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Consumer Interest and Its Effect on Purchase Intention for Plant-Based Milk Substitutes

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ABSTRACT

Interest in plant-based milk substitutes has been increasing steadily. This growing demand can be attributed to various factors, including health concerns, environmental awareness, and ethical values. Among the health-related reasons are lactose intolerance and cow's milk allergy, both of which have become increasingly prevalent worldwide. Additionally, the rising diversity in consumer diets, such as veganism and vegetarianism, has made plant-based milk substitutes a suitable alternative for these groups. Plant-based milk substitutes are suspensions made from various raw materials, such as cereals, pseudo-cereals, legumes, nuts, and seeds, dissolved in water. These products resemble cow's milk in appearance. In many countries, including Türkiye, the term "milk" is used in a broader sense to refer not only to animal-derived milk but also to plant-based milk-like beverages, which have become more prominent in recent years. The purpose of this study was to investigate the relationship between plant-based milk substitutes, consumer interest in these products, and purchase intention. A total of 400 consumers aged 18 years and older participated in the study, with 392 valid questionnaires included in the analysis. Correlation analysis was conducted to evaluate the relationship between consumer interest and purchase intention, while regression analysis was used to determine the effects of interest on purchase intention. Results of collinearity analyses revealed a positive and significant relationship between consumer interest and purchase intention. Furthermore, the regression analysis demonstrated that consumer interest has a significant impact on purchase intention. It was concluded that as consumer interest increases, purchase intention also rises.

Keywords: Plant-based milk substitute, Consumer Interest, Purchase Intention

Tüketici İlgisi ve Bitki Bazlı Süt Alternatiflerine Yönelik Satın Alma Niyeti Üzerindeki Etkisi

ÖZ

Bitki bazlı süt alternatiflerine olan ilgi giderek artmaktadır. Bu artan talep, sağlık endişeleri, çevresel farkındalık ve etik değerler gibi çeşitli faktörlere dayandırılabilir. Sağlıkla ilgili nedenler arasında laktoz intoleransı ve inek sütü alerjisi yer almakta olup, her ikisi de dünya genelinde giderek daha yaygın hale gelmiştir. Ayrıca, veganlık ve vejetaryenlik gibi tüketici diyetlerindeki çeşitliliğin artması, bitki bazlı süt alternatiflerini bu gruplar için uygun bir seçenek haline getirmiştir. Bitki bazlı süt alternatifleri, tahıllar, psödo-tahıllar, baklagiller, sert kabuklu meyve ve tohumlar gibi çeşitli hammaddelerin suda çözülmesiyle elde edilen süspansiyonlardır. Bu ürünler, görünüm olarak inek sütüne benzemektedir. Türkiye dahil birçok ülkede, "süt" terimi, yalnızca hayvansal kaynaklı sütü değil, aynı zamanda son yıllarda daha belirgin hale gelen bitki bazlı süt benzeri içecekleri de kapsayacak şekilde daha geniş bir anlamda

kullanılmaktadır. Bu çalışmanın amacı, bitki bazlı süt alternatifleri, bu ürünlere olan tüketici ilgisi ve satın alma niyeti arasındaki ilişkiyi araştırmaktır. Çalışmaya 18 yaş ve üzeri toplam 400 tüketici katılmış olup, analizde 392 geçerli anket değerlendirilmiştir. Tüketici ilgisi ile satın alma niyeti arasındaki ilişkiyi değerlendirmek için korelasyon analizi yapılmış, ilginin satın alma niyeti üzerindeki etkilerini belirlemek için ise regresyon analizi uygulanmıştır. Kollineerlik analizlerinin sonuçları, tüketici ilgisi ile satın alma niyeti arasında pozitif ve anlamlı bir ilişki olduğunu ortaya koymuştur. Ayrıca, regresyon analizi, tüketicinin satın alma niyeti üzerinde anlamlı bir etkisi olduğunu göstermiştir. Sonuç olarak, tüketici ilgisi arttıkça satın alma niyetinin de arttığı sonucuna varılmıştır.

Anahtar Kelimeler: Bitki bazlı süt ikamesi, Tüketici ilgilenimi, Satın alma niyeti

INTRODUCTION

A visit to the dairy section of any grocery store shows a wide range of plant-based milk substitutes based on a wide variety of herbal products. The popularity of plant-based milk substitutes has significantly increased in recent years. Many consumers today limit or avoid milk and dairy consumption for a variety of reasons, including milk protein allergies, lactose intolerance, personal and environmental health concerns, and dietary differences, such as vegetarian diets [1]. In this context, sales of plant-based milk substitutes have been steadily increasing at a high rate over the years. The global plant-based milk substitutes market is estimated to reach a market size of \$47.2 billion by 2033, with an annual growth rate of 9.9% between 2023 and 2033 [2].

Plant-based milk substitutes are defined as aqueous extracts from raw plant materials that are a source of protein and calories for human consumption, have a lower percentage of fat compared to cow's milk, and are cholesterol- and lactose-free [3]. In addition to the advantageous effect they provide to consumers due to their nutritional value, plant-based milk substitutes are also economically favorable for the industry, as their production costs can be lower than those of cow's milk. Another advantage is that food industry residues that are rich in proteins and carbohydrates can be used as raw materials. These materials are often discarded or sold cheaply as feed. However, when they are recycled, environmental benefits such as less water is needed to treat wastewater and the impact on climate change and ecotoxicity can be reduced [4].

Plant-based milk substitutes are extracts obtained by dissolving nuts, cereals, pseudocereals, seeds, and legumes in water. Although plant-based milk substitutes do not contain the nutritional content of animal dairy products, they have similar sensory and functional properties. They have been described as a healthy alternative product group owing to their nutrient content, including healthy fatty acids and carbohydrates, as well as B, E, and antioxidants. They are also an important product group for consumers with protein allergies and lactose intolerance [5]. Plant-based milk substitutes are considered a food source for the development of products that can be an alternative to animal milk and for the production of products with nutritional content that can be considered as qualified products. Plant-based milk substitutes contain minerals, vitamins, and many health-beneficial components, and are considered functional products. They are offered as nutritious alternative products, such as special drinks, cheese,

and yogurt, for consumers suffering from protein allergies and lactose intolerance as well as for consumers following a vegan diet [6].

Although different raw materials are used in the production of plant-based milk substitutes, their production stages are generally similar. First, the raw material was soaked in water for a few hours prior to processing. The mixing process was then carried out with water. After the mixture was obtained, filtration was performed to separate the residues that did not dissolve in water, and components such as sweeteners, sugar, and stabilizers were added upon request. In the last production step, stability, homogenization, and pasteurization processes were carried out (Figure 1). Liquid extracts were obtained using these processes [7].

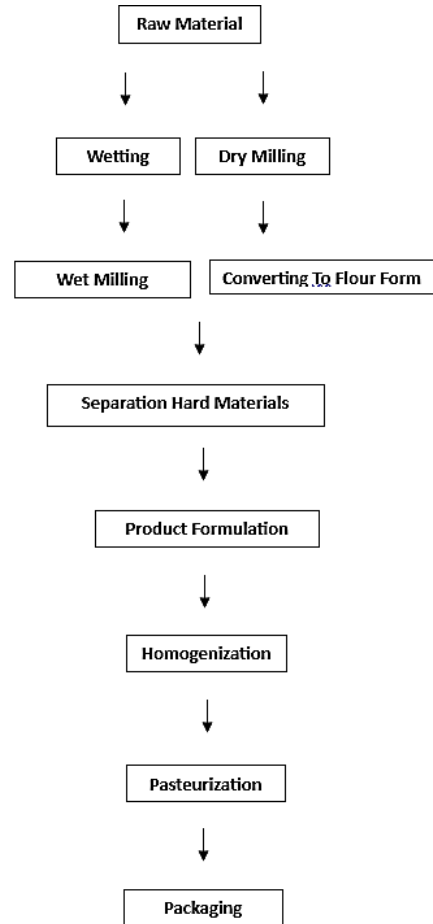


Figure 1. Production scheme of plant-based milk substitutes [8]

To improve the quality and acceptability of plant-based milk substitutes, a number of technological interventions have been applied to improve product stability, eliminate bad tastes, inactivate or remove inhibitors, and improve shelf life [9].

Table 1 shows the processes applied for the production of plant-based milk substitutes and their advantages.

Table 1. Technological interventions applied to the production of plant-based milk substitutes and their objectives [4]

Ultrasound procedure	Pulsed electric field	High intensity ultrasound irradiation	Ohmic heating	Ultra-high and high pressure homogenization
Improving shelf life	Improving shelf life Inactivation of inhibitors	Sedimentation and product stability	Removal of bad taste and aroma	Improving shelf life Sedimentation and product stability

Today's consumers are becoming more nutritionally conscious and changing their eating habits towards a healthier, sustainable and ethical diet, which is reflected in the demand for plant-based milk substitutes. However, the majority of consumers also have reservations about including such beverages in their daily diet.

Some factors limit consumers' consumption of plant-based milk substitutes. The most important of these factors are taste and appearance. Taste and appearance are the most important purchasing criteria of consumers. The plant material used as raw material in plant-based milk substitutes may have a green, gray, and brownish color due to the natural color of the plant material used as raw material, has a sandy structure due to its insoluble particles, and the feeling it leaves in the mouth, which can negatively affect consumers' desire to buy [10].

Another factor is that consumers lack knowledge of the social, economic, and health impacts of replacing animal-based foods with plant-based foods in their dietary preferences. Economically, it is also noted that in some countries, plant-based milk substitutes are offered at high prices, making it difficult for consumers from all walks of life to access these products [8].

The aim of this research is to measure the relationship between consumers' interest and purchase intention towards plant-based milk, which has entered our lives for various reasons, considering the increasing demand for cow's milk substitutes that have no allergic effects, nutritional, sensory, and technological properties, and to raise awareness.

METHODS

This study examines the consumer profile of plant-based milk and the relationship between consumer interest and purchase intention. The main mass of research consists of individuals aged 18 years and older living in Türkiye. This study was conducted in January and February 2024. The research sample comprised 400 people, and a face-to-face and online survey method was applied. Eight questionnaires found to be incomplete and inaccurate were excluded, and 392 questionnaires were included in the analysis.

The questionnaire consists of three parts. In the first part, a 7-point semantic differences scale was developed by Zaichkowsk [11]. It consists of 10 items (worthless/ valuable, unattractive/ attractive, ordinary/ magical, means nothing to me/ means something to me, unnecessary/ necessary, boring/ interesting, unimportant/ important, irrelevant/ relevant to me, unexciting/ exciting, and inappropriate/ appropriate) to measure the participants' level of interest in plant-based milk.

In the second part of the study, in order to measure the participants' purchase intention towards plant-based milk, a 4-item, 5-point Likert (1: strongly disagree, 5: strongly agree) purchase intention scale was taken from the research site www.surveymonkey.com [12].

The last part of the questionnaire contained five questions (gender, age, education, occupation, and income) to reveal the demographic characteristics of the participants.

RESULT and DISCUSSION

The demographic characteristics of the participants are presented in Table 2. Accordingly, it can be said that the gender distribution of the participants is approximately equal. Approximately two-thirds of the participants were aged between the ages of 21-40. It can be said that the marital status of the participants is approximately half and half. Most of the participants (77.5%) were university graduates, and the proportions of workers, civil servants, and self-employed were close to each other. Civil servants provided the highest level of participation by civil servants. Consumer interest in milk and its substitutes is influenced by advertising and promotion [13], product quality and price [14], sociodemographic factors [15], [16], and consumer education [17].

Studies have shown that young people are likely to prefer milk [18]. Similar studies have determined that age affects purchasing behavior, and that the level of education has a significant effect on purchasing behavior [15]. In this respect, when the age range of the participants was taken into consideration and the effect of occupational groups was also evaluated, it can be expected that the results of the analyses would be positively affected. Young people's interest in such product groups is likely to affect their interest and

purchase intentions. Especially in young people under the age of 30, the likelihood of trying and preferring plant-based milk and its products increases because of

health concerns, environmental awareness, and veganism, and concerns such as the following trends among young people [19-21].

Table 2. Demographic characteristics of participants in the study

	F	Percentage		F	Percentage
Gender			Marital status		
Woman	208	53.1	Single	207	52.8
Male	184	46.9	Married	185	47.2
Age			Profession		
20 and under	73	18.6	Not working	43	11.0
21-30	164	41.8	Worker	97	24.7
31-40	96	24.5	Officer	121	30.9
41-50	41	10.5	Self-employment	96	24.5
51 and over	18	4.6	Student	35	8.9
Education			Revenue		
Primary education	34	8.7	15000 TL and under	98	25.0
High school	54	13.8	15001-25000 TL	143	36.5
Associate degree	126	32.1	25001-35000 TL	75	19.1
Bachelor's degree	95	24.2	35001-45000 TL	46	11.7
Postgraduate	83	21.2	45001 TL and over	30	7.7

The Kaiser-Meyer-Olkin (KMO) value of the scale used in the study was 0.936 and the Bartlett Sphericity Test value was $p < 0.05$ ($p: 0.000$) and it was determined that the scale was suitable for factor analysis. The results of confirmatory and exploratory factor analyses are presented in Table 3. Accordingly, the interest scale consisted of a single dimension and was represented by

10 items. Purchase intention consists of a single dimension, and is represented by three items. The scale items represented 68% of the total explained variance. The reliability values were 0.953 for the interest scale and 0.888 for the purchase intention scale. Thus, the scale is highly reliable.

Table 3. Shopping influencers scale factor analysis results

Items	Factor Loadings	Eigenvalue	Variance Explained	Cronbach α
Factor 1. Interest		8.286	59.184	0.953
Worthless/Valued	0.838			
Not Attractive/Attractive	0.828			
Ordinary/Enchanting	0.805			
Doesn't/do not mean anything to me	0.792			
Unnecessary/Necessary	0.774			
Boring/Interesting	0.769			
Unimportant/Important	0.742			
Irrelevant to me/Relevant for me	0.733			
Unexciting/Exciting	0.719			
Not suitable / Suitable	0.708			
Factor 2. Purchase Intention		1.293	9.239	0.888
I plan to buy milk-like herbal drinks in 6 months.	0.889			
I plan to buy milk-like herbal drinks in 9 months.	0.858			
I plan to buy milk-like herbal drinks in 3 months.	0.821			

Statistical data revealing the interest and purchase intention profiles of the participants towards plant-based milk are presented in Table 4. Accordingly, participants' level of interest in plant-based milk was high ($\bar{x}=4.11$). Although the participants' purchase intention towards plant-based milk was lower than interest ($\bar{x}=3.12$), it can be said that it was above average. These results show that the participants were interested in plant-based milk but were more hesitant to purchase it. Plant-based milk substitutes are generally more expensive than animal milk. This is thought to be because of the costlier processing of the product and the limited number of companies engaged in production. Some studies state that price changes positively affect purchase probabilities [21, 22]. Other situations identified in the

literature are that consumers find plant-based milk substitutes and analogue products obtained from them nutritionally inadequate and sensory inappropriate; as a result, they do not want to buy them [19, 21, 23]. However, more processed packaged product groups may also contain negative messages for consumers. Consumers may classify plant-based milk substitutes as more processed products and, therefore, may choose not to prefer them [19].

Table 4. Shopping influencers statistics

	\bar{x}	S
Interest	4.1133	1.7388
Purchase Intention	3.1259	1.13te 36

The findings of the correlation analysis applied to examine the possible relationship between interest in and purchase intention towards plant-based milk are presented in Table 5. Accordingly, there is a significant positive relationship between interest and purchase intention.

Table 5. Correlation analysis for the relationship between the sub-dimensions of the scales

		Purchase Intention
Interest	Pearson Correlation	0.642**
	Sig. (2-tailed)	0.000
	N	392

**Significant relationship at 0.01 significance level

Table 6. Regression analysis for the relationship between the sub-dimensions of the scales

Independent Variable	Dependent Variable	Fixed*	(β)	St. Error	(t)	p
Interest	Purchase Intention	1.403	0.642	0.025	16.550	0.000

*The regression equation: Purchase Intention = 1.403 + 0.642×Interest

The results of research conducted in January and February 2024 across Turkey contain similar findings to studies on consumer interest and purchase intention in the literature. In our country, people are interested in plant-based milk substitutes, but remain somewhat hesitant about purchasing them. This interest is generally influenced by increasing milk allergy and perception of healthy nutrition [4, 8, 24], curiosity and perception of social media [25-27] environmental impacts of milk production facilities, protection of animal rights, and preference for a vegan lifestyle [27-29].

CONCLUSION

The results of the study show a strong relationship between consumer interest in plant-based milk substitutes and purchase intention. Consumers were found to be interested in and intended to purchase plant-based milk substitutes due to factors such as health concerns, environmental impacts, and ethical values. In this study, purchase intention was found to be lower than the level of interest, suggesting some hesitation among consumers to purchase these products. This hesitation could be due to factors such as economic reasons and the taste and texture characteristics of the product. Furthermore, based on the research results, it was observed that consumer interest in plant-based milk substitutes and purchase intentions are associated with consumers' demographic characteristics. For example, young and middle-aged respondents were found to have higher interest and purchase intentions towards plant-based milk substitutes than other age groups. Similarly, the interest and purchase intention of respondents with higher levels of education towards plant-based milk substitutes were more pronounced than for those with lower levels of education. These results provide important guidance for developing marketing strategies and communicating effectively with consumers regarding plant-based milk substitutes. Improving the taste and texture characteristics of the product, reviewing pricing, and providing consumers with more information on the health benefits and environmental impacts of the

product could increase purchase intention and expand the market share of plant-based milk substitutes. In conclusion, consumer interest in and purchase intention for plant-based milk substitutes is a complex process shaped by the interaction of health, environmental, and social factors. Future research could conduct further analysis on this topic to gain a deeper understanding of the effects of these factors on consumer behavior and contribute to more effective management of marketing strategies for plant-based milk substitutes.

Accordingly, consumers' interest has a significant effect on purchase intention. Accordingly, as interest increases, purchase intention also increases. There is a fixed purchase intention of 1.403 units for plant-based milk and each unit increase in interest increases purchase intention by 0.642.

CONFLICT OF INTEREST:

The authors declare that they do not have any conflict of interest.

ETHICAL REVIEW

Necessary ethical documents were obtained and expressed before analysis.

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