CONSUMER PERSPECTIVE REGARDING DRIED TROPICAL FRUITS IN TURKEY

G. CINAR
Department of Agricultural Economics, Faculty of Agriculture, Aydın Adnan Menderes University, Turkey
E-mail address: gokhan.cinar@adu.edu.tr

ABSTRACT

The purposes of this study are to evaluate the tropical fruit (banana, kiwi, pineapple) preferences of consumers in Turkey and their willingness to pay and to assess the factors that affect this willingness to pay. In this context, tropical fruit products were presented in packages of 50 grams to 386 individuals who had never tasted these products before, and after the products had been tasted, surveys were administered. The findings revealed that dried banana has sensory issues related to hardness and taste and that dried kiwi has sensory issues related to taste and odour. The results show that improving the taste characteristics and increasing the emphasis on health while promoting the products could have a positive impact on increasing the demand for these products in Turkey.

Keywords: consumers, dried fruits, sensory analysis, willingness to pay

1. INTRODUCTION

In Turkey, fruit is a widely cultivated product. However, demand for banana, pineapple and kiwi, which are tropical fruits, is met through imports because of climatic conditions and land constraints in Turkey. In 2015, Turkey had a total of 5,896,156 USD of pineapple imports, 108,334,990 USD of banana imports and 2,945,173 USD of kiwi imports. Many of these imports are from countries such as Costa Rica, Ecuador, Chile, Guatemala and Panama (ANONYMOUS, 2016). Importing from other countries increases the risk that these products will be decayed. The protections applied to remove this risk, however, make it difficult to maintain quality standards that differ from country to country.

These issues can be resolved by drying the products. Drying essentially means removing the moisture from the product with the help of the sun or mechanical devices (CHANG *et al*., 2016). This process reduces packaging, shipping and transportation costs for the product due to the decrease in its weight and mass and reduces the measures needed for product protection (OMOLOLA *et al*., 2017). On the other hand, dried fruits contain more antioxidants, fibre and vitamins than do fresh fruits (BENNETT *et al*., 2011). This information shows that dried fruit consumed regularly and in the correct amount can reduce risk for various health factors such as glycaemia and cardiovascular diseases (JESZKA-SKOWRON *et al*., 2017).

Although dried fruits have advantages related to both consumer health and commercial risk, few studies have focused on consumer preferences for these products. Accordingly, JESIONKOWSKA *et al*. (2009) determined the factors affecting the consumption preferences of Dutch, French and Polish consumers who expressed that they consumed dried fruit and fruit products at least once a month. Similar studies have been conducted on Dutch, French (SIJTSEMA *et al*., 2012) and Chinese (WU, 2017) consumers. In these studies, it was argued that emphasis on health can play an especially important role in increasing the consumption of these products. ALPHONCE *et al*., (2015) assessed consumer preference in Europe and the willingness of consumers to pay extra for tropical dried fruit produced in Africa. The organic status of dried fruit and fair trade factors have been shown to influence consumer willingness to pay extra for dried fruit.

Various fruits such as dried apricots, figs and grapes, which are extensively cultivated in Turkey, are consumed frequently and are well recognized by consumers. Therefore, the Turkish consumer is familiar with dried fruit products and the process of their production. However, in Turkey, dried kiwi, banana and tropical fruits such as pineapple have recently started to be sold. Currently, these products are occasionally sold in private stores, in a limited number of supermarkets and online. Therefore, consumers in Turkey do not know much about these tropical dried fruits, and many of them have never tasted these products.

Specifically, approximately 75-90% of the food products that are newly introduced into a market may fail in the first few years after being launched (TALAVERA *et al*., 2017). To understand and improve market success for new products, consumer analysis is needed (CHEN *et al*., 2013; DE ANDRADE *et al*., 2017).

However, consumers' decision to eat fruits and derivative products is the result of the interaction between a large variety of factors (SABBE *et al*., 2009). Studies show that the foremost factor governing consumer preferences is the fruit's internal features such as taste, odour, colour, and firmness (POLLARD *et al*., 2002; HARKER *et al*., 2008). Another important factor is the importance that the consumer gives to health and their lifestyle (POLLARD *et al*., 2001). Considering health, it is indicated that the probability of purchasing fruit is affected positively when health-related information or the possible benefits of the product are noted on the label (SILVESTRI *et al*., 2018). According to SABBE *et al*., (2008), consumers' socio-demographic structures such as gender and habitat are

related to their willingness to purchase tropical fruits. In addition, while consumers can be affected by a wide range of external product features such as brand, price, convenience, availability, and packaging in food selection, they pay more attention to price, especially when buying fruit (SABBE *et al*., 2009). Overall, apart from consumers' socio-demographic features, the price of the product and the health-consciousness and lifestyle of the consumer are important considerations in fruit consumption. For this reason, these matters were the primary focus of this study.

Realizing consumers' sentimental expectations, leads to consumer satisfaction and increases the marketing of the product (GRUNERT, 2002). HALAGARDA and SUVALA (2018) argue that referring to consumers' experiences on the current products increases the level of significance of the research outcomes. MIGLIORE *et al*., (2017) has emphasized that not recognizing and being unfamiliar with tropical fruits is one obstacle to purchasing. A product overview was written and a taste test administered in order to overcome these problems as well as to appraise these products, which are new to the market from the consumers' point of view.

The fundamental hypothesis underlying this study is that the willingness to buy a new fruit product can change depending on an individual's sensitivity towards health and the internal features of the product, as well as the demographic and socio-economic features of consumers. That information contributes to the choice of the target market. In addition, another hypothesis formed claims that sensory evaluation tests presented to the consumers helps them to evaluate the characteristics of the products. That information, if exists, contributes to the development of the sensual features of the product. The last hypothesis indicates that a new product has a perceptual position compared to the various derivative products. That information helps to determining possible competitor products.

In this context, the main purpose of this study is to determine the willingness of consumers who have never tasted dried tropical fruits (kiwi, banana, pineapple) to pay for these products.

In addition to this objective, other objectives of my study are as follows:

- Determining the amount of money that consumers, who want to buy dried tropical fruits, are willing to pay;
- Revealing the factors that affect willingness to pay for dried tropical fruits;
- Analysing the degree of preference for and deficiencies of dried tropical fruits depending on their sensory properties; and
- Determining the consumption preference hierarchy for dried tropical fruits compared to their other derivative products.

Given the assumption that dried tropical fruit products are quite new for many consumers, it is important to understand the different factors that affect consumers' willingness to purchase and consumption behaviour in terms of developing promotion policies. Few studies have examined consumers' preferences for dried fruits, and none of these studies focused on the Turkish market. Through an extensive literature search and application of the different methods used in this study, better marketing strategies can be developed for the decision makers and operators in the dried tropical fruit industry.

2. MATERIALS AND METHODS

2.1. Overview

This study was conducted in Izmir, which is located in the western part of Turkey and is the biggest city in the area. Participants who had not tasted dried tropical fruits before were given banana, kiwi, and pineapple in packs of 50 grams to taste free of charge. The participants were then asked to rate the taste, colour, appearance, hardness, and odour of these products in points. Then, a questionnaire was administered to the participants, and the consumers' willingness to purchase these products and the factors that influence this willingness were determined. Finally, the participants' preference for different types of these products (fresh fruit, mineral water, fruit milk, fruit yogurt) and the ranking of the derivative products in the consumer mind were determined based on the information gathered from these same questionnaires.
SPSS 21 (Statistical Package for Social Sciences) and R package programs were used for the statistical analysis in this study. The materials and methods used in this study at presented in detail below.

2.2. Sample selection

The location of the survey was İzmir Province, as it contains the largest city in the Aegean region and the third largest city in Turkey. The total population of İzmir Province is 4,223,545. This province, according to code TR31, represents a region of its own. In the study, the number of consumers surveyed was determined by the following sample formula (NEWBOLD, 1995):

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

where n is the sample size, N is the population size (4,223,545), and p is the prediction rate (0.5 for the maximum sample size) and the probability level confidence interval (95% confidence interval, σ_p: 0.02551 for 0.05 margin of error from the equation of $1.96\sigma_p$: 0.05). Accordingly, the number of consumers randomly selected for the face-to-face survey was 385. Questionnaires were administered to a total of 386 consumers, of which there were 193 females and 193 males; thus, the numbers of male and female consumers were equal.
The main constraint of this study is about the sample collected from a limited part of Turkish society. The sample in this study may not be a representative of all segments of the Turkey population. The research can be expanded with sample size acquired from different regions and cultures.

2.3. Sensory evaluations

In this study, dried tropical fruits (kiwi, banana, pineapple) were evaluated by consumers who had not previously tasted such products before. Participants were selected on a volunteer basis. The products were presented to the participants free of charge as dried kiwi, banana, and pineapple in packs of 50 grams. A little time was given, and water was provided in order to minimize residual effects between tasting the different products. The participants were then asked to rate the taste, odour, appearance, firmness, and colour of each product objectively on a 9-point Likert-type scale (1. Dislike extremely, 5. Neither like

nor dislike, 9. Like extremely). On this scale, for example, for firmness, 1 defines the expression “the product is extremely firm”, while 5 defines the expression “the product is neither firm nor soft”, and 9 defines the expression “the product is an ideal firmness”. Although this evaluation method, which makes use of previous studies (ZHAO *et al*., 2007; BARRETT *et al*., 2010), is generally used by expert panellists, it can also be used by consumers (WORCH *et al*., 2010).

2.4. Conditional valuation method and lower bound meaning for payment

In this study, the conditional evaluation method was applied to determine consumer willingness to pay for dried tropical fruits. For this method, a hypothetical market is created for any goods or services that cannot be sold on the market, the benefits that can be gained from such goods or services are explained, and how much consumers are willing to pay for the benefits that they receive in consuming these goods or services is determined (CARSON, 2000; UZMAY and CINAR, 2017). In this research, dried kiwi, banana and pineapple were first tasted by consumers in complementary packages of 50 grams. These consumers had not previously tasted these products before. After this step, consumers were informed about the products, specifically, the products' health advantages. Then, consumers were asked separately about kiwi, banana and pineapple and whether they would like to buy these products. If the response was positive, the final price that they were willing to pay was determined. The prices obtained from each consumer were converted to the consumer's general willingness to pay based on the lower bound method presented below (BLAINE *et al*., 2003).

$$\text{Lower Bound Method (LBM)} = \prod_0 (P_0) + \sum_{i=1}^{k} \prod_i (P_i - P_{i-1})$$

where Π_0 is the cumulative percentage of willingness to pay, P_0 is the lowest payment boundary, and K is the number of boundaries.

2.5. Logistic regression

In this study, the dual logistic regression method is used to determine the factors that affect consumer willingness to pay for dried fruit. In the logistic regression model, the dependent variable is discrete, and the estimated probability values range from 0 to 1. A general logistic regression model is expressed below (GUJARATI, 1995).

$$P_i = F(z_i) = F(\alpha + \beta X_i) = \frac{1}{1 + e^{-(zi)}} = \frac{1}{1 + e^{-(\alpha + \beta X_i)}}$$

where P_i=i is the probability that the i^{th} individual chooses a specific option, F is the cumulative probability function, α is the constant coefficient, β is the estimation parameter for each independent variable, and X is the independent variable. In this study, consumer dried fruit consumption status (no/yes) was the dependent variable in the logistic regression model. Models are designed separately for the three separate products. In the models, the dependent variables are consumers who are not willing to pay for the dried products. The independent variables are education level of the consumers, understanding of a healthy life, gender, income, age and body mass index. The response obtained from the expression "I think I am a consumer who understands a healthy life" represented the consumers' understanding that a healthy life is included in the response model. For this,

before receiving their answer, it was expressed to the consumers that health-consciousness involves living a healthy life, eating healthy, exercising, sleeping well, and being in touch with nature frequently. Accordingly, the consumers were asked to evaluate themselves objectively. In addition to this process, the study also used hypothesis tests such as Mann-Whitney U, Friedman, and Kendall's W.

2.6. Fuzzy pairwise comparison method and multidimensional scaling analysis

In this study, after the products were tasted by the consumers, questionnaires were administered. The sections included in the questionnaire were in the order of the consumption preferences among fresh fruit, fruit yoghurt, plain fruit, fruit milk, fruit soda and dried tropical fruits. In this section, the fuzzy pairwise comparison method was used. The steps of the method can be summarized as follows (TANAKA, 1997). Pairwise comparisons were presented to indicate individual preferences. The total distance in a comparison was equal to 1. If G_{KH}=0.5, then K≈H; if G_{KH}>0.5, then K>H; and if G_{KH}<0.5, then K<H. The number of paired comparisons of the objectives (C) was determined as C=[(Z.(Z-1))/2]. Z referred to the preferred number of objectives in the formula. In this study, 10 comparisons of five different products were presented to everyone. For each pairwise comparison, the g_{cr} preference was obtained. Measurement of the preference degree of r according to c can be expressed as g_{cr}=1-g_{rc}. Then, the fuzzy preference matrix was generated.

$$G_{cr} = \begin{cases} 0 \quad if \;\; c = r \;\; \forall\, c, r = 1, \ldots . n \\ g_{cr} \; if \; c \neq r \; \forall \, c, r = 1, \ldots . . n \end{cases}$$

In this study, a 5×5 fuzzy preference matrix was created for each individual as follows:

$$G = \begin{bmatrix} 0 & g_{12} & g_{13} & . & g_{1r} \\ g_{21} & 0 & . & . & . \\ g_{31} & g_{32} & 0 & . & . \\ . & . & . & 0 & . \\ g_{c1} & . & . & . & 0 \end{bmatrix}$$

The separately preferred density of each objective (μ_j) was obtained using the following equation:

$$\mu_j = 1 - (\sum_{c=1}^{n} G_{cr}^2 /(n-1))^{1/2}$$

The value of μj ranged between 0 and 1. This information provides a more efficient structure than traditional sorting methods (GUNDEN and TERRENCE, 2012).
The objective hierarchy obtained by fuzzy pairwise comparisons was converted to perceptual maps using multidimensional scaling. This analysis obtained the projection of the objects in a k-dimensional space based on the determined distance between n objects according to p argument. This projection used the distance between units. This analysis used Kruskal's stress to determine concordance with distances between estimated distances.

$$\text{Stress} = \sqrt{\frac{\sum\sum\left(d_{ij} - k_{ij}\right)^2}{\sum(d_{ij}^2)}}$$

3. RESULTS

3.1. Consumer profile

In Table 1, various demographics such as gender, age and educational level of the participants are presented. According to the regional results of the Turkish Statistical Institute's research on income and living conditions for 2014, the average annual household income was 32,639 TL. The monthly average annual income is 2719 TL. In this study, the average household income was 2904 TL. According to TURKSTAT, the average height of Turkish citizens is 167.2 centimetres, and the average weight is 71.5 kilograms (ANONYMOUS, 2003a). The weight and height ratios of the participants were obtained with the aim of establishing the body mass index variable to use in the model at a subsequent stage. In the present study, the average weight of the participants was 70 kilograms, and the average height was 168 centimetres. Participants with a primary education accounted for 51.3% of the total participants, 32.4% of the participants were high school graduates, and 16.4% of the participants were university graduates. This information agrees with the educational characterization of İzmir province. Approximately 49.6% of the Izmir population is female, and 51.4% is male. Based on these data, the numbers of male and female participants selected for the sample group were equal. The household size of the participants was 4. In general, the demographic findings corresponded to the Turkish consumer profile.

Table 1. Participants' socioeconomic characteristics*.

Demographic variable	Minimum	Maximum	Mean
Weight (kilograms)	50	130	70.292
Size (centimetres)	150	190	168.450
Age (year)	18	75	41.233
Number of people in the household	1	10	4.256
Income level of the household (Turkish lira)	1400	11000	2904.330
Educational status			
Primary/secondary school		198	51.3%
High school		125	32.4%
College/Faculty/Postgraduate		63	16.4%
Gender			
Female		193	50%
Male		193	50%

*at the time of the survey, 1 USD=2.72 TL.

As previously mentioned, consumers that had not consumed dried tropical fruits (banana, kiwi, pineapple) prior to the study were selected. In addition, consumers with no chronic illnesses caused by fruits and who generally consumed fruit fresh, especially banana, kiwi and pineapple, were also selected. The consumers were asked open-ended questions about the most consumed, the most liked and the most disliked fruit types that they had consumed in the previous year. The responses obtained are presented in Table 2. According to the responses, the most consumed fruits in the last year were apples, followed by oranges. These findings are consistent with the Turkish Statistical Institute's data on the consumption of food items. Accordingly, apple is the most consumed fresh

fruit in Turkey, with an annual consumption of 67,634,642 kilograms (ANONYMOUS, 2003b). In general, it can be stated that the fruit consumption characteristics of the consumers participating in the survey were well matched with the Turkish consumer.
Specifically, the fact that these fruits can be produced in Turkey, can easily be accessed, and are cheaper are the most basic reasons for them being consumed the most. In addition, some products (watermelon, melon) are consumed by consumers as fruit although they are regarded as plants in the literature. On the other hand, the most popular fruit is banana, and the least popular fruit is grapefruit. Additionally, 62.2% of the consumers preferred to buy fresh fruits from the bazaar, 20.2% from the supermarkets and 10.6% from grocery stores. For these selections, product type, cost and availability are the primary factors affecting their selection.

3.2. Sensory data analysis

In this research, sensory evaluation by consumers was performed on dried kiwi, banana and pineapple. The evaluated sensory criteria were hardness, smell, taste, appearance and colour. The highest score for these criteria was 9, while the lowest score was 1. When evaluated in terms of overall score, the highest score was for dried pineapple (7.14). This score was described as a "good at a moderate level" on the sensory evaluations scale. In addition, the second-best score was for kiwi (5.96). This score was described as "neither good nor bad". The lowest score belonged to dried banana, with an average of 4.54. This score was described as "slightly bad".
Figure 1 presents the sensory evaluation data for the products. According to these data, the average hardness scores were 1.6 for banana, 7.4 for kiwi and 7.5 for pineapple. The taste score averages were 2.1 for banana, 5.1 for kiwi and 6.7 for pineapple. The colour score averages were 6.8 for banana, 7.5 for kiwi and 7.2 for pineapple. The average point of appearance was 5.8 for banana, 6.6 for kiwi and 7.1 for pineapple. The average scores for smell were 6.4 for banana, 3.2 for kiwi and 7.2 for pineapple. In summary, banana had a low score in terms of hardness and taste, and kiwi had a low score in terms of taste and smell. Pineapple also had a higher value than the other products in five criteria.

3.3. Willingness to pay

Table 3 presents consumer willingness to pay for dried products. According to the table, 62.2% of consumers were reluctant to buy dried banana. Of these consumers, 78.3% attributed the reason for not buying this product to the problems with taste and hardness, and 92.1% attributed the reason to other sensory attributes. On the other hand, the lowest price given for this product was 0.10 TL and the highest price was 10 TL by consumers who wanted to buy the product. However, findings from the lower bound of the payment methods showed that the general consumer group tended to be willing to pay 0.91 TL for a 50 gram package of dried banana.
When the dried kiwi findings were examined, it could be observed that 52.2% of the consumers wanted to buy dried kiwi, while 47.8% did not want to buy it. Among the consumers who were reluctant to purchase this product, 78.7% had reasons relating to product odour and taste, and 86.4% had reasons relating to other sensory properties.
On the other hand, for the consumers who wanted to buy the product, the lowest price for this product was 0.10 TL, and the highest price was 13 TL. However, the findings from the lower bound method show that the general consumer group tended to be willing to pay 1.30 TL for a 50 gram package of this product.

Table 2. Consumer preferences for fresh fruit consumption.

The fruit that I consume the most			My favourite fruit			The fruit that I never eat		
	Frequency	%		Frequency	%		Frequency	%
Apple	118	30.570	Banana	119	30.829	None	100	25.907
Orange	77	19.948	Strawberry	46	11.917	Grapefruit	51	13.212
Banana	61	15.803	Plum	45	11.658	Medlar	27	6.995
Tangerines	34	8.808	Apple	41	10.622	Quince	25	6.477
Plum	28	7.254	Kiwi	29	7.513	Grape	23	5.959
Strawberry	15	3.886	Peach	13	3.368	Alligator Pear	18	4.663
Watermelon	13	3.368	Watermelon	12	3.109	Apple	16	4.145
Kiwi	11	2.850	Cherry	12	3.109	Plum	11	2.850
Pear	5	1.295	Tangerines	12	3.109	Orange	11	2.850
Melon	4	1.036	Pineapple	10	2.591	Diospyros Kaki	10	2.591
Pomegranate	4	1.036	Orange	9	2.332	Eriobotrya Japonica	10	2.591
Pineapple	3	0.777	Grape	7	1.813	Apricot	10	2.591
Apricot	3	0.777	Unripe Almond	6	1.554	Pear	9	2.332
Peach	3	0.777	Pear	5	1.295	Pomegranate	9	2.332
Grape	3	0.777	Melon	4	1.036	Peach	8	2.073
Ages	2	0.518	Apricot	4	1.036	Strawberry	7	1.813
Quince	1	0.259	Pomegranate	3	0.777	Mulberry	5	1.295
Cherry	1	0.259	Other	9	2.331	Other	36	9.324
Total	386	100		386	100		386	100

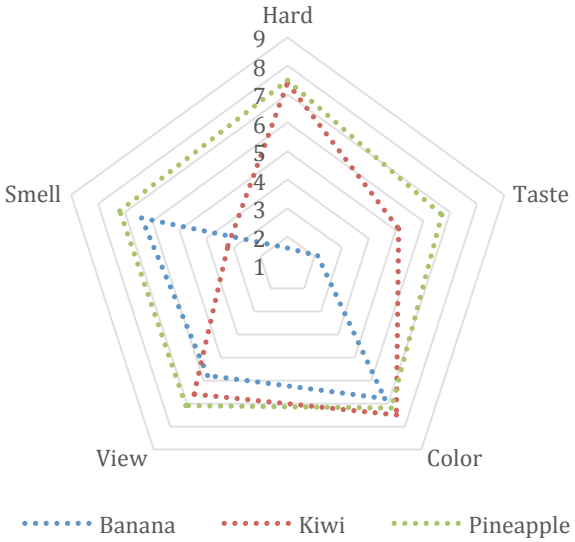

Figure 1. Sensory evaluation for dried banana, pineapple and kiwi.

While 60.1% of the consumers were willing to pay for the dried pineapple, 39.1% did not want to buy this product. Accordingly, dried pineapple was the product with the highest willingness to pay. Of the consumers, 71.2% that were reluctant to purchase had issues relating to taste, and 89.8% of the consumers indicated that they had issues with other sensory characteristics. However, among the consumers who wanted to buy the product, the lowest price given for this product was 0.25 TL, and the highest price was 10 TL. However, the findings from the lower bound method showed that the general consumer group tended to be willing to pay 1.97 TL for a 50 gram package of this product. In general, the highest willingness to pay was for dried pineapple. The second highest willingness to pay was for dried kiwi, followed by dried banana.

3.4. Factors influencing consumer preferences

In this part of the study, factors affecting consumer willingness to buy dried banana, kiwi and pineapple have been revealed. For this, a logistic regression model was used, and each product was analysed separately (Table 4). Consumers who wanted to purchase products were the dependent variables in the model, and the independent variables were their socio-demographic characteristics. The data obtained indicated that the models were significant ($p<0.05$). The correct estimation rate of the dependent variable was 71.2 for dried banana, 70.7 for dried kiwi and 69.7 for dried pineapple. The explanatory power of the dependent variables (R^2) for the independent variables was 16.3% for dried banana, 24.7% for dried kiwi and 24.0% for dried pineapple. In Table 4, the direction of the B coefficient represented the odds ratio (probability of occurring) of the Exp (B) coefficient.
The findings showed that gender affected the consumption of dried fruit. Female participants wanted to pay more for dried products than did the male participants. While this willingness to pay was significant for dried pineapple and kiwi, it was not statistically significant for banana. According to these results, females tended to buy 6.99 (1/0.143) times more dried pineapple than males and 4.83 (1/0.207) times more dried kiwi than males (Table 4).

Table 3. Willingness of consumers to pay for dried banana, pineapple, and kiwi.

Dried kiwi (TL/package)				Dried pineapple (TL/package)				Dried banana (TL/package)			
WTP(TL)	**Frequency**	**%**	**C%**	**WTP(TL)**	**Frequency**	**%**	**C%**	**WTP(TL)**	**Frequency**	**%**	**C%**
13	1	0.26	0.26	10	12	3.11	3.11	10	3	0.78	0.78
10	7	1.81	2.07	8	1	0.26	3.37	5	21	5.44	6.22
7	1	0.26	2.33	7	4	1.04	4.40	4	3	0.78	7.00
6	1	0.26	2.59	6	3	0.78	5.18	3	22	5.70	12.70
5	30	7.77	10.36	5	51	13.21	18.39	2.5	4	1.04	13.73
4	8	2.07	12.44	4	11	2.85	21.24	2	40	10.36	24.10
3.5	1	0.26	12.69	3	43	11.14	32.38	1.5	8	2.07	26.17
3	28	7.25	19.95	2.5	5	1.30	33.68	1	33	8.55	34.72
2.75	2	0.52	20.47	2	47	12.18	45.85	0.75	2	0.52	35.24
2.5	2	0.52	20.98	1.5	6	1.55	47.41	0.5	8	2.07	37.31
2.25	1	0.26	21.24	1	38	9.84	57.25	0.25	1	0.26	37.57
2	38	9.84	31.09	0.75	1	0.26	57.51	0.1	1	0.26	37.83
1.5	7	1.81	32.90	0.5	12	3.11	60.62	0	240	62.18	100.00
1	35	9.07	41.97	0.25	1	0.26	60.88	Total	386	100.00	
0.75	1	0.26	42.23	0	151	39.12	100.00				
0.5	8	2.07	44.30	Total	386	100.00					
0.25	1	0.26	44.56								
0.1	1	0.26	44.82								
0	213	55.18	100.00								
Total	386	100.00									
LBM=1.30 TL/package (26.0 TL/kg)				LBM=1.97 TL/package (39.4 TL/kg)				LBM=0.91 TL/package (18.2 TL/kg)			

Table 4. Results of the logistic regression model.

Independent variable	Description	WTP dried banana			WTP dried kiwi			WTP dried pineapple		
		B	Exp(B)	S.E.	B	Exp(B)	S.E.	B	Exp(B)	S.E.
Educational status	College/Faculty									
	High	0.025	1.025	0.256	-0.281	0.326	0.745	-0.617	0.539	0.329
	Primary/Secondary	-0.189	0.828	0.324	-0.580	0.560*	0.260	-0.671	0.511*	0.258
PHLA	No	1.270	3.262*	0.233	1.662	5.271*	0.238	1.635	5.130*	0.267
	Yes									
Gender	Women	-0.552	0.576	0.621	-1.575	0.207*	0.752	-1.946	0.143*	0.687
	Male									
Income	Scale	0.001	1.001*	0.001	0.001	1.001*	0.001	0.001	1.001*	0.001
Age	Scale	-0.007	1.007	0.020	0.006	0.994	0.021	0.015	0.985	0.022
BMI	Scale	0.019	1.020	0.011	-0.016	0.984	0.011	-0.017	0.983	0.011
Constant		-4.296	0.014*	0.951	0.186	1.205	0.870	1.396	4.037	0.880
Model details										
Model Coefficients		-0.497	0.608*	0.105	-0.208	0.812*	0.102	0.442	1.556*	0.104
X^2			49.230*			78.612*			75.257*	
R^2			16.3			24.7			24.0	
Log likelihood			462.757			452.345			441.426	
Predicted			71.2			70.7			69.7	

*$p<0.05$.

On the other hand, the tendency to consume products was not statistically significant in terms of education, except for pineapple. Consumers with a primary/secondary school level of education were willing to buy fewer products than were those with a college/faculty level of education. For dried kiwi and pineapple, this information was statistically significant. Those with education at the college/faculty level tended to purchase 1.95 (1/0.511) times more dried pineapple and 1.78 (1/0.560) times more dried kiwi than did those with a primary/secondary level of education. In addition, an increase in income significantly increased the willingness to pay for all three products ($p<0.05$). However, there was no significant relationship of consumer age or body mass index with the desire to consume these products. Finally, a positive relationship was found between consumers being health-conscious consumers and their willingness to purchase products (PHLA). According to this result, those who expressed that they were health-conscious consumers tended to buy 3.26 times more dried banana, 5.27 times more dried kiwi and 5.13 times more pineapple than did those who did not pay attention to health ($p<0.05$).
In general, income, health consciousness and gender were influential factors on willingness to purchase.

3.5. The hierarchical selection of consumers and perceptual mapping of products

In Table 5, the fuzzy comparison results are presented. This method has been applied to determine the hierarchy of consumer preference for banana, pineapple and kiwi products as fresh, in mineral water, in fruit milk, in fruit yoghurt and as dried fruit. The validity of the fuzzy comparison method was tested by the Friedman test and Kendall's W test. The Friedman test determines whether consumers are behaving differently in at least one product selection. Accordingly, the H_0 hypothesis was rejected, and at least one ranking was found to be different from the others ($p<0.01$).
This method was carried out after consumers tasted the dried tropical fruit products. The findings indicated that fresh banana, kiwi and pineapple were most preferred by participants (0.651). Specifically, the preference to consume fresh product was statistically significantly higher in males than in females ($p<0.05$). The second highest preference for consumers was to consume these products in mineral water (0.438). There was no significant difference between males and females in the consumption of the product in mineral water ($p>0.05$). The third highest preference for consumers was to consume the products as fruit milk (0.401). The preference for consuming the product as fruit milk was statistically significantly higher in females than in males ($p<0.05$). The fourth highest preference for consumers was to consume the products as fruit yoghurt (0.366). The preference for consuming the product as fruit yoghurt was statistically significantly higher in females than in males ($p<0.05$). The lowest preference for consumers was to consume the products dried (0.203). The preference for consuming the product as dried was statistically significantly higher for females than for males ($p<0.05$).
However, in Table 5, consumption preference order by gender is also presented. When the table is examined, the preference order of the male's products was as follows: fresh (0.715), in mineral water (0.467), in fruit milk (0.350), in fruit yoghurt (0.310) and dried (0.178). For females, the order of preferences was as follows: fresh (0.587), in fruit milk (0.452), in fruit yoghurt (0.423), in mineral water (0.410) and dried (0.228). On the other hand, males preferred fruit yoghurt and fruit milk, while females were more indifferent about making similar selections as mineral water, fruit yoghurt and fruit milk.

Table 5. Fuzzy pairwise comparison findings.

Variable	Gender	Mean	Preference	Mann-Whitney U	Asymp. Sig.	General mean**	Std. Deviation	General preference
Fresh fruits	Woman	0.587	1	13924.00	0.000	0.651	0.285	1
	Male	0.715	1					
Mineral water	Woman	0.410	4	12943.00	0.080	0.438	0.235	2
	Male	0.467	2					
Fruit milk	Woman	0.452	2	14235.00	0.000	0.401	0.253	3
	Male	0.350	3					
Fruit yoghurt	Woman	0.423	3	13502.00	0.000	0.366	0.211	4
	Male	0.310	4					
Dried fruits	Woman	0.228	5	16046.00	0.018	0.203	0.200	5
	Male	0.178	5					

**Significant by Friedman test for $p<0.01$; Kendall's $W = 0.267$.

In this research, multi-dimensional scaling analysis was used to create a perception map for consumers for different types of tropical fruits (kiwi, banana, pineapple). This analysis included products seen as substitutes in the market and their differentiation from one another (KINNEAR and TAYLOR, 1996). According to multidimensional scale findings, the stress value was 0.01786, and the R^2 value was 0.99863. These values indicated that the findings could be interpreted. Figure 2 presents a consumer perception map generated from fuzzy comparison data. Accordingly, consumer perceptions differed according to the different selling processes of the fruits. Only fruit milk and fruit yoghurt were given the same weight by the consumers, while fresh fruit was placed in another dimension with dried fruit and with mineral water. According to the findings of the positioning matrix, the most distant perceived products were fruit soda and dried fruit, with a distance of 3.970, and the closest perceived products were fruit yoghurt and fruit milk, with a distance of 0.787. Dried fruit was the closest product to the fresh fruit, with a distance of 2.206. However, the distance between dried fruit and fruit milk was 2.841, and the distance between dried fruit and fruit yoghurt was 2.844. Hence, since fresh fruit was the closest product to dried fruit, it may be a rival for it. However, dimensional distinctions and overall distance values indicated that consumers perceived dried tropical fruits in a different position compared to other products.

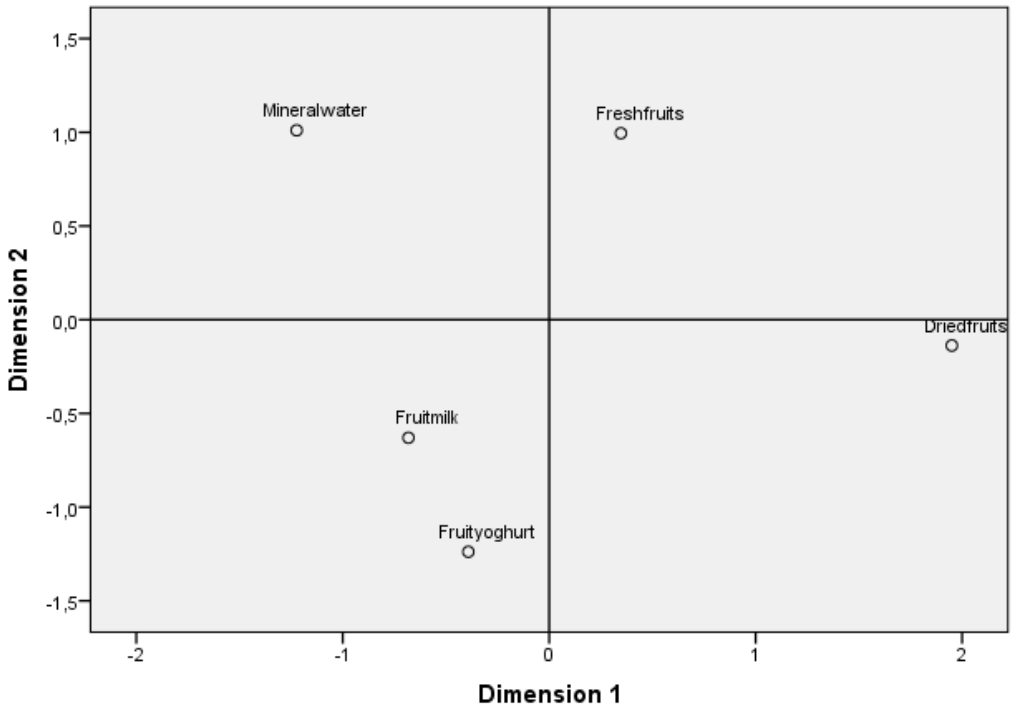

Figure 2. Two-dimensional positioning of the general perception for the products.

4. DISCUSSION AND CONCLUSIONS

This study was conducted to evaluate the factors affecting Turkish consumer preferences for dried tropical fruits (banana, kiwi, pineapple) and the willingness of these consumers to pay for these products. Significant results have emerged from this research.

First, the results of the sensory evaluation method showed that there were issues with dried bananas related to taste and hardness and that the issues for dried kiwi were related to odour and taste. The sensory properties of pineapple were better than those of the other products. In ALPHONCE *et al*., (2015)'s study of European consumers, the average firmness of dried banana was defined as being below average, with 4 points, while its taste was defined as being average, with approximately 5 points. Both the firmness and taste scores of pineapple were just above average (5 points). In this study of Turkish consumers, however, the firmness and taste scores of dried banana were less than those in ALPHONCE *et al*., (2015)'s study, with 1.6 and 2.1 points, respectively. The average taste score given by Turkish consumers to pineapple was 6.7, and the average firmness score was 7.5. These scores were above average. European consumers gave the highest scores to dried mango, pineapple, and banana, in order. In this study, Turkish consumers preferred dried pineapple, kiwi, and banana, in order. In previous studies, dried kiwi was not evaluated sensually by consumers. Generally, the dried banana taste and hardness issues and the average scores for dried pineapple agree with the study of European consumers (ALPHONCE *et al*., 2015). The maturity of the fruit before drying is the most important factor affecting fruit taste and flavour because the maturity level of the fruit is related to the sugar level. Very mature fruits contain high levels of concentrated sugar. During the drying process, this sugar becomes more apparent, and the dried fruit can be very sweet. Conversely, this highly concentrated sugar will lead to a worse taste after drying. On the other hand, excessive drying can harden the fruit. The presence of protections against decay may cause odour problems. Therefore, it is important to determine the level of moisture that does not disturb the drying style or the product taste (MANZUNGU and MACHIRIDZA, 2001). The products had equal and acceptable features in terms of appearance (shape and size) and colour. This information suggests that suppliers should focus on improving poor sensory features rather than the appearance of the products.

The second important result of the survey is related to the willingness to pay for the products. It has been emphasized in previous studies that sensory attributes of food products are effective in procurement decisions (TOPCU *et al*., 2015). Specifically, taste is one of the most important factors affecting the purchase preferences for both dried products (ENDIYANI and SALIMA, 2017) and fruits (KAMENIDOU *et al*., 2002, PANICO *et al*., 2011). The results of this study also confirmed these data. In this study, 37.8% of the consumers did not want to buy dried banana, 44.8% did not want to buy dried kiwi, and 38.8% did not want to buy dried pineapple. Many of the consumers who did not want to buy these products cited sensory characteristics, especially taste. In addition, the research results showed that the willingness to pay was 18.2 kg/TL for dried banana, 26.0 kg/TL for dried kiwi and 39.4 kg/TL for dried pineapple. The lowest willingness to pay was for banana. The market sales price for these products in Turkey is 36 kg/TL. Accordingly, consumers were willing to purchase only dried pineapple for a price above market value. Therefore, the market prices and sensory characteristics of dried banana and kiwi show that they are very unlikely to be consumed frequently by consumers.

The third important result of the study relates to the socio-demographic characteristics of the consumers, which affect the willingness to pay for products. The results showed that income had a positive effect on the willingness to pay for these products. These data overlap with a study conducted on consumers in Zimbabwe relating their preferences for dried fruit (MANZUNGU and MACHIRIDZA, 2001). In addition, health consciousness has a significant impact on the willingness to consume a product. This result agrees with research on Chinese consumer preferences for dried mango (WU, 2017). Additionally, female consumers were more willing to purchase these products than were males. The education level was particularly influential on the consumption of kiwi and pineapple. Studies examining consumption habits of Turkish consumers have indicated that gender,

education level and income level are influential in food purchasing decisions. In addition, high-income, highly educated female consumers are more sensitive to food safety (GOKTOLGA *et al*, 2006). Recently, increasing income levels resulting from economic development in Turkey and increasing education levels, combined with the need for a balanced diet, have created a new consumer market. In this context, the socio-demographic characteristics of the consumer group that wants to purchase dried tropical fruits may facilitate the desire of the target consumer for these products.

The fourth important result of the study is the creation of a hierarchy of preferences for different states of the products. Different studies on dried products have revealed that products are preferred in their fresh state as opposed to their dried state (SIJTSEMA *et al*, 2012, OWUREKU-ASARE *et al*, 2017). The belief that fresh fruit has more vitamins causes French consumers to consume more of the product when it is fresh (JESIONKOWSKA *et al*, 2007). However, this situation may differ from country to country (JESIONKOWSKA *et al*, 2008). The results of this study support the idea that consumers prefer fresh fruit, as Turkish consumers preferred fresh products from among all the different types of fruit products. However, consumers primarily preferred products in mineral water, then fruit milk and then fruit yoghurt. The differences in the consumption preferences and rankings of these products according to gender have been determined. Specifically, females were more indifferent about whether the product was in mineral water, fruit yoghurt or fruit milk. The averages for dried tropical fruits differed from the other products. In addition, consumers positioned dried tropical fruits differently than other forms of the same fruits. This result suggests that tropical dried fruit is unique. Therefore, the consumer may not make comparisons with other products while purchasing these products. This information can be used for developing advertising strategies.

In general, the results indicate that sensory issues related to these products need to be addressed. In addition, when determining the target market, more attention needs to be given to consumers with higher income and education levels and to consumers that pay more attention to health; in addition, the presentation of dried tropical fruit products specifically to women may increase the likelihood of their consumption. Moreover, it may be necessary to emphasize a new product rather than identifying a competitive market for the promotion of products. When the results of the research are holistically assessed, they can help to develop better tropical dried fruit products and more effective marketing tools. Finally, this research was limited to a specific region. Thus, future researchers may be advised to focus on examining whether consumers of different cultures have an impact on the willingness to pay for dried tropical fruit products.

REFERENCES

Alphonce R., Temu A. and Almli V.L. 2015. European consumer preference for African dried fruits. British Food Journal. 117(7):1886-1902.

Anonymous (2003a) TURKSTAT, 2003, Available at www.tuik.gov.tr/HbPrint.do?id=21508 (accessed Dec 28, 2016).

Anonymous (2003b) TURKSTAT, Available at www.tuik.gov.tr/PreTablo.do?alt_id=1012 (accessed Dec 25, 2016).

Anonymous (2016). TURKSTAT, Available at biruni.tuik.gov.tr/disticaretapp/disticaret.zul?param1=3&param2=4&sitcrev=4&isicrev=0&sayac=11607 (accessed Dec 20, 2016).

Barrett D.M., Beaulieu J.C. and Shewfelt R. 2010. Color, flavor, texture, and nutritional quality of fresh-cut fruits and vegetables: desirable levels, instrumental and sensory measurement, and the effects of processing. Critical Reviews in Food Science and Nutrition 50(5):369-389.

Bennett L.E., Jegasothy H., Konczak I., Frank D., Sudharmarajan S. and Clingeleffer P.R. 2011. Total polyphenolics and anti-oxidant properties of selected dried fruits and relationships to drying conditions. Journal of Functional Foods 3(2):115-124.

Blaine W.T., Lichtkoppler F.R. and Standbro R. 2003. An assessment of residents' willingness to pay for green space and farmland preservation conservation easements using the contingent valuation method (CVM). Journal of Extension 41(4):1-4.

Carson R.T. 2000. Contingent valuation: A user's guide. Environmental Science and Technology 34(8):1413-1418.

Chang S.K., Alasalvar C. and Shahidi F. 2016. Review of dried fruits: Phytochemicals, antioxidant efficacies, and health benefits. Journal of Functional Foods 21:113-132.

Chen Q., Anders S. and An H. 2013. Measuring consumer resistance to a new food technology: A choice experiment in meat packaging. Food Quality and Preference 28(2):419-428.

De Andrade J.C., Nalério E.S. Giongo C., De Barcellos M.D., Ares G. and Deliza R. 2017. Consumer perception of dry-cured sheep meat products: Influence of process parameters under different evoked contexts. Meat Science 130:30-37.

Endiyani E. and Salima R. 2017. Consumer Preferences for Products Processed Dried Red Chillies (A Case Study: Bogor Region). Jurnal Agropolitan 1(1):26-35.

Goktolga Z.G., Bal S.G. and Karkacier, O. 2006. Factors effecting primary choice of consumers in food purchasing. The Turkey case. Food Control 17(11):884-889.

Grunert K.G. 2002. Current issues in the understanding of consumer food choice. Trends in Food Science & Technology 13(8):275-285.

Gujarati D.N. 1995. Basic Econometrics. 3rd Edition, Mc Graw Hill Inc, NY, USA.

Gunden C. and Thomas T. 2012. Assessing consumer attitudes towards fresh fruit and vegetable attributes. Journal of Food Agriculture & Environment 10(2):85-88.

Halagarda M. and Suwała G. 2018. Sensory optimisation in new food product development: A case study of polish apple juice. Italian Journal of Food Science 30(2):317-335.

Harker F.R., Amos R.L., White A., Petley M.B. and Wohlers M. 2008. Flavor differences in heterogeneous foods can be detected using repeated measures of consumer preferences. Journal of Sensory Studies 23(1):52-64.

Jesionkowska K., Konopacka D., Plocharski W., Sijtsema S.J. and Zimmermann K.L. 2007. What do Polish and Dutch consumers think about dried fruit and products with them creative group discussions as a mean of recognition consumers' perception. Polish Journal of Natural Science 4:169-175.

Jesionkowska K., Sijtsema, S., Simoneaux, R., Konopacka, D. and Plocharski, W. 2008. Preferences and consumption of dried fruit and dried fruit products among Dutch, French and Polish consumers. Journal of Fruit and Ornamental Plant Research 16:261-274.

Jesionkowska K., Sijtsema S.J., Konopacka D. and Symoneaux R. 2009. Dried fruit and its functional properties from a consumer's point of view. The Journal of Horticultural Science and Biotechnology 84(6):85-88.

Jeszka-Skowron M., Zgoła-Grześkowiak A., Stanisz E. and Waśkiewicz A. 2017. Potential health benefits and quality of dried fruits: Goji fruits, cranberries and raisins. Food Chemistry 221:228-236.

Kamenidou I., Tzimitra-Kalogianni I., Zotos Y. and Mattas K. 2002. Household purchasing and consumption behaviour towards processed peach products. New Medit. 1(1):45-49.

Kinnear T.C. and Taylor J.R. 1996. Marketing Research: An Applied Approach, McGraw Hill, New York, 635-640.

Kruskal J.B. 1964. Multidimensional scaling by optimizing goodness of fit to a nonmetric hypothesis. Psychometrica 29(1):1-27.

Manzungu E. and Machiridza R. 2001. A survey of the distribution of and consumer preference for dried fruits and vegetables in the Harare-Chitungwiza metropolis. Journal of Applied Science in Southern Africa 7(1):23-41.

Migliore G., Farina V., Tinervia S. Matranga G. and Schifani G. 2017. Consumer interest towards tropical fruit: factors affecting avocado fruit consumption in Italy. Agricultural and Food Economics 5(1):5-24.

Newbold P. 1995. Statistics for business and economics. Prentice-Hall International, New Jersey.

Omolola A.O., Jideani A.I. and Kapila P.F. 2017. Quality properties of fruits as affected by drying operation. Critical Reviews in Food Science and Nutrition 57(1):95-108.

Owureku-Asare M., Ambrose R.P., Oduro I., Tortoe C. and Saalia, F.K. 2017. Consumer knowledge, preference, and perceived quality of dried tomato products in Ghana. Food Science & Nutrition 5(3):617-624.

Panico T., Del Giudice T., Cicia G. and Cembalo L. 2011. Consumption of organic strawberries in Italy: demand analysis. New Medit. 10(3):11-16.

Pollard J., Greenwood D., Kirk S. and Cade J. 2001. Lifestyle factors affecting fruit and vegetable consumption in the UK Women's Cohort Study. Appetite 37(1):71-79.

Pollard J., Kirk S.F.L. and Cade J. E. 2002. Factors affecting food choice in relation to fruit and vegetable intake: A review. Nutrition Research Reviews 15: 373-387.

Sabbe S., Verbeke W. and Van Damme P. 2008. Familiarity and purchasing intention of Belgian consumers for fresh and processed tropical fruit products. British food journal 110(8):805-818.

Sabbe S., Verbeke W. and Van Damme P. 2009. Perceived motives, barriers and role of labeling information on tropical fruit consumption: exploratory findings. Journal of Food Products Marketing 15(2):119-138.

Sijtsema S.J., Jesionkowska K., Symoneaux R., Konopacka D. and Snoek H. 2012. Perceptions of the health and convenience characteristics of fresh and dried fruits. Food Science and Technology 49(2):275-281.

Silvestri C., Cirilli M., Zecchini M., Muleo R. and Ruggieri A. 2018. Consumer acceptance of the new red-fleshed apple variety. Journal of Food Products Marketing 24(1):1-21.

Talavera M. and Chambers IV E. 2017. Using sensory sciences help products succeed. British Food Journal 119(10):2130-2144.

Tanaka K. 1997. An Introduction to Fuzzy Logic for Practical Applications. Springer Verlag, New York.

Topcu Y., Uzundumlu A.S. and Baran D. 2015. How sensory and hedonic quality attributes affect fresh red meat consumption decision of Turkish consumers?. Italian Journal of Food Science 27(2):181-190.

Uzmay A. and Cinar G. 2017. The likelihood of sheep meat consumption in Turkey. Italian Journal of Food Science 29(2):209-221.

Worch T., Lê S. and Punter P. 2010. How reliable are the consumers? Comparison of sensory profiles from consumers and experts. Food Quality and Preference 21(3):309-318.

Wu D. 2017. Consumer Preference on Intrinsic Quality Attributes of Dried Mango Among Chinese Consumers. D. Thesis. Food Technology, China.

Zhao X., Chambers E., Matta Z., Loughin T.M. and Carey E.E. 2007. Consumer sensory analysis of organically and conventionally grown vegetables. Journal of Food Science 72(2):87-91.

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