant-based milk alternatives from legumes and seeds is an ancient technology dating back to the 13th century. As technology has advanced, legumes (soybean), seeds (sunflower), nuts (almond, hazelnut), and cereals (oat, rice) have been used in the production of plant-based milk alternatives. Especially nuts such as almonds and hazelnuts are used in preparing plant-based milk alternatives due to their nutritional content rich in essential fatty acids, proteins, dietary fibers, phytosterols, polyphenols, vitamins, and minerals (Sethi et al, 2018, p. 3410-3418). Unlike animal milk, plant-based milk alternatives contain phytochemicals (phenolic acids, flavonoids, stilbenes, lignans, hydrolysable tannins, condensed tannins, proanthocyanidins, carotenoids, alkaloids, phytates, terpenes, phytoestrogens), dietary fiber, and have a low glycemic index (Chalupa-Krebzdak et al, 2018, p. 87-91; Sethi et al, 2018, p. 3410-3418). In recent years, consumers' demands for such different products have increased due to several reasons such as increased health awareness, desire to improve the quality and duration of life, and effort to reduce the costs for the prevention and treatment of diseases. In addition, food manufacturers have also turned to increase the variety of products with a personalized beneficial effect. These products, called "functional foods", are defined as food or food ingredients that provide additional benefits to physiology and metabolic functions beyond meeting the body's basic nutritional needs thus preventing diseases, and providing a healthier human life (Martins et al, 2016, p. 445-457).

Due to the health-promoting components, plant sources (grains and legumes) have been recognized as functional foods and nutraceuticals in recent years (Kaur and Das, 2011, p. 861-875). Additionally, plant-based milk alternatives are in use not only as a beverage but also as a product ingredient in many western nations (Sethi et al, 2016, p. 3410-3418). The Mintel research showed that sales of plant-based milk alternatives in the United States have increased by 61% since 2012 (Mintel Press Team, 2018a). Retail sales of plant-based milk alternatives in the United States increased by 9% to US$1.6 billion in the first half of 2018, more than doubling to reach US$21 billion globally between 2009 and 2015 (Cornucopia Institute, 2019, p. 2). The selection includes milk made from almonds, oats, coconut, peas, hemp, and other grains, seeds, nuts, and legumes in addition to traditional soy milk. Plant-based milk substitutes (ice cream, yogurt, cream, and cheese) have seen similarly rapid growth, with sales in the United States more than doubling in the last two years to $920 million in 2019 (Allen, 2019). Another research reported that the market size of global plant-based milk alternatives was $19.66 billion in 2020, with a 3.05% lower growth rate 2020 compared to the average annual growth in the 2017-2019 period due to the devastating impact of COVID-19. The market is anticipated to resume its prior dynamic growth in the post-pandemic period, growing at a CAGR of 13.30% from US$22.25 billion in 2021 to US$53.97 billion in 2028 (Fortune Business Insight, 2022). Plant-based milk alternatives commonly found in the market in Türkiye are soy, almond, oat, and coconut milk. As in the world, we estimate that consumption of plant-based milk alternatives in Türkiye has increased significantly in recent years. However, we could not find reliable data on the market figures for these products in Türkiye. To the best of our knowledge, this is the first study about the consumption frequency and preferences of plant-based milk alternatives in Türkiye. In our

study, 22.1% of the participants consumed plant-based dairy products 1-3 times a week or more often (regular consumers), 37.5% consumed 2-3 times a month or less frequently (irregular consumers), and 40.4% did not consume these products at all. Consumers of the plant-based milk alternatives preferred almond milk more frequently (81.2%), followed by 60.2% coconut milk, 51.3% soy milk, and 40.8% oat milk.

Verbeke (2005, p. 47-48) have reported that the most important acceptance criteria for functional foods are the socio-demographic characteristics of consumers such as gender, education, age, income, and openness to new products. A study of the use of functional foods found significant sociocultural differences between US and European consumers (Markovina et al, 2015, p. 26-32). Poulsen et al. (1999, p. 16) reported that relatively older participants (over 55) are more likely to purchase functional foods. According to Buyukkaragoz et al. (2014, p. 628-635), older consumers in Türkiye were 3.935 times more aware of functional foods than younger consumers ($p<0.05$). A prior study found that female customers are a more promising target market than male consumers (Maxim et al, 2019, p. 138-142), and our study also supported this result. In the current study, young adults consumed more plant-based milk alternatives than older consumers (unshown data). In terms of socio-demographics, consumers with a higher educational background and higher income purchased functional products more often (Verbeke, 2005, p. 47-49). In our study, most of the participants have a higher education background and there was a significant relationship between high education levels and consumption of plant-based milk alternatives. Furthermore, participants with higher incomes reported consuming more plant-based milk alternatives than participants with lower incomes in our study (unshown data). In another study, Wolf et al. (2020, p. 11210-11216) used k-means cluster analysis to identify three consumption clusters for US households. The largest cluster, comprising 61.6% of households, was consuming dairy milk regularly and drinking little or no plant-based beverages. The second cluster, flexitarian households which accounted for 15.6% of respondent households, were frequently consuming both dairy milk and plant-based beverages. Plant-based consumers, who made up 22.8% of all households, were consuming almost entirely plant-based beverages. According to their findings, flexitarian families were larger, more likely to have young children, more likely to have a vegetarian or vegan member, and more liberal than conventional dairy-consuming households when comparing demographic variations between clusters. Plant-based households shared many characteristics with flexitarian households. For almost all consumption purposes, the flexitarian and plant-based clusters were willing to substitute dairy milk for plant-based beverages (Wolf et al, 2020, p. 11210-11216).

Mintel's research reported that 90% of consumers of plant-based milk alternatives also buy cow's milk, and that one of the main factors in choosing these products is that they taste better (Mintel Press Team, 2018b). Taste is the most important characteristic of milk consumption in general. In other studies, consumers cited flavor as a significant factor in explaining why they prefer plant milk or food alternatives over dairy products (McCarthy et al, 2017, p. 6125-6138; Schyver and Smith, 2005, p. 292-299). In another study, Palacios et al.

(2009, p. 739-741) reported that cow's milk was evaluated significantly better than soy milk in terms of taste and other sensory properties. In our study, the participants who consumed plant-based milk alternatives reported that the most common reasons for consumption were "good fat", "beneficial for health", "taste good" and "trendy". Also, people who like to have healthy/clean food, try new things, and spend time in the supermarket consumed plant-based milk alternatives. The flavor, freshness, price of the product, and the plant made from had affected the consumers' purchasing decisions. In addition, consumers reported that nutrient content also affects their decision. Although plant-based milk alternatives are functional foods, the protein (essential amino acid), vitamin and mineral (calcium, iodine, iron) content, and bioavailability of some nutritional components are lower than in dairy milk (Chalupa-Krebzdak et al, 2018, p. 87-91; Sethi et al, 2018, p. 3408-3423; Singhal et al, 2017, p. 799-800). According to studies, consumers were generally aware of the fact that animal milk is a source of calcium and its benefits, especially on skeletal health, but they also considered plant-based milk an important source of calcium (Chapman et al, 1995, p. 336-337; McCarthy et al, 2017, p. 6126-6137; Kopf-Bolanz and Sousa, 2017, p. 2-4).

McCarthy et al. (2017, p. 6126-6127) used a selection-based composite analysis in a study of cow's and plant-based milk consumers to rank the importance of certain product characteristics for cow's milk and plant-based milk alternatives. The fat content (1–2% fat), package size, and label statements for cow's milk were determined to be the most crucial factors. The amount of sugar (naturally sweetened), the type of plant source (almonds), and the size of the package are the three major characteristics of plant-based milk alternatives. Achieving a healthy lifestyle and a balanced diet were important values and the protein and calcium content of products was mentioned as significant by both groups (McCarthy et al., 2017, p. 6126-6137). In our study, consumers stated that being able to taste before purchasing, being unsweetened, being promotional, and having high protein are the features that most affect their purchasing decisions.

Beverages are no longer just thirst quenchers in today's world. Consumers request special functions in beverages due to current health trends. These changes lead to the development of new products in the beverage industry. The functionality of these drinks can be tailored to specific needs and lifestyles, such as boosting energy, delaying aging, combating fatigue and stress, and preventing certain diseases. Cow's milk allergy, lactose intolerance, weight management, and hypercholesterolemia have arisen in a need for an alternative functional dairy product. The traditional understanding of milk has changed because of consumer attitudes toward cow's milk, increased awareness of lactose intolerance, and the widespread incidence of cow's milk allergy (Aydar et al, 2020, p. 2). The US National Library of Medicine (2020) found that a decline in lactose digestion has been observed in 65% of the world's population. In East Asia, lactose intolerance affects 70–100% of the population. Additionally, West African, Arab, Jewish, Greek, and Italian communities are affected by this intolerance. The prevalence of lactose intolerance in Türkiye has been reported to be 70-80% (Yılmaz Köse and Ölmez, 2016, p. 245-252). Individuals with lactose intolerance should avoid

lactose-containing products and substitute lactose-free or milk-free alternatives, such as plant-based milk alternatives (Yadav et al, 2017, p. 23-26). In our study, only 18.5% of the participants reported that they are lactose intolerant and 28.6% have no idea. Also, 78.9% of those with lactose intolerance (n=129) and 52.4% of those without lactose intolerance (n=246) purchased plant-based milk alternatives in the past year (unshown data). According to these findings, consumers' preferences for plant-based milk substitutes are not significantly influenced by their lactose intolerance.

Consumers have been relying more on computers and information technologies, particularly mobile platforms, and social media for information on nutrition and health (DiFilippo et al, 2015, p. 243-253). Adolescents and young adults are more inclined to use these platforms for health, as they spend most of their time using smartphones and social media (Chau et al, 2018, p. 77-91; Ajie and Chapman-Novakofski, 2014, p. 631-645). Most consumers who participated in our research and consumed plant-based milk alternatives stated that the uptrend of these products affects their consumption preferences. Social media influences the nutritional behaviors of adolescents and young adults and can also spread misinformation. People with poor health literacy are particularly affected by false health claims. In a study, it was determined that the level of insufficient literacy was between 22% and 33% (Berkman et al, 2010, p. 9-19). Additionally, according to research on European health literacy, eight countries' low health literacy levels ranged from 2% to 27% (Kickbusch et al, 2013, p. 15). In the study by Özdemir et al. (2010, p. 464-477), the literacy level of adults living in Türkiye was found to be 41% on the Rapid Estimate of Adult Literacy in Medicine (REALM) scale and 72% on the Newest Vital Sign (NVS) instrument. On the other hand, in Türkiye , not only health professionals but also people from different disciplines provide information about nutrition and food, and this accelerates the flow of wrong or unproven information. In recent years, the increasing claims in the media about animal milk being harmful to health in Türkiye create pressure on consumers. Health professionals with this perspective have created an "unhealthy" label against animal milk. Many consumers who follow health and nutrition trends have started to listen to these statements and their purchasing preferences regarding dairy products have changed (Sağlam and Gümüş, 2019, p. 153-162). On the other hand, most consumers who participated in our study and consumed plant-based milk alternatives stated that they preferred these products due to their being healthier choices. Consumers, who stated that the comments they read about the products affect their purchasing decision, consume more plant-based milk alternatives (OR=0.763, 95% CI, $p<0.05$). In addition, consumers reported that dietitians were the most influential person in their purchasing decisions, and regular consumers who stated that they were influenced by sports trainers consumed more plant-based milk alternatives than irregular consumers (OR=1.237, 95% CI, $p<0.05$).

Today, consumers' preferences also have turned to plant-based diets for various reasons such as avoiding animal cruelty, increasing environmental awareness, as well as the desire to live a healthy life (Vegetarian Society, 2022). Individuals – especially the younger generations (16 to 24 years old) – increasingly associate dairy farming with environmental damage (Mintel

Press Team, 2019). Recent research showed that dairy products have high water, soil, and greenhouse gas footprint compared to other foods (Poore and Nemecek, 2018, p. 987-992). Also, some studies reported that reducing animal protein consumption can reduce chronic disease incidence and impact the environment (Westhoek et al, 2014, p. 196-205; Clark et al, 2019, p. 23357-23358). Despite the emergence of various trends such as veganism, vegetarianism, lacto-vegetarianism, and ovo-vegetarianism, plant-based milk substitutes are not only consumed by vegans, vegetarians, or people with allergies and milk sensitivities (Vegetarian Society, 2022).

Studies investigate how consumers' perceptions and preferences for functional foods have changed to improve health (Urala, 2005, p. 23; Krystallis et al, 2008, p. 525-538; Siró et al, 2008, p. 457-458). A recent study evaluated the improvement in diet quality between 1990 and 2018 in 185 countries and reported no improvement in South Asia and Sub-Saharan Africa, while a moderate increase in all other regions (Miller et al, 2022, p. 695-696). Few countries around the world are on track to meet nutrition targets (Global Nutrition Report, 2022, p. 13-17). According to the data of the Türkiye Nutrition and Health Survey (Republic of Türkiye Ministry of Health, 2019, p. 5-7), the perception of healthy nutrition in society does not act. Turkish society has made a rapid transition toward western type nutrition, and this situation causes significant problems in meeting daily nutrients. However, according to the results we obtained from our study, the desire for healthy nutrition increases the tendency toward the consumption of plant-based milk alternatives. This study can be considered a first step for the interest in and structuring these products as a part of healthy nutrition. Understanding the consumers' reasons for preferring plant-based milk alternatives will guide future studies on this subject.

5. CONCLUSION

In a conclusion, consumer acceptance of plant-based milk alternatives is influenced by the consumer's perception of healthy food, marketing strategies, and consumer expectations. Therefore, there is a strong need to accurately communicate the advantages and disadvantages, as well as the health-promoting benefits of plant-based milk alternatives. Our study showed that socio-demographic characteristics such as age, monthly income, education level, and prices are important factors affecting consumers' decisions to purchase and/or consume plant-based milk alternatives. Income level is found to be the main determinant in purchasing these products. Plant-based milk alternatives cost around $3.42, compared to animal milk, which costs about $1.03 per liter in Türkiye today. Therefore, for many families, animal milk continues to be an important food group in terms of providing calcium and protein. In addition, it has been observed that there is a lack of information regarding these products or that the concept has been misinterpreted. Consumers evaluate plant-based milk alternatives as more nutritious and healthier compared to animal milk. From this perspective, it's critical to inform customers of

these products or their nutritional components' positive effects on health. Plant-based milk substitutes are without a doubt one of the most promising and rapidly expanding food industry segments, but they also require scientifically reliable evidence of the benefits they provide for human health. However, there are some limitations in this study. One of these limitations is that the study was conducted online. Therefore, all data are based on the statements of the participants. In addition, the study was not designed based on consumer behavior models. Consumer behavior models play an important role in explaining what consumers buy, why they buy, when they buy, and where they buy. For this reason, studies with larger samples based on consumer behavior models are needed.

6. REFERENCES

Ajie, W.N. & Chapman-Novakofski, K.M. Impact of computer-mediated, obesity-related nutrition education interventions for adolescents: a systematic review. *J Adolesc Health*. 2014;54(6):631-645.

Allen, M. (2019). *Plant-based food retail sales are growing 5x total food sales*. Çevrimiçi https://gfi.org/blog/spins-data-release-2019/#:~:text=The%20U.S.%20retail%20market%20for,data%20from%20GFI%20and%20PBFA.&text=New%20data%20show%20that%20the,market%20is%20worth%20%244.5%20billion

Aydar, E. F., Tutuncu, S., & Ozcelik, B. Plant-based milk substitutes: Bioactive compounds, conventional and novel processes, bioavailability studies, and health effects. *J Funct Foods*. 2020;70:103975.

Berkman, N.D., Davis, T.C. & McCormack, L. Health literacy: what is it? J Health Commun. 2010;15(2): 9-19.

Boaitey, A., & Minegishi, K. Determinants of household choice of dairy and plant-based milk alternatives: evidence from a field survey. Journal of Food Products Marketing. 2020;26(9):639-653.

Bridges, M. (2018). Moo-ove over, cow's milk: the rise of plant-based dairy alternatives. *Pract Gastroenterol*, 21, 20-27. Çevrimiçi https://med.virginia.edu/ginutrition/wp-content/uploads/sites/199/2014/06/January-18-Milk-Alternatives.pdf

Büyükkaragöz, A., Bas, M., Sağlam, D., & Cengiz, Ş.E. Consumers' awareness, acceptance and attitudes towards functional foods in Turkey. *Int J Consum Stud*. 2014;38(6):628-635.

Chalupa-Krebzdak, S., Long, C.J., & Bohrer, B.M. Nutrient density and nutritional value of milk and plant-based milk alternatives. *Int Dairy J*. 2018;87:84-92.

Chapman, K.M., Chan, M.W., & Clark, C.D. Factors influencing dairy calcium intake in women. *J Am Coll Nutr*. 1995;14(4):336-340.

Chau, M.M., Burgermaster, M., & Mamykina, L. The use of social media in nutrition interventions for adolescents and young adults-A systematic review. *Int J Med Inform*. 2018;120:77-91.

Clark, M.A., Springmann, M., Hill, J., & Tilman, D. Multiple health and environmental impacts of foods. *Proc Natl Acad Sci*. 2019;116(46):23357-23362.

Cornucopia Institute. (2019). *"Pouring" Over Plant-Based Beverages. A Consumer's Guide to Identifying the Best Non-Milk Alternatives. WI: Cornucopia Institute Cornucopia*. Çevrimiçi https://www.cornucopia.org/wp-content/uploads/2022/08/PlantBasedBeverageReport1.pdf

Das, A., Raychaudhuri, U., & Chakraborty, R. Cereal based functional food of Indian subcontinent: a review. *J Food Sci Technol*. 2012;49(6):665-672.

DiFilippo, K.N., Huang, W.H., Andrade, J.E., & Chapman-Novakofski, K.M. The use of mobile apps to improve nutrition outcomes: A systematic literature review. *J Telemed Telecare*. 2015;21(5):243-253.

Dubey, M.R., & Patel, V.P. Probiotics: a promising tool for calcium absorption. *Nutr J*. 2018;12(1):59-69.

Fortune Business Insight. (2022). *Dairy Alternatives Market Size, Share & COVID-19 Impact Analysis, By Source (Soy, Almond, Coconut, Rice, Oats, and Others), Product Type (Non-Dairy Milk, Butter, Cheeses, Yogurts, Ice Cream, and Others), Distribution Channel (Supermarkets/Hypermarkets, Convenience Stores, Online Retail, and Others), and Regional Forecats, 2022-2029*. Çevrimiçi https://www.fortunebusinessinsights.com/industry-reports/dairy-alternatives-market-100221

Global Nutrition Report. (2022). 2021 *Global Nutrition Report: The state of global nutrition*. Bristol, UK: Development Initiatives. Çevrimiçi https://globalnutritionreport.org/reports/2021-global-nutrition-report/executive-summary/

Grand View Research. (2022). *Dairy Alternatives Market Size, Share & Trends Analysis Report By Source (Soy, Almond, Coconut, Rice, Oats), By Product (Milk, Yogurt, Cheese, Ice-cream, Creamers), By Distribution Channel, And Segment Forecasts, 2022 – 2030*. Çevrimiçi https://www.grandviewresearch.com/industry-analysis/dairy-alternatives-market

Haas, R., Schnepps, A., Pichler, A., & Meixner, O. (2019). Cow milk versus plant-based milk substitutes: A comparison of product image and motivational structure of consumption. *Sustainability*, *11*(18), 5046.

Johns, T., & Sthapit, B.R. Biocultural diversity in the sustainability of developing-country food systems. *Food Nutr Bull*. 2004;25(2):143-155.

Kaur, S., & Das, M. Functional foods: An overview. *Food Sci Biotechnol*. 2011;20(4):861-875.

Kickbusch, I., Pelikan, J.M., Apfel, F., & Tsouros, A.D. (2013). *Health literacy: the solid facts*. Copenhagen: World Health Organization Regional Office for Europe. Çevrimiçi https://apps.who.int/iris/handle/10665/326432

Kopf-Bolanz, K., & Sousa, A. Nutritional Implications of an Increasing Consumption of Non-Dairy Plant-Based Beverages Instead of Cow's Milk in Switzerland. *J Adv Dairy Res.* 2017;*5:197*.

Krystallis, A., Maglaras, G., & Mamalis, S. Motivations and cognitive structures of consumers in their purchasing of functional foods. *Food Qual Prefer.* 2008;19:525-538.

Mäkinen, O.E., Wanhalinna, V., Zannini, E., & Arendt, E.K. Foods for special dietary needs: Non-dairy plant-based milk substitutes and fermented dairy-type products. *Crit Rev Food Sci Nutr.* 2016;56(3):339-349.

Markovina, J., Stewart-Knox, B.J., Rankin, A., Gibney, M., Almeida, M.D.V., Fischer, A.R.H., Kuznesof, S.A., Poinhos, R., Panzone, L., Frewer, L.J. Food4Me study: validity and reliability of Food Choice Questionnaire in 9 European countries. *Food Qual Prefer.* 2015;45:26-32.

Martins, I.M., Chen, Q., & Chen, C.Y.O. (2016), Emerging Functional Foods Derived from Almonds, *Ferreira I.C.F.R, Morales, P. & Barros, L. (Eds.),* In *Wild Plants, Mushrooms and Nuts (*445-469*), UK: John Wiley & Sons*.

Maxim, C., Farcas, A., Vodnar, D., Tofana, M. & Socaci, S. Consumers' requirements for functional foods. *Bulletin UASVM Food Sci Technol*. 2019;*76*(2):138.

McCarthy, K., Parker, M., Ameerally, A., Drake, S., & Drake, M. Drivers of choice for fluid milk versus plant-based alternatives: What are consumer perceptions of fluid milk? *J Dairy Sci.* 2017;100(8):6125-6138.

Miller, V., Webb, P., Cudhea, F., Shi, P., Zhang, J., Reedy, J., Erndt-Marino, J., Coates, J. & Mozaffarian, D. Global dietary quality in 185 countries from 1990 to 2018 show wide differences by nation, age, education, and urbanicity. *Nat Food*. 2022;3(9):694-702.

Mintel Press Team. (2018a). US Non-Dairy Milk Sales Grow 61% Over the Last Five Years. Çevrimiçi https://www.mintel.com/press-centre/food-and-drink/us-non-dairy-milk-sales-grow-61-over-the-last-five-years

Mintel Press Team. (2018b). Taste is the Top Reason US Consumers Eat Plant-Based Proteins. Çevrimiçi https://www.mintel.com/press-centre/food-and-drink/taste-is-the-top-reason-us-consumers-eat-plant-based-proteins#:~:text=Mintel%20Press%20Team&text=However%2C%20new%20research%20from%20Mintel,even%20health%20(39%20percent

Mintel Press Team. (2019). *Milking the Vegan Trend: A Quarter (23%) of Brits Use Plant-Based Milk*. Çevrimiçi https://www.mintel.com/press-centre/food-and-drink/milking-the-vegan-trend-a-quarter-23-of-brits-use-plant-based-milk

Mordor Intelligence (2022). Asia-Pacific Dairy Alternatives Market - Growth, Trends, COVID-19 Impact, and Forecasts (2022 - 2027). Çevrimiçi https://www.mordorintelligence.com/industry-reports/asia-pacific-dairy-alternatives-market

National Health Services. (2022). Lactose intolerance. Çevrimiçi https://www.nhs.uk/conditions/lactose-intolerance/

Özdemir, H., Alper, Z., Uncu, Y. & Bilgel, N. Health literacy among adults: a study from Turkey. *Health Educ Res.* 2010;*25*(3):464-477.

Palacios, O., Badran, J., Drake, M.A., Reisner, M. & Moskowitz, H. Consumer acceptance of cow's milk versus soy beverages: Impact of ethnicity, lactose tolerance and sensory preference segmentation. *J Sens Stud.* 2009;*24*(5):731-748.

Park, Y. W. The impact of plant-based non-dairy alternative milk on the dairy industry. Food science of animal resources. 2021;41(1):8.

Poore, J. & Nemecek, T. Reducing food's environmental impacts through producers and consumers. *Science (New York, N.Y.).* 2018;360:987-992.

Poulsen, J. (1999). Danish consumers' attitudes towards functional foods. *MAPP Working Papers, University of Aarhus, Aarhus School of Business, The MAPP Centre*, No 62, 1-44. Çevrimiçi https://pure.au.dk/ws/files/32297714/wp62.pdf

Sağlam, K. & Gümüş, T. Yazılı, Görsel ve Sosyal Medyada Gıda ile İlgili Bilgi Kirliliğinin Halkın Gıda Tercihi Üzerine Etkisi. *Gıda*. 2019;44(1):153-162.

Schyver, T. & Smith, C. Reported attitudes and beliefs toward soy food consumption of soy consumers versus nonconsumers in natural foods or mainstream grocery stores. *J Nutr Educ Behav.* 2005;*37*(6):292-299.

Sethi, S., Tyagi, S. K. & Anurag, R.K. Plant-based milk alternatives an emerging segment of functional beverages: a review. *J Food Sci Technol.* 2016;*53*(9): 3408-3423.

Sexton, A.E., Garnett, T. & Lorimer, J. Vegan food geographies and the rise of Big Veganism. *Prog Hum Geogr*. 2022;46(2):605–628.

Singhal, S., Baker, R.D. & Baker, S.S. A Comparison of the Nutritional Value of Cow's Milk and Nondairy Beverages. *J Pediatr Gastroenterol Nutr.* 2017;*64*(5):799-805.

Siró, I., Kápolna, E., Kápolna, B. & Lugasi, A. Functional food. Product development, marketing and consumer acceptance—A review. *Appetite.* 2008;*51*(3):456-467.

Republic of Turkey Ministry of Health, General Directorate of Public Health. (2019). *Turkey Nutrition and Health Survey 2017,* 1132, Ankara. Çevrimiçi https://hsgm.saglik.gov.tr/depo/birimler/saglikli-beslenme-hareketli-hayat-db/TBSA_RAPOR_KITAP_2017_ENG_.pdf

The US National Library of Medicine. (2020). Lactose Intolerance. Çevrimiçi https://medlineplus.gov/genetics/condition/lactose-intolerance/

Urala, N. (2005). Functional foods in Finland Consumers' views, attitudes and willingness to use. *VTT Publications*. Çevrimiçi https://www.vttresearch.com/sites/default/files/pdf/publications/2005/P581.pdf

Vainio, A., Niva, M., Jallinoja, P., & Latvala, T. From beef to beans: Eating motives and the replacement of animal proteins with plant proteins among Finnish consumers. Appetite. 2016;106:92-100.

Vandenplas, Y., Koletzko, S., Isolauri, E., Hill, D., Oranje, A.P., Brueton, M., Staiano, A. & Dupont, C. Guidelines for the diagnosis and management of cow's milk protein allergy in infants. *Arch Dis Childh.* 2007;*92*(10):902-908.

Vegetarian Society. (2022). *Going veggie for animals*. Çevrimiçi https://vegsoc.org/

Verbeke, W. Consumer acceptance of functional foods: socio-demographic, cognitive and attitudinal determinants. *Food Qual Prefer.* 2005;*16*(1):45-57.

Vicentini, A., Liberatore, L. & Mastrocola, D. Functional foods: trends and development of the global market. *Ital J Food Sci.* 2016*;28*(2):338-351.

Westhoek, H., Lesschen, J.P., Rood, G., Wagner, S., De Marco, A., Murphy-Bokern, D., Leip, A., van Grinsven, H., Sutton, M.A. & Oenema, O. Food choices, health and environment: Effects of cutting Europe's meat and dairy intake. *Glob Environ Change*. 2014;26:196-205.

Wolf, C.A., Malone, T. & McFadden, B.R. Beverage milk consumption patterns in the United States: Who is substituting from dairy to plant-based beverages? *J Dairy Sci*. 2020;103(12):11209-11217.

World Health Organization. (2010). Body mass index - BMI. Çevrimiçi https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi

Yadav, D.N., Bansal, S., Jaiswal, A.K. & Singh, R. Plant based dairy analogues: An emerging food. *Agri Res & Tech*. 2017;10(2):23-26.

Yılmaz Köse, B. & Ölmez, Y. Laktoz intoleransı ve diyet. *Gastroentroloji.* 2016;*20(3)*: 245-252. Çevrimiçi https://guncel.tgv.org.tr/journal/67/pdf/100475.pdf