Kefir Consumption Patterns of Students from Ataturk University, Turkiye: A Survey Study

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Abstract

Kefir is a fermented beverage produced by the lactic fermentation of milk using kefir grains or a starter culture. It has many health benefits due to its anti-inflammatory, antimicrobial, and anti-diabetic properties, while it could also regulate the gut microbiota. Thus, interest in kefir is growing in the scientific community. In this study, a survey was conducted on 401 students from Atatürk University during the 2019-2020 academic year to examine their consumption habits and knowledge level of kefir. The data were collected through a face-to-face questionnaire. The findings showed that 42.14% of the participants were aware of kefir, but only 16.96% of them consumed it. The majority of the students expressed their interest in consuming kefir due to its health benefits. They also stated that they have very little information about kefir except that it boosts immunity and is good for health. Interestingly, participants who were not familiar with kefir showed interest in consuming it after a brief explanation and kefir tasting. The findings suggest that people are interested in healthy foods, indicating a potential for spreading information and increasing kefir consumption among the younger generations.

Keywords: Kefir, Consumption habits, Kefir, University students.

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1. Introduction

Kefir is an acidic and carbonated fermented milk beverage with a low alcohol content obtained as a result of the fermentation of bacteria and yeasts in kefir grains in milk or water (Farnworth, 2003; Zamberi et al., 2016). According to the definition of the Turkish Food Codex Communiqué on Fermented Dairy Products, kefir is defined as "a fermented dairy drink that contains a minimum of two of the typical microorganisms of kefir grains, comprising *Lactobacillus kefiri, Lactobacillus kefiranofaciens, Lactobacillus kefirgranum,* and *Kluyveromyces marxianus* and Saccharomyces spp. from lactose-fermenting yeasts." In addition, kefir, produced with kefir grains or starter cultures which may contain species belonging to *Lactobacillus, Leuconostoc, Lactococcus, Acetobacter* and similar bacterial genera and different yeast species, is defined as a "fermented milk product" (Anonymous 2009). Originating in the Balkans, Eastern Europe and the Caucasus, kefir has spread to other parts of the world over time due to its positive effects on health. This sour and viscous beverage has become popular among people in countries, such as the United States, Japan, France and Brazil (Fiorda et al., 2017). The kefir grains, also known as kefir yeast, differentiate kefir from other dairy products (Azizi et al., 2021). Kefir grains vary in size from 1 to 4 cm and resemble small cauliflower florets in shape and colour (Garofalo et al., 2020). This gelatinous and slimy structure consists of kefiran, a natural exopolysaccharide (EPS), and a protein matrix in which lactic acid bacteria (LAB), yeasts and acetic acid bacteria symbiotically coexist (Kesenkaş et al., 2017). The physicochemical properties and biological activity of kefir are highly influenced by the diversity of this microbial flora, fermentation time, fermentation temperature and the amount of grain used (Angulo et al., 1993; Lin et al.,1999; Talib et al., 2019; Wang et al., 2020).

Many studies have shown that kefir consumption has crucial health benefits, including antimicrobial, antitumor, anti-carcinogenic, hypocholesterolemic, anti-hypertensive, anti-diabetic, immunomodulatory and contributing to the digestion of lactose (Güven et al., 2003, Güzel-Seydim et al., 2011, Bourrie et al., 2016, Van 2019, Şanlier et al., 2019, Kaur et al., 2020). The microflora is a significant factor in kefir-related

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health benefits due to the metabolites present in the product (Garofalo et al., 2020). In other words, the organoleptic and health-promoting properties of kefir can be attributed to its nutrient content, microbiota, and by-products (including postbiotics) produced from their metabolic activities. A unique combination of volatile metabolites, organic acids, free amino acids, and vitamins provides therapeutic properties and enhances the nutritional value of kefir (Parvez et al., 2006).

Milk and dairy products are significant sources of calcium, magnesium, potassium, phosphorus, vitamin D, riboflavin, vitamin B12, and vitamin A (Mobley et al., 2014). Regular consumption of dairy products, especially those containing probiotics like kefir, could have therapeutic and anti-inflammatory effects, enhance the immune system, lower cholesterol levels, and possess antioxidant qualities that may aid in preventing diabetes, as mentioned previously (Rosa et al., 2017). Despite the beneficial effects of these probiotic products on human health, they have not been adequately recognized, resulting in low consumption due to a lack of consumer knowledge about probiotic products and their benefits. Unfortunately, milk and dairy products in Turkiye are not produced or consumed at the desired levels. According to 2021 data, consumption of fermented dairy products, such as kefir, cheese and yogurt, has declined sharply in Turkiye (Anonymous, 2022). Therefore, it is important to investigate the knowledge and consumption of these products among individuals. In the present study, a group of associate's, undergraduate's and master's degree students from Atatürk University were surveyed about their knowledge and consumption habits of kefir. The present study aimed to investigate the consumption habits and level of knowledge of kefir among students. Additionally, this study sought to raise awareness among students about the benefits of kefir consumption, identify any problems they encounter, and take necessary measures to address them. In light of the findings obtained in this study, solutions have been recommended to increase kefir consumption and establish a foundation for encouraging healthier lifestyles.

2. Material and Methods

This study was conducted with the participation of volunteer students studying in different departments at Atatürk University in November 2019. A total of 401 students participated in the survey conducted by tasting the kefir drink that we produced traditionally. Home-made kefir beverages were produced using kefir grains by inoculating them in UHT milk at 25°C for 20 h. At the end of incubation, kefir grains were filtered. A total of 40 liters of kefir were produced for approximately 15 days or approximately 2.5 liters per day. The project team set up a stand in the Technical Sciences Vocational School and Medico Social Building at Ataturk University and served kefir to approximately 500 students and academic staff. At the kefir service, brochures were distributed to the participants and information about kefir was given. The slogan of the brochure was 'Drink Kefir to Stay Healthy.' The brochure included detailed information about kefir grains and kefir, as well as the benefits and nutritional value of kefir. The survey questions were structured based on the studies by Irmão and Rezende Costa (2018), Yelce and Gül (2020) and Ürkek and Taş (2021). Firstly, questions on social data were used to determine the demographic characteristics of the participants (Table 1). Following the 10-item questionnaire expert, input was administered to participants in face-to-face interviews after notification by the researchers. The survey questions consisted of detailed questions about knowledge about kefir, its consumption and behavioral structures, including consumers' opinions, preferences and perceptions, in accordance with the purpose of this study. After completing the questionnaire, the students were given a serving of kefir. The data for the analysis were prepared in electronic tables using the Microsoft Excel® for Windows program, version 2019. The results of this study were explained in categorical variables in number and percentage.

This research was conducted with written consent obtained from the participants in this study. They voluntarily agreed to participate in this study and were granted permission to use their data to analyze and for publication processes.

3. Results and Discussion

The demographic characteristics of the students are presented in Table 1. A total of 401 university students participated in the survey. Ages 18 to 45, with the majority (93.76%) belonging to the 18-25 age group. Among the participants, 59.85% were male and 40.15% were female. Among those whose education was examined, 42.4%, 53.12%, and 4.48% had associate's, undergraduate's, and master's degrees, respectively. Based on the evaluation results regarding the health status of the participants, the answer deemed "good" attained the highest score of 88.28%, while the answer labeled "bad" was received at a rate of 0.99%.

Table 1. Demographic characteristic of the students

Demographic characteristic		*n*	*%*
Sex	Female	161	40.15
	Male	240	59.85
Age	18-25	376	93.76
	26-32	19	4.74
	33-45	6	1.5
Education degree	Associate	170	42.4
	Undergraduate	213	53.12
	Master's	18	4.48
Health	Good	354	88.28
	Moderate	43	10.73
	Bad	4	0.99

Table 2. The knowledge of students about kefir

Answer	*Sex*	*n*	*%*
Yes	Female	76	18.70
	Male	94	23.44
	Total	169	42.14
No	Female	85	21.20
	Male	146	36.41
	Total	231	57.61
Few	Female	1	0.25
	Male	0	0.00
	Total	1	0.25
Total		401	100.00

Table 3. The sources of information on kefir definition

Sources	*Sex*	*n*	*%*
Newspaper, TV, Internet	Female	34	20.00
	Male	42	24.71
	Total	76	44.71
Social environment, Relatives	Female	26	15.29
	Male	36	21.18
	Total	62	36.47
Food Engineer	Female	14	8.24
	Male	4	2.35
	Total	18	10.59
Not sure	Female	2	1.18
	Male	12	7.06
	Total	14	8.24
Total		170	100.00

Table 4. Milk and dairy products consumption of the students

Answer	*Sex*	*n*	*%*
Yes	Female	148	37.09
	Male	225	56.39
	Total	373	93.48
No	Female	12	3.01
	Male	14	3.51
	Total	26	6.52
Total		399	100.00

Participants were initially surveyed about their awareness of kefir to determine whether they had any knowledge of kefir. Of the respondents, 42.14% answered “yes”, while a significant proportion (57.61%) answered “no”, and only 0.25% stated that she had little knowledge (Table 2). The data collected suggests that compared to other fermented products kefir, a special fermented dairy product, is less known and consumed by the students than other fermented products. Considering that these answers did not provide a clear result, therefore, the survey was continued with further detailed questions.

In order to detail the information of the participants who have knowledge about the source of this information, 44.71% said they learned about it from the newspaper, 36.47% from their friends and 10.59% from the food engineers. However, some of students (8.24%) participating in the survey stated that they were not sure of the source of the information they had about kefir. Table 3, displays the distribution of these answers.

The students were asked questions about the consumption of milk and dairy products, including kefir. As can be seen in Table 4, 93.48% of students participated in the survey stated that they consumed milk and dairy products, regularly. Regarding this, the consumption rate was higher in male students (56.39%) than for female students (37.09%). In the Turkish Nutrition Guide, it is advised that adults should consume three portions of milk and dairy products, while children, adolescents, pregnant and lactating women and post-menopausal women should consume between two and four portions of these products. One portion includes a medium-sized mug of milk (240 mL), yogurt (200-240 mL), or two matchbox-sized portions of cheese (40-60 g on average) (Pekcan et al., 2016).

The students were asked about their consumption frequency of milk and dairy products. The data collected showed that 53.27% of the students consumed dairy products at least once a day (Table 5). In addition, 32.66% of the student population reported consuming milk and dairy products weekly, 10.30% monthly, and 3.77% annually. Aktaç et al. (2021) conducted a survey analyzing attitudes towards traditional fermented food consumption among 1233 students. The study found that 89.7% of participants had positive traditional fermented food consumption and 45.2% of this consumption rate was associated with health benefits. In the research carried out by Ürkek and Taş (2021), 39.8% of the university students determined that they preferred fermented milk products because they liked them, and 40.9% of them preferred them because they were healthy.

Table 5. The frequency of milk and dairy products consumption among students

Answer	*Sex*	*n*	*%*
Once a year	Female	5	1.26
	Male	10	2.51
	Total	15	3.77
Once a month	Female	16	4.02
	Male	25	6.28
	Total	41	10.30
Once a week	Female	44	11.06
	Male	86	21.61
	Total	130	32.66
Once a day	Female	94	23.62
	Male	118	29.65
	Total	212	53.27
Total		398	100.00

Table 6. The knowledge that kefir is a dairy product

Answer	*Sex*	*n*	*%*
Yes	Female	136	34.09
	Male	188	47.12
	Total	324	81.20
No	Female	24	6.02
	Male	51	12.78
	Total	75	18.80
Total		399	100

Table 7. The consumption rates of kefir per gender of the students

Answer	*Sex*	*n*	*%*
Yes	Female	30	7.48
	Male	38	9.48
	Total	68	16.96
No	Female	131	32.67
	Male	202	50.37
	Total	333	83.04
Total		401	100

Table 8. Reasons for kefir non-consumption by the students

Answer	*Sex*	*n*	*%*
Not benefit	Female	3	1.18
	Male	4	1.57
	Total	7	2.76
Not safe	Female	3	1.18
	Male	10	3.94
	Total	13	5.12
Expensive	Female	17	6.69
	Male	24	9.45
	Total	41	16.14
Not need	Female	77	30.31
	Male	116	45.67
	Total	193	75.98
Total		254	100.00

An evaluation was made to determine whether the students knew that kefir is a dairy product. 81.20% of students conveyed their awareness, whereas 18.80% admitted to a lack of knowledge (Table 6). This information was so important for this study. Because kefir, which is consumed with pleasure in many countries around the world, is unfortunately not known and consumed enough in Turkiye.

Table 7 shows the kefir consumption rates of the students. According to the answers of the students participating in the survey regarding their kefir consumption habits, 83.04% stated that they did not consume kefir, while only the remaining 16.96% stated that they consumed kefir. Among those who consume kefir, 9.48% are men and 7.48% are women. Regarding non-consumers, 50.37% are men and 32.67% are women. Similarly, in the research conducted by Yelce and Gül (2020), 70.83% of the consumers living in Antalya city center stated that they do not consume kefir. It appears that the consumption of kefir is lower among university students.

The surveyed students who did not regularly drink kefir were questioned about their reasons (Table 8). Respondents ranked their reasons for not using kefir in the following order; not needed (75.98%), expensive (16.14%), not safe (5.12%) and not benefiting (2.76%).

The students who participated in the survey were asked whether they knew how kefir is produced (Table 9). Of all participants, 57.14% of the students stated that they did not know, 25.31% stated that they had some knowledge and 17.54% stated that they had knowledge about kefir production. Although the majority of students know that kefir is a dairy product, it is understood that they have no idea how it is produced. Sharing information about the production process of kefir for more conscious consumption will benefit society in terms of general culture. It is believed that providing information about kefir production in the brochures distributed as part of the current study may be useful in this regard.

The surveyed students were asked whether they had any information about the health benefits of kefir (Table 10). Only 31.08% of students answered 'yes' whereas 39.6% of them said 'no'. Tarakci et al. (2015) investigated the consumption habits of fermented dairy products among consumers in Ordu province, and 42.0% answered yes and 58.0% answered no to the question. 'Do you have any information about the effect of kefir on human health?'. Unfortunately, in Turkiye, kefir is not as well-known as other dairy products, and the health benefits of kefir are only known to a very

Table 9. The knowledge about how kefir is produced

Answer	*Sex*	*n*	*%*
Yes	Female	32	8.02
	Male	38	9.52
	Total	70	17.54
Few	Female	44	11.03
	Male	57	14.29
	Total	101	25.31
No	Female	84	21.05
	Male	144	36.09
	Total	228	57.14
Total		399	100.00

Table 10. The awareness of the health benefits of kefir

Answer	*Sex*	*n*	*%*
Yes	Female	62	15.54
	Male	62	15.54
	Total	124	31.08
Few	Female	43	10.78
	Male	74	18.55
	Total	117	29.32
No	Female	55	13.78
	Male	103	25.81
	Total	158	39.60
Total		399	100.00

Table 11. Answers to the query 'Would you consume kefir after today?'

Answer	*Sex*	*n*	*%*
Yes	Female	53	13.28
	Male	67	16.79
	Total	120	30.08
No	Female	39	9.77
	Male	48	12.03
	Total	87	21.80
Sometimes	Female	68	17.04
	Male	124	31.08
	Total	192	48.12
Total		399	100.00

small number of people. For this reason, this study was carried out to explain its advantages and introduce it to university students in particular. The definition of kefir, its production and health benefits were explained in detail in the brochures distributed to the students during the survey.

Students were asked the question, 'Would you consume kefir after today?' The highest response rate was recorded for the 'sometimes' option at 48.12%. The lowest response rate was for 'no' (21.8%), while 30.08% of the participants answered positively (Table 11). Most of the students who had no knowledge about kefir before and had never drunk kefir answered this question positively. However, students who do not currently consume milk and products and students who do not like the taste and smell of kefir responded negatively. Kefir, a probiotic milk product, is a wonderful drink due to its functional properties. However, its consumption is low in our country and society needs to be informed about it. From the answers to this question, it can be concluded that this goal has been partially achieved.

4. Conclusion

According to the results of the present study, students at Ataturk University have limited knowledge about kefir and do not consume enough dairy products. Although kefir is not a popular beverage among students, they have shown a considerable interest in it. The reason for the lower consumption of traditional fermented drinks like kefir could be because these drinks are usually produced at home or by small-scale producers in certain regions of Turkiye. Food preferences of university students are influenced by advertisements, social media, and the internet, which leads them to consume fast food and reduce the consumption of traditional fermented foods, including kefir. However, this study has confirmed that kefir, an affordable and probiotic food with acceptable sensory features, has the potential for increased consumption by the younger generation. Consequently, promoting kefir as a healthy food is a practical and promising.

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Declaration of Competing Interest

The authors declare that they have no financial or non-financial competing interests.

Author's Contributions

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