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Yogurt consumption in Türkiye, commercial use of yogurt yeast, and evaluation of consumers' attitudes toward yogurt-like products produced using different yeasts

Türkiyede'ki yoğurt tüketimi, ticari olarak yoğurt mayasının kullanılması ve tüketicilerin farklı mayalıklar kullanılarak üretilen yoğurt benzeri ürünlere karşı tutumlarının değerlendirilmesi

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Abstract

This study aims to determine the consumption of ready-made and homemade yogurt, the level of knowledge about different yeasts (chickpea, dewdrop, sugar, cone, vinegar, etc.) that can be used while fermenting yogurt, and their attitudes toward using yogurt leavening in case it is sold commercially. The research was carried out with 500 participants, 427 females (85.4%) and 73 males (14.6%) between 18 and 74. 77.0% of the female participants and 61.6% of the men shared that they had fermented yogurt. 80.1% of the women and 84.9% of the men did not know about using different raw materials as leavening agents other than yogurt yeast. According to their educational status, 54.5% of associate degree graduates wanted yogurt yeast to be sold in the market, like rennet, 55.9% of postgraduate participants wanted to use it if it was sold, and 48.5% of them said yes to the reliability of yogurt yeast. In addition, the participants stated that they liked to consume yogurt in general, found homemade yogurt healthier, and made their yogurt.

Keywords: Chickpeas, Commercial yogurt, Dewdrops, Homemade yogurt, Yeast

Öz

Bu çalışmada tüketicilerin hazır ve ev yoğurdu tüketimleri, yoğurt mayalanırken kullanılabilecek farklı mayalıklar (nohut, çiy damlası, şeker, külah, sirke vb.) hakkındaki bilgi düzeyleri ve ticari olarak satılması durumunda yoğurt mayalığı kullanma tutumlarının tespit edilmesi amaçlanmıştır. Araştırma 18-74 yaş arası 427 kadın (%85.4) ve 73 erkek (14.6) olmak üzere toplam 500 katılımcıyla yürütülmüştür. Kadın katılımcıların %77.0'si ve erkeklerin %61.6'sı yoğurt yaptıklarını paylaşmıştır. Kadınların %80.1'i ve erkeklerin %84.9'u yoğurt mayası dışında farklı hammaddeleri maya olarak kullanma konusunda bilgi sahibi olmadıklarını belirtmiştir. Öğrenim durumlarına göre ön lisans mezunlarının %54.5'inin peynir mayası gibi yoğurt mayasının da marketlerde satılmasını istediklerini, lisansüstü katılımcıların %55.9'u satıldığı takdirde kullanmak istediklerini ve yoğurt mayasının güvenilirliğine ise %48.5'inin evet şeklinde cevap verdikleri görülmüştür. Çalışma sonucunda katılımcıların genel olarak yoğurt tüketmeyi sevdikleri, ev yoğurdunu daha sağlıklı buldukları ve kendi yoğurtlarını yaptıkları tespit edilmiştir.

***Anahtar kelimeler**: Nohut, Ticari yoğurt, Çiy damlaları, Ev yoğurdu, Mayalık*

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1. Introduction

Balanced and proper nutrition in societies plays an important role in protecting people's health and sustainability (Kart & Demircan, 2014; Engindeniz et al., 2021). With the emergence of the notion of the conscious consumer, consumer purchasing behavior has shifted, resulting in variances in product preferences. Consumers have started to pay more attention to certain issues such as "health," "food," and "nutrition." Food security aims to ensure that everyone has the right to physically and economically access adequate food and to buy and consume foods that help develop healthy eating habits (FAO, 2001; Leisinger, 2000; Demirbaş & Elâ, 2005; Onurlubaş & Gürler, 2016). Yogurt is an example of a safe food since it is rich in health-promoting bioactive ingredients, creates a positive image among consumers thanks to its probiotic properties, is popular around the world, and is recommended for consumption to improve health (Vijaya Kumar et al., 2015; Homayouni Rad et al., 2016; Sarkar, 2019). Following the proliferation of yogurt around the globe and technical advancements, individuals began to investigate the formation mechanism of yogurt, and research in this area increased. Consumption of yogurt is important in terms of diet quality, as it allows individuals to increase their intake of calcium, potassium, magnesium, and zinc, to take adequate amounts of vitamins B2 and B12, and to have lower triglyceride, systolic blood pressure, and insulin resistance (Wang et al., 2013). Furthermore, according to Vatanparast et al. (2019), in their study examining the yogurt consumption of Canadian children and adults by age, they found that 7.7% of children in the 2–18 age group and 50% of adults consumed yogurt. Despite the importance of animal products in human nutrition, it is clear that they are not sufficiently consumed. It is required to ensure the consumption of these products, to determine the relevant consumer behaviors, to analyze the differences observed regarding consumer behaviors, to establish effective control mechanisms in the production of these products throughout the whole process, to develop a sustainable quality standard, and to produce both natural and healthy products in line with consumer demands.

Yogurt is a fermented milk-based product produced using *Lactobacillus delbrueckii* subsp. *bulgaricus* and *Streptococcus thermophilus* starter bacteria (thermophilic and homofermentative strains) (Türk Gıda Kodeksi, 2009). Recently, some vegetables (Kiros et al., 2016), fruit species (Oliveira et al., 2015), and plant extracts (Balthazar et al., 2015; Bansal et al., 2016; Hussein et al., 2011; Parsa et al., 2015; Hashemi et al., 2016) have been used to make yogurt. The commercial production of yogurt yeast, known to be discovered by Turks, is made in foreign countries, and most of the yogurts sold in Turkey are fermented with an imported culture. Small businesses selling yogurt starter cultures in Turkey work as distributors of major culture-producing countries such as the USA, the Netherlands, France, and the UK (Yılmaz, 2006; Demirci & Ocak, 2020). Since the 1990s, studies have accelerated in Turkey to reduce foreign dependency and produce our own yogurt culture, but a large-scale production facility has not been established yet (Acar & Tunail, 2006; Durak et al., 2015; Demirgül & Sağdıç, 2017).

In this study, the consumers' preferences for yogurt consumption and their views on commercial yogurt and homemade yogurt were evaluated comprehensively. Another important title of the study is yogurt yeast. For this purpose, the knowledge levels of consumers about the yeast used in the production of homemade yogurt and the different yeasts (chickpea, dewdrop, sugar, cone, vinegar, etc.) used in the fermentation of yogurt and their approaches were also evaluated.

2. Material and method

2.1. Participants

The research consists of 500 participants, ranging in age from 18 to 74 years old, in Turkey. No sample selection method was used in the study, and individuals who voluntarily participated in the study were included with the complete count method.

2.2. Research design

Informed consent forms were obtained from the volunteers who agreed to participate in the study in May 2021. This study was conducted according to the guidelines outlined in the Declaration of Helsinki. The Erzincan Binali Yıldırım University Human Research Ethics Committee (decision dated 30/04/2021 and numbered 05/26) approved all procedures involving human subjects.

2.3. Data collection

The research data were collected online using a questionnaire prepared in line with the opinions of experts and consisted of 16 items to determine the participants' attitudes towards yogurt and 15 things to assess their views about yogurt yeast.

2.4. Statistical analysis

All statistical analyses were performed using IBM Version 22.0. While using percent (%) values from descriptive statistics, the relationship between categorical variables was determined with the Pearson chi-square test at the $p<0.05$ significance level.

3. Results

The demographic characteristics of the participants (Table 1a), their yogurt consumption preferences (Table 1b), and attitudes about yogurt yeast were given in Table 1c. The distribution of participants by gender was 85.4% female and 14.6% male. 7.2% of the participants were primary school graduates, 23.8% were secondary school graduates, 8.8% had an associate degree, 46.6% had an undergraduate degree, and 13.6% had a postgraduate/PhD degree. 38.6% of the participants were 18–24 years old, 22.8% were 25–34 years old, 13.8% were 35–49 years old, 24.4% were 50–65 years old, and 0.4% were over 65. 30.4% of the participants had low income, 31.2% had medium income, 32.0% had high income, and 6.4% had a very high income. 51.4% of the participants were single, 47.0% were married, and 1.6% were divorced.

According to Table 1b, 93.2% of the participants liked to consume yogurt; 50.5% of them paid attention to the probiotics in their yogurt preferences and 98.6% of them found the home yogurt healthier. However, 62.9% said they made yogurt at home, 40.2% consumed yogurt occasionally, 29.3% consumed yogurt made by family elders, and 35.6% stated that they prefer ready-made yogurts with fruit, honey, vitamins, minerals, and probiotics when they are enriched. In addition, 68.3% of them pay attention to the expiration date of ready-made yogurt 66% of them think that commercial yogurt has additives, and 89.6% of them find homemade yogurt healthier. In addition, as seen in Table 1b, regarding the nutritional properties that the participants considered important, "the probiotic and protein content properties of yogurt" were statistically significant ($p<0.05$).

According to 73.9% of the participants, yeast, and process might have been effective in making homemade yogurt sour compared to commercial yogurt, 83.6% of the participants stated that they understood the home yogurt deteriorated due to the change in taste, 33.3% of the participants stated that the consistency of home yogurt was one of the reasons for affecting consumers negatively. 73.0% of the participants made yogurt, 86.6% used their yogurt yeast at home, 82.6% could not find yogurt yeast, 87% of them trusted the fermented yogurt they found, and 66.8% did not accept yogurt fermented with commercial yogurt yeast as homemade yogurt. In addition, 24.4% of them knew that sugar could be added to yogurt yeast when fermenting yogurt, 91.4% didn't know that different raw materials other than yogurt yeast could be used as a leavening agent 6% used chickpea as a different leavening agent, and 53.6% stated that they would like yogurt yeast to be sold in markets. They said no to the situation of sale, 60.8% of the participants didn't want to use yogurt yeast if it was produced and sold like rennet in the market 68.8% of them would not find this yeast safe if it were sold 72.7% of them stated that they wanted the taste of yogurt to be the same or close to homemade yogurt, among their expectations for the yogurt they produced with this type of commercial yogurt yeast.

According to gender, the yogurt consumption of the participants, their preferences, and their views on yeast are given in Table 2. It was determined that 85.4% of the participants like to consume yogurt, 77.5% of women and 78.1% of men consume yogurt regularly, 99.5% of women find home yogurt healthier, 39.1% of women and 26.0% of men do not consume commercial yogurt, 50.5% of the women and 31.5% of the men answered no to the situation of nutritionally enriched commercial yogurts, and 85.6% of the participants thought there were additives in commercial yogurts.

As seen in Table 2, it was found that 77.0% of women and 61.6% of men made yogurt; 82.9% of the women could not find yogurt yeast, 87% of the participants trusted that they found the yogurt yeast, 68.9% of the women and 54.8% of the men did not see the yogurt made with commercial yogurt yeast as home yogurt,

80.1% of women and 84.9% of men did not know about using different raw materials as leavening except for yogurt yeast, and 85.4% of them said yes to the sale of yogurt yeast like rennet in the markets.

Table 1a. Demographic characteristics of the participants.

Parameters	N=500
Age (n, %)	
18-24	193 (38.6)
25-34	114 (22.8)
35-49	69 (13.8)
50-65	122 (24.4)
65 and over	2 (0.4)
Gender (n, %)	
Female	427 (85.4)
Male	73 (14.6)
Educational status (n, %)	
Primary school	36 (7.2)
Secondary school	119 (23.8)
Associate degree	44 (8.8)
Undergraduate	233 (46.6)
Master's/doctorate	68 (13.6)
Marital status	
Single	257 (51.4)
Married	243 (48.6)
Job	
Student	294 (58.8)
Small business	16 (3.2)
Officer	96 (19.2)
Farmer	12 (2.4)
Retired	12 (2.4)
Housewife	70 (14.0)
Income status	
Low income	152 (30.4)
Medium income	156 (31.2)
High income	160 (32.0)
Very high-income	32 (6.4)
Family type	
Core	430 (86.0)
Large	69 (13.8)
Other	1 (2.0)

*More than one option is marked.

Table 1b. Yogurt consumption status of the participants

Parameters	N=500
Cases of liking to consume yogurt.	
I like	466 (93.2)
I dislike	34 (6.8)
Nutritional properties that they pay attention to in yogurt consumption*.	
Fat	181 (36.1)
Protein	240 (47.9)
Calorie	72 (14.4)
Vitamin-Mineral content	210 (41.9)
Probiotic	253 (50.5)
Other	25 (5.0)
Which yogurt do they find healthier?	
Homemade yogurt	493 (98.6)
Commercial yogurt	7 (1.4)

Table 1b. Continue

Parameters	N=500
Where do you buy the yogurt?*	
Market	142 (28.3)
Village	72 (14.4)
Open market	11 (2.2)
Make it myself	315 (62.9)
My elders make it	147 (29.3)
Consumption of commercial yogurt.	
Yes	113 (22.6)
No	186 (37.2)
Sometime	201 (40.2)
Does the nutritional (fruit, honey, vitamin, mineral, probiotic, etc.) enrichment of commercial yogurts ensure its consumption?	
Yes	178 (35.6)
No	223 (44.6)
Some	99 (19.8)
What do you pay attention to when buying commercial yogurt? *	
Expiration date	342 (68.3)
Price	118 (23.6)
Brand	298 (59.5)
Packaging	83 (16.6)
Others	34 (6.8)
Are there any additives in readymade yogurt?	
Yes	330 (66.0)
No	170 (34.0)

*More than one option is marked.

Table 1c. Yogurt preferences, and attitudes about yogurt yeast of the participants

Parameters	N=500
Reasons to prefer homemade yogurt*	
I think it's healthier	449 (89.6)
Love your taste	276 (55.1)
Because it has no additives	364 (72.7)
Because it is more economical	108 (21.6)
Other	11 (2.2)
Opinions on the sourness of home yogurt compared to ready-made yogurt*	
Yeast and the way it is fermented	370 (73.9)
Using additives in ready-made yogurt	316 (63.1)
Storage conditions	135 (26.9)
Expiration date	67 (10.4)
Characteristics of the milk used	152 (30.3)
Others	12 (2.74)
Ways to understand the spoilage of homemade yogurt*	
When the taste changes	419 (83.6)
When her scent changes	303 (60.5)
When its structure changes	243 (48.5)
Other	8 (1.6)
Factors that bother consumers in home yogurt*	
Smell	122 (24.4)
Color	49 (9.8)
Consistency	167 (33.3)
Creamy	128 (25.5)
Aroma	68 (13.6)
Other	111 (22.2)

Table 1c. Continue

Parameters	N=500
Yogurt fermentation conditions	
Yes	365 (73.0)
No	75 (15.0)
Sometime	60 (12.0)
Where do they get the yeast when making homemade yogurt?*	
I use my own yeast at home	434 (86.6)
I get it from the neighbor	153 (30.5)
I use ready-made yogurt as leavening	69 (13.8)
Cases of finding fermented yogurt	
Yes	87 (17.4)
No	413 (82.6)
A sense of trust in the fermented yogurt they found	
Yes	435 (87.0)
No	65 (13.0)
The case of making homemade yogurt when they make yogurt at home with ready-made yogurt	
Yes	166 (33.2)
No	334 (66.8)
Status of the raw materials added to the milk together with the yogurt yeast while fermenting yogurt*	
Sugar	122 (24.4)
Dew droplets	11 (2.2)
Vinegar	8 (1.6)
Chickpeas	20 (4.0)
Cone	4 (0.8)
Others	20 (4.0)
Situations of using different raw materials as leavening except for yogurt leavening	
Yes	43 (8.6)
No	457 (91.4)
Which raw material do they use as different leavening?*	
Dew droplets	17 (3.4)
Vinegar	20 (4.0)
Chickpeas	30 (6.0)
Cone	9 (1.8)
Others	14 (4.83)
Like rennet, yogurt yeast is sold in markets.	
Yes	232 (46.4)
No	268 (53.6)
Attitudes to use if yogurt yeast is produced and sold in the market like rennet.	
Yes	196 (39.2)
No	304 (60.8)
Attitudes to find this sold yogurt yeast-safe.	
Yes	156 (31.2)
No	344 (68.8)
Their expectations in the yogurts they produce with ready-made yogurt yeast in this form*	
It should form a thicker yogurt.	277 (55.3)
It should ensure that the taste is the same or close to home yogurt.	364 (72.7)
It should ensure that it can be consumed for a longer period of time without spoiling.	146 (29.1)
Other	31 (6.2)

*More than one option is marked.

Table 2. According to gender, individuals' yogurt consumption, preferences, and opinions about yeast

Parameters	Female n=427		Male n=73		Total n=500		p
	S	%	S	%	S	%	
Do you like to consume yogurt?							
I like	398	93.2	68	93.2	427	85.4	0.572
I dislike	29	6.8	5	6.8	73	14.6	
Do you regularly consume yogurt?							
Yes	331	77.5	57	78.1	427	85.4	0.526
No	96	22.5	16	21.9	73	14.6	
Which yogurt do they find healthy?							
Homemade yogurt	425	99.5	68	93.2	427	85.4	0.001*
Commercial yogurt	2	0.5	5	6.8	73	14.6	
Do you consume commercial yogurt?							
Yes	90	21.1	23	31.5	113	22.6	0.050
No	167	39.1	19	26.0	186	37.2	
Sometime	170	39.8	31	42.5	201	40.2	
The fact that nutritional enrichment (fruit, honey, vitamin, mineral, probiotic, etc.) of commercial yogurts can lead to consumption.							
Yes	106	28.0	72	45.9	178	35.6	0.654
No	191	50.5	32	31.5	223	44.6	
Sometime	81	21.4	18	22.6	99	19.8	
Are there any additives in commercial yogurt?							
Yes	271	65.5	59	62.5	428	85.6	0.359
No	143	34.5	27	37.5	72	14.4	
Can you make yogurt?							
Yes	320	77.0	45	61.6	365	73.0	0.030*
No	57	12.2	18	24.7	75	15.0	
Sometime	50	10.8	10	13.7	60	12.0	
Can you find yogurt yeast?							
Yes	73	17.1	14	19.2	427	85.4	0.386
No	354	82.9	59	80.8	73	14.6	
Do you trust the yogurt yeast you find?							
Yes	376	88.1	59	80.2	435	87.0	0.070
No	51	11.9	14	19.8	65	13.0	
The cases of making homemade yogurt when they make yogurt at home with commercial yogurt.							
Yes	133	31.1	33	45.2	166	33.2	0.014*
No	294	68.9	40	54.8	334	66.8	
Situations of using different raw materials as leavening except for yogurt leavening.							
Yes	85	19.9	11	15.1	96	19.2	0.212
No	342	80.1	62	84.9	404	80.8	
If the yogurt yeast you buy meets your standards, will you use it continuously?							
Yes	167	39.1	29	39.7	196	39.2	0.509
No	260	60.9	44	60.3	304	60.8	
Like rennet, should yogurt yeast be sold in markets?							
Yes	194	45.4	38	52.1	427	85.4	0.178
No	233	54.6	35	47.9	73	14.6	

*Pearson chi-square test

The participants' yogurt consumption status, classification, and scores related to yogurt fermentation by age were presented in Table 3. The participants in the 25-34 age group said that 96.5% like to consume yogurt more, 86.9% of the 50-65 age group regularly consume yogurt, those in the 18-24 age group consume more (29.1%) commercial yogurt, and those in the 65 and older age group more (100%) stated that they make homemade yogurt and find homemade yogurt healthier. Those between the ages of 18 and 24 shared that they would use it continuously if the yogurt yeast they bought was at the standard they expected.

Table 3. Yogurt consumption status of individuals according to age, their classification, and scores about yogurt fermentation

Parameters	18-24		25-34		35-49		50-65		65 and over		p
	S	%	S	%	S	%	S	%	S	%	
Do you like to consume yogurt?											
I like	177	91.7	110	96.5	64	92.8	114	93.4	1	50.0	0.073
I dislike	16	8.3	4	3.5	5	7.2	8	6.6	1	50.0	
Do you regularly consume yogurt?											
Yes	133	68.9	93	81.6	56	81.2	106	86.9	-	-	0.000*
No	60	31.1	21	18.4	13	18.8	16	13.1	2	100	
Do you consume commercial yogurt?											
Yes	56	29.1	31	27.2	11	15.9	14	11.5	1	50.0	0.005*
No	63	32.6	39	34.2	24	34.8	60	49.2	-	-	
Sometime	74	38.3	44	38.6	34	49.3	48	39.3	1	50.0	
Can you make yogurt?											
Yes	110	57.0	83	72.8	60	87.0	110	90.2	2	100	0.000*
No	50	25.9	18	15.8	1	1.4	6	4.9	-	-	
Sometime	33	17.1	13	11.4	8	11.6	6	4.9	-	-	
Which yogurt do they find healthier?											
Homemade yogurt	187	96.9	114	100	69	100	121	99.2	2	100	0.136
Commercial yogurt	6	3.1	-	-	-	-	1	0.8	-	-	
If the yogurt yeast you buy meets your standards, will you use it continuously?											
Yes	123	63.7	62	54.4	29	42.0	62	50.8	1	50.0	0.021*
No	70	36.3	52	45.6	40	58.0	60	49.2	1	50.0	

*Pearson chi-square test

It was found to be statistically significant that the participants had probiotic properties in terms of nutritional properties ($p<0.05$). While emphasizing the place where they buy yogurt, the answer "I make it; myself from the market; my elders will do it" was also found important. Also, "Does the fact that the nutritional value of commercial yogurts is enriched (fruit, honey, vitamins, minerals, probiotics, etc.) lead you to consume them?" The answers given to the question were also found to be statistically significant. To the question "Why do you prefer homemade yogurt?" the participants answered, "I think it is healthier," "I like the taste," and "It does not contain any additives" (not specified in the table). They said that they got the yeast from their neighbors according to their educational status and displayed an attitude of skepticism about the existence of natural yeast. In this way, they also expressed their concerns about finding natural yogurt yeast for homemade yogurt.

The attitudes of the participants about yeast according to their educational status are given in Table 4.

Table 4. Attitudes of the participants about yogurt yeast according to their educational status

Parameters	Primary school		Secondary school		Associate degree		Undergraduate		Master's/ doctorate		p
	S	%	S	%	S	%	S	%	S	%	
Can you find yogurt yeast?											
Yes	3	8.3	14	11.8	9	20.5	41	17.6	20	29.4	0.019*
No	33	91.7	105	88.2	35	79.5	192	82.4	48	70.6	
Do you trust the yogurt yeast you find?											
Yes	30	83.3	107	89.9	34	77.3	210	90.1	54	79.4	0.033*
No	6	16.7	12	10.1	10	22.7	23	9.9	14	20.6	
Like rennet, should yogurt yeast be sold in markets?											
Yes	11	30.6	45	37.8	24	54.5	110	47.2	42	61.8	0.005*
No	25	69.4	74	62.2	20	45.5	123	52.8	26	38.2	
If the yogurt yeast you buy meets your standards, will you use it continuously?											
Yes	8	22.5	35	29.4	20	45.5	95	40.8	98	55.9	0.001*
No	28	77.5	84	70.6	24	54.5	78	59.2	30	44.1	
Would you trust the yogurt yeast if it sold?											
Yes	6	16.7	32	26.9	13	29.6	72	30.9	33	48.5	0.007*
No	30	83.3	87	73.1	31	70.4	161	69.1	35	51.5	

*Pearson chi-square test

It was determined that 91.7% of primary school graduates could not find yogurt leavening 90.1% of undergraduate graduates trusted the yeast they found, 61.8% of the graduate participants wanted this leavening to be sold in the markets, such as rennet; 55.9% of them can use it if it is sold; and 48.5% can trust this yeast.

"Probiotic" answers were found to be statistically significant in the answers of the participants about the nutrients they pay attention to while consuming yogurt, and the answers to the question "Where do you buy probiotic yogurt?" were found to be statistically significant ($p<0.05$). “What do you pay attention to when buying commercial yogurt?”, “Expiration date”, and “What are the features you are worried about in commercial yogurt?” "Color" was determined to be statistically significant in the answers given to the question. In addition, the answers "I get it from my neighbor" to the question "Where do you get the yeast to make homemade yogurt?" and "chickpea" answers to the question "What do you use as another leavening agent?" were found statistically significant ($p<0.05$) (not specified in the table).

The participants’ yogurt consumption status and their classification of yogurt fermentation according to their income are given in Table 5. It was determined that 86.2% of the high-income group participants regularly consume yogurt, 42.1% of the low-income group consume between 251 and 500 g, 78.7% of the high-income group participants fermented yogurt, and 90.0% of them trusted the yeast they found.

Table 5. The participants’ yogurt consumption status and their classification of yogurt fermentation according to their income

Parameters	Low income group (0–2000 TL)		Medium income group (2001–4000 TL)		High-income group (4001–8000 TL)		Very high-income group (8001 TL and over)		p
	S	%	S	%	S	%	S	%	
Would you trust the yogurt leaven if it sold?									
Yes	99	65.1	126	80.8	138	86.2	25	78.1	0.000*
No	53	34.9	30	19.2	22	13.8	7	21.9	
How much yogurt do you consume per week?									
0-250 gr	45	29.6	28	17.9	20	12.5	101	20.2	0.000*
251-500 gr	64	42.1	43	27.6	52	32.5	166	33.2	
501gr - 1 kg	16	10.5	26	16.7	30	18.8	81	16.2	
More than 1 kg	21	13.8	55	35.3	56	35	140	2.8	
I don't consume	6	3.9	4	2.6	2	1.3	-	-	
Can you make yogurt?									
Yes	97	63.8	120	76.9	126	78.7	22	68.7	0.002*
No	38	25.0	14	9.0	16	10.0	7	21.9	
Sometimes	17	11.2	22	14.1	18	11.3	3	9.4	
Do you trust the yogurt yeast you find?									
Yes	130	85.5	140	89.7	144	90.0	21	65.6	0.001*
No	22	14.5	16	10.3	16	10.0	11	34.4	

*Pearson chi-square test

According to the income level of the participants, the nutritional properties of yogurt that they pay attention to are "probiotic" and "Where do you buy the yogurt from?", "From the market", "From the village", "Me," and "My seniors" were found to be statistically significant (Table 5). In addition, "What do you pay attention to when buying commercial yogurt?", "Price" and "Why do you prefer homemade yogurt?" to reply "I think it is healthier because it has no additives" were determined to be important. “What do you think about homemade yogurt being sourer than commercial yogurt?” to reply, “Storage conditions and expiry time” were found to be statistically significant. However, “What are the properties you are worried about in commercial yogurt?” to answer "color" and "Where do you get the yeast to make homemade yogurt?" to reply “I get it from my neighbor” were also found important.

The participants gave the answers to the questions "What do you use as another leavening agent?" to "Chickpea" and "What kind of properties do you expect to have in fermented yogurt when you use commercial yogurt?" to "Consumption time should be longer (not specified in the Table).

4. Discussion

In this study, the yogurt consumption of participants throughout Turkey, their comparisons between commercial and homemade yogurt, and their knowledge levels about fermentation and different yeasts were evaluated. It was determined that women liked to consume yogurt more (93.2%) and consumed yogurt regularly (77.5%). Moodi et al. (2021), in their study with 541 students, found that 315 (60.6%) of them did not consume yogurt compared to 205 (39.4%) students. Karakaya & Akbay (2013) stated that the reason for the low consumption of drinking milk is because families consume more yogurt in their study conducted in Istanbul. At the same time, Karakaya & Kızıloğlu (2018) reported that the differences between the consumption amounts of yogurt in terms of the education level of the consumers were statistically significant. They determined that primary school graduates consumed more yogurt than others. It found that there was a significant relationship between the number of individuals in the family and the amount of yogurt consumption and that consumers in low-population families consumed more yogurt per month.

Çetinkaya (2010), in his study in which Kafkas University students determined the consumption levels of milk and products; reported that 46.9% consumed cheese, 32% yogurt, 15.6% butter, 1.5% milk powder, 2% fruit milk, and fruit yogurt. Ürkek & Taş (2021) reported that university students prefer probiotic yogurt and kefir very little, and the reason is due to their taste and price. Yalçın & Argun (2017) stated that 0.8% of the students 1-2 times a day, 5.8% several times a week, 6.7% once a week, 7.5% once every 15 days, 17.5% consumed yogurt once a month, 18.3% of them consumed it less frequently, and 43.3% of them did not consume any probiotic yogurt. Literature reviews have shown that there are not many studies on scoring to determine the level of probiotic knowledge. However, Yurttaş & Yılmaz (2017) stated that 15% of health school students had good probiotic knowledge, 48.1% had medium, and 36.9% had low levels of probiotic knowledge. To eliminate the imbalance in the intestinal microbiota and improve or modulate intestinal health, the public should benefit more from the experts in the use of probiotic, prebiotic, paraprobiotic, and postbiotic food supplements and over-the-counter pharmaceutical products (Uğur et al., 2021).

Tarakçı et al. (2015) stated that the question "Where do you buy yogurt from?" 32.7% of them were in the market, 31.3% in the village, 2.0% in the market, and 34.0% in their home consumers in Ordu city. The researcher's results are in agreement with the present study results.

In this study, it was determined that the participants believed homemade yogurt was healthier than commercial yogurt. This result was also directly proportional to the idea that there were additives in commercial yogurt, as presented in the results of the study. Özbey (2020), in his study with 1200 students, found that 68% of the participants answered yes to the question, "Do you think there are additives in drinking milk and plain yogurt?”

The participants stated that they used commercial yogurt yeast to make yogurt at home, and in general, they were not knowledgeable about other methods to make yogurt besides yogurt yeast. In this respect, more studies need to be carried out to increase the knowledge level of consumers. Güzeler et al. (2017) recommended the production of yogurt fermented with chickpeas in their research, where they examined the physical, chemical, and microbiological properties of yogurt fermented with chickpeas. More research should have been done to learn about the sensory and chemical properties of yogurt made from different yogurt yeasts. In the literature,

we had not come across any other study that directly measured the participants' attitudes toward yeast in Turkey.

When examined according to educational status, 62.2% of secondary school graduates stated that they would not use the yogurt yeast sold in the markets. In comparison, 61.8% of undergraduates said that they would use it. %83.3 of primary education graduates stated they would not trust the yeast sold in markets. Based on these data, we suggested that the knowledge level of the participants was insufficient and that experts should adequately inform people on this subject. Compared to Europe and America, the per capita consumption of yogurt in our country was quite low. People generally, due to sensory properties such as taste and smell, did not prefer commercial yogurts, resulting in decreased yogurt consumption (Demirci & Şimşek, 1997; Herdem, 2006). In addition, consumers appreciate yogurts prepared with traditional methods more from a sensory perspective. For this reason, we could emphasize that, by sticking to the traditional production method, using either natural yogurt yeast or different yeasts to meet the consumer with yogurt production would be more accepted by everyone from a sensory point of view.

Yogurt was produced using dew droplets collected from plants in the morning of Hıdırellez and chickpea samples from 15 brands. The control yogurt made with traditional yogurt yeast was superior to the samples produced with chickpea and dew droplets in terms of both yogurt bacteria and sensory properties (Anonymous, 2021). This study was essential in formulating yogurt, a product with precious bioactive compounds, in line with the development and new trends in the food sector in 2021 by testing various yeasts with preliminary tries under hygienic laboratory conditions.

5. Conclusions

Yogurt is a popular product that stands out as one of the world's most consumed fermented dairy products. It is an excellent food to provide a daily intake of nutrients that can prevent diseases and positively affect consumer's health. Most participants stated that they liked to consume yogurt, a valuable product, and they consumed it regularly. In addition, 73.0% of the participants made their yogurt, 82.6% could not find fermented yogurt, 87% trusted the fermented yogurt they found, 66.8% did not accept yogurt fermented with commercial yogurt yeast as homemade yogurt, and 91.4% did not accept yogurt leavening. It was determined that they did not know that different raw materials could be used in yogurt yeast. It has also been observed that the consumer generally has a positive attitude towards natural yoghurt yeast. However, we believe there was still insufficient knowledge, and the underlying reason was skepticism. There was a need for long-term, reliable studies under appropriate laboratory conditions for the production and use of yeast. It has been considered that these doubts could be eliminated by preparing yogurt yeast production in line with consumer expectations in our country.

Author contribution

FY: supervision, article administration, and resources. FY and ÖK; methodology and writing-original draft preparation. FY and ÖK; writing, reviewing, and editing.

Declaration of ethical code

The authors declare that all of the rules stated to be followed within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed.

Conflicts of interest

The authors reported no potential conflicts of interest.

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