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Araştırma Makalesi

Investigation of Consumers' Attitudes Towards Seaweeds and Insects

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ABSTRACT

The purpose of this research is to determine consumers' preferences for the consumption of seaweeds and edible insects and the factors affecting this very phenomenon. Accordingly, face-to-face surveys were conducted with 132 participants in Antalya. The probit model was used to determine the factors affecting seaweed consumption preference. The reasons why consumers do not prefer edible insects, were determined the deploying the fuzzy paired comparison method. The findings show that the society was not inclined to consume insects as food. The reasons for not consuming insects, in order of importance, are disgust, health concerns, appearance, beliefs, taste perception, texture perception, ethical and moral values, perception of hardness and perception of fear. On the other hand, interest in consuming seaweed as food is much higher. In general, It has been found that women and young consumers who are prone to trying new foods are more likely to purchase seaweed. The results show that the recommendations of institutions such as the United Nations on this issue should be reviewed before implementation.

Key words: Alternative food, , insect consumption, seaweed consumption, sensitivity to new foods.

Tüketicilerin Yosun ve Böceklere Karşı Tutumlarının İncelenmesi

ÖZ

Bu araştırmanın amacı tüketicilerin deniz yosunu ve yenilebilir böcek tüketimine yönelik tercihlerini ve bu duruma etki eden faktörleri belirlemektir. Buna göre Antalya'da 132 katılımcısıyla yüz yüze anket çalışması yapılmıştır. Deniz yosunu tüketim tercihini etkileyen faktörlerin belirlenmesi amacıyla Probit modeli kullanılmıştır. Tüketicilerin yenilebilir böcekleri tercih etmeme nedenleri bulanık eşli karşılaştırma yöntemi kullanılarak belirlenmiştir. Bulgular toplumun böcekleri yiyecek olarak tüketmeye yatkın olmadığını gösteriyor. Böcek tüketmeme nedenleri önem sırasına göre iğrenme, sağlık kaygısı, görünüş, inanç, tat algısı, doku algısı, etik ve ahlaki değerler, sertlik algısı ve korku algısıdır. Öte yandan deniz yosununun yiyecek olarak tüketilmesine ilgi çok daha fazladır. Genel olarak yeni yiyecekleri denemeye yatkın olan kadın ve genç tüketicilerin deniz yosunu satın alma olasılıklarının daha yüksek olduğu tespit edilmiştir. Sonuçlar, Birleşmiş Milletler gibi kurumların bu konudaki tavsiyelerinin uygulama öncesinde gözden geçirilmesi gerektiğini göstermektedir.

Anahtar kelimeler: Alternatif gıda, böcek tüketimi, deniz yosunu tüketimi, yeni gıdalara duyarlılık.

INTRODUCTION

Literature provides evidence that human beings will experience significant problems in accessing food in the near future as a result of global population growth, inadequate animal and agricultural production, and the increasing number of demanding consumers day by day (Gilland, 2002; Tripathi et al., 2019).

The most important reason for this is the rapidly rising industrial formation. This situation brings along various environmental problems such as land degradation, deforestation and water pollution (Zhang et al., 2019).

It is evident from literature that to meet world food demand by 2050, production of grain crops and meat must increase from 2.1 billion tonnes to 3 billion tonnes and from 200 million tonnes to 470 million tonnes respectively (Elder and Hayashi, 2018; Tripathi et al., 2019). It is predicted that the food problem will increase in the future, especially in developing countries (Gilland, 2002). In addition, data show that the trend of meat consumption in the world is upward, especially in developing economies where incomes are rapidly increasing (Wang, 2022).

Many problems such as rapidly increasing demand for animal protein, limited resources for producers, population density and unfair distribution of food have led international organizations to seek alternative solutions.

In this context, it is argued that one of the solutions to these needs as alternative food is insect consumption (entomophagy) (Ardoin and Prinyawiwatkul, 2021), while the other may be seaweed (Losada-Lopez et al., 2021). For this reason, the UN Food and Agriculture Organization, in its report titled "Edible Insects: Future Prospects For Food And Nutrition Security" published in May 2013, recommended the establishment of insect eating and breeding farms with the aim of increasing food supply (Van Huis, 2016).

Moreover, edible insects are low in fat, rich in protein (Kourimska and Adamkova, 2016; Payne et al., 2016; Nongonierma and FitzGerald, 2017) and contain many vitamins and minerals (Candoğan and Özdemir, 2021). Edible insects are stated to be superior compared to other protein sources such as fish and beef (Aksoy and El, 2021).

In fact, some experts estimate that we unknowingly eat an average of 140 thousand insect parts every year mixed into commonly consumed foods such as chocolate, coffee and wheat flour (Anonymous, 2023).

On the other hand, there is ample evidence of the health and nutritional benefits of using seaweed-derived products (Brownlee et al., 2012). The increasing use of seaweed for its health benefits and increasing concerns about various chronic conditions such as diabetes among humans have led to the growth of global trade (Brownlee et al., 2012).

As a matter of fact, the number of scientific studies on both insect consumption (entomophagy) and algae consumption, has increased significantly in recent years, indicating that these issues will be an important and sensitive area of interest in the future (Lucas et al., 2019).

Consumer attitudes towards the acceptance of renewable insect consumption are unclear in many countries, especially in European societies, such as Turkiye (La Barbera et al., 2018). The notion that edible insects are dirty, harmful, and dangerous to personal health is perceived as an important risk by consumers (Faccio et al., 2019). It can also be said that consuming insects can trigger skin, respiratory and gastrointestinal allergies (Muslu, 2020; Demirci and Yetim, 2021). Consumption of these products may vary significantly between countries depending on culture, region of residence, and previous consumption level (Erdogan et al., 2021).

Based on the literature, this study is designed to investigate the consumption trend of edible insects and seaweed as an alternative food. Exploring entomophagy and the place of seaweeds in food systems as alternative food spans across many disciplines, including the social and natural sciences, humanities, business and culinary arts. The main purpose of the research is to determine whether consumers will consume insects and seaweed for food purposes and what affects this.

MATERIALS and METHODS

The first insect farm established to meet Turkiye's live feed needs is in Antalya. Nutrient-rich insect species, from grasshoppers to mealworms, are produced on the farm. The farm meets the feed needs of zoos, pet shops, chicken farms, aquarium animals, fisheries, cosmetics and pharmaceutical industries in the domestic market (Anonymous, 2022). Antalya Gulf is located in the "Lesser Asian Current" system extending between Iskenderun and Marmaris. In this respect, the gulf has the advantage of keeping the sea fresh in an ecological sense and also has a significant fishing potential provided by the open sea (Yazar ve Soyyigit, 2020). In addition, Antalya is the 5th largest city in Turkiye. It is the first preferred city of tourists in Turkiye (Anonymous, 2022). In summary, this province was included in the scope due to the assumption that households living in the region would be familiar with these issues. With a similar assumption, it was planned to include more educated and younger individuals in the research.

The main material of the research consists of information obtained from survey forms. In addition, national and international publications, books and internet resources published on the subject constitute the other materials of the study. The surveys were conducted on a voluntary basis. Ethics committee approval for

the survey used in the research was received by Aydın Adnan Menderes University Social and Humanities Research Ethics Committee at the meeting held on 20.8.2023.

Data Collection

Due to time and budget constraints, the research is limited to surveys conducted only in Antalya Center (Muratpaşa). The population of the central district Muratpaşa is 526292. The proportional sample size formula was used to determine the number of consumers. This formula is as follows.

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

Here;
n: sample volume,
N: 526292
P: represents the prediction rate (The p value was taken as 0.5 for the maximum sample volüme), probability level confidence interval (90% confidence interval, σp:0.04559 from the equation 1.645σp:0.075 for a margin of error of 0.075) (Newbold, 1995). Sample size was determined using a 90% confidence interval and a 7.5% margin of error. As a result of the calculation, the sample size was found to be 121. A face-to-face survey was conducted with a total of 132 participants.

Data Analysis

The survey items to be used in this research were created with the help of a Likert-type scale. Consumers' general attitudes were analyzed using a 5-point Likert-type scale. Participants' tendencies to consume new foods were analyzed with the help of the Food Neophobia Scale developed by Pliner and Hobden (1992). This scale consists of two dimensions and 10 items. The highest score on the scale is 7 and the lowest score is 1. This scale is a 7-point Likert type (Table 3). Appropriate hypothesis tests were used in research for analysis of the survey items created in accordance with this purpose. Additionally, other important statistical techniques used are listed below.

Fuzzy paired comparison method

The reasons for participants' reluctance to consume insects may be similar. For this reason, indecision may occur when ranking the importance levels. In this research, in addition to being used in different consumer research (Gunden and Thomas, 2012; Çınar and Keskin, 2018), the fuzzy pairwise comparison method was also suitable for our study because it explains the importance levels more successfully than the classical rating with sharp boundaries.

The method stages can be summarized as follows (Tanaka, 1997). Pairwise comparisons are presented to indicate preference. The total distance in the comparison is equal to 1. If GKH=0.5, K≈H; If GKH is >0.5, K>H; If GKH<0.5, K<H. In this research, a total of 36 comparisons of 9 different products were presented to each person. For each paired comparison, gcr preference was obtained. The measurement of the degree of preference of r relative to c can be expressed as gcr=1-grc.

$$G_{cr} = \begin{cases} 0 & if\ \ c = r\ \ \forall\, c, r = 1, \ldots . n \\ g_{cr} & if\ c \neq r\ \forall\, c, r = 1, \ldots . . n \end{cases} \qquad (2)$$

Then, a fuzzy preference matrix is created. In this research, 9x9 dimensional fuzzy preference matrices (G) were created for each individual as follows.

$$G = \begin{vmatrix} 0 & g_{12} & g_{13} & . & . & . & . & . & g_{1r} \\ g_{21} & 0 & . & . & . & . & . & . & . \\ g_{31} & g_{32} & 0 & . & . & . & . & . & . \\ . & . & . & 0 & . & . & . & . & . \\ . & . & . & . & 0 & . & . & . & . \\ g_{c1} & . & . & . & . & 0 & . & . & . \\ . & . & . & . & . & . & 0 & . & . \\ . & . & . & . & . & . & . & 0 & . \\ g_{c1} & . & . & . & . & . & . & . & 0 \end{vmatrix} \qquad (3)$$

The individual preference density μj for each is obtained by using the equation below and varies between 0-1.

$$\mu_{j=} 1 - (\sum_{c=1}^{n} G_{cr}^{2} /(n-1))^{1/2} \quad (4)$$

Probit model

In the study, probit model was used to determine consumer characteristics affecting the choice of seaweed as an alternative food choice. The dependent variable of willingness to accept seaweed consumption is binary (willing or unwilling). That's why this method was preferred. If Yi = 1, the consumer is willing to adopt alternative food; If Yi = 0, the consumer is reluctant to adopt. We can briefly explain this method as follows.

$$Y_i^* = \alpha + \beta X_i + \mu_i \quad (5)$$

$$Pr\ (Yi = 1IXi) = Pr\ (Yi > 1IXi) = Pr\ (\mu i \geq -Xi\beta IXi) = \phi(Xi\beta) \quad (6)$$

Here Yi is consumer acceptance of alternative food (seaweed purchasing behavior) and Xi is a vector of all independent variables. With the guidance of the literature, some socio-economic and neophobia characteristics of the consumer have been used as independent variables in our study.

FINDINGS and DISCUSSION

General characteristics of the survey participants

Table 1 presents various demographic information of the survey participants, such as gender, age, education and income level. 60.6% of the survey participants are women and 39.4% are men. When education levels are examined, it is observed that the majority are high school graduates, also possessing university and primary education. While their age range varies between 18 and 63 and, their average age is 31.32. The average number of households is 3.79. The majority of participants defined their income as moderate.

Table 1. Socio-demographic characteristics of the survey participants

Variable	Definition	Frequency (f)	Percentage (%)	Variable	Definition	Frequency (f)	Percentage (%)
Gender	Woman	80	60.6	Income	Very low	5	3.8
	Male	52	39.4		Low	12	9.1
Education	Primary education	12	9.1		Middle	68	51.5
	High school	69	52.3		High	27	20.5
	University	51	38.6		Very high	20	15.2
Variable		Minimum	Maximum	Mean	Standard deviation (Sd)		
Age (years)		18	63	31.3182	11.44207		
Households (number)		1	6	3.7955	1.25241		

Respondents' attitudes towards seaweed consumption

Survey participants' general attitudes towards seaweed consumption are presented in Table 2. Accordingly, a significant portion of the participants think that seaweed will have a bad smell (51.5%), taste (53.8%) and appearance (51.5%) when consumed. On the other hand, a significant portion of the participants are undecided that the cost of consuming seaweed will be low (39.4%), and that the product may cause allergic diseases (44.7%). Additionally, only 25.8% of respondents believe that seaweed production will cause less harm to the environment. In addition, it can be said that a significant portion of the survey participants stated that consuming seaweed is not against their ethical values (50.8%) and beliefs (50.7%).

Table 2. General attitudes towards seaweed consumption

Definition		1	2	3	4	5
I think seaweed might have a bad smell to consume	f	21	22	21	32	36
	%	15.9	16.7	15.9	24.2	27.3
I think seaweed might taste bad	f	21	20	20	35	36
	%	15.9	15.2	15.2	26.5	27.3
I think seaweed may have low nutritional value	f	16	15	55	13	33
	%	12.1	11.4	41.7	9.8	25
I think seaweed looks bad	f	15	19	30	42	26
	%	11.4	14.4	22.7	31.8	19.7
I think consuming seaweed is not healthy.	f	19	47	44	11	11
	%	14.4	35.6	33.3	8.3	8.3
I think the cost of consuming seaweed will be low	f	16	36	52	20	8
	%	12.1	27.3	39.4	15.2	6.1
I think consuming seaweed can cause allergic diseases	f	15	31	59	19	8
	%	11.4	23.5	44.7	14.4	6.1
I think seaweed consumption can prevent animal slaughter	f	28	45	35	15	9
	%	21.2	34.1	26.5	11.4	6.8
I think producing seaweed is less harmful to the environment	f	18	23	57	20	14
	%	13.6	17.4	43.2	15.2	10.6
I do not support the ethical consumption and production of seaweed	f	34	33	38	15	12
	%	25.8	25	28.8	11.4	9.1
Consuming seaweed could solve animal welfare problem	f	35	34	38	20	5
	%	26.5	25.8	28.8	15.2	3.8
As a matter of faith, I do not support the consumption and production of seaweed	f	32	35	38	14	13
	%	24.2	26.5	28.8	10.6	9.8

Choices: strongly agree = 5, agree = 4, neutral = 3, disagree = 2, strongly disagree = 1.

Food Neophobia characteristics of the respondents

In short, the fear of trying new foods is called food neophobia. In the research, the food neophobia scale developed by Pliner and Hobden (1992) was considered as an independent variable used to determine the factors affecting seaweed consumption. Thus, it was examined whether food neophobia scale scores were effective on seaweed consumption. The validity of this scale has been tested and proven in many previous studies. The Cronbach Alpha coefficient value used to test the reliability of the scale is 83.6. While the scaling of the items varies between 1 and 7 points, items with a sign (*) added next to the items are reverse scored. In order to facilitate explanation within the model, unlike many studies, the scores were reverse coded to ensure that the food neophobia attitude received low scores. In summary, in this study, the lower the score, the higher the consumer's food neophobia (fear of food). On the other hand, the higher the score, the higher the tendency for new food liking. Descriptive statistics of the food neophobia scale are presented in Table 3.

Factors affecting respondents' consumption of seaweed

Probit model was used to determine the factors affecting consumers' desire to purchase seaweed as food. Model results are presented in Table 4. Variables were chosen based on relevent consumer literature (Anusha Siddiqui et al., 2023; Palmieri et al., 2023). The dependent variable of the model is the attitude towards consuming seaweed as food. About 51.52% of consumers refused to consume seaweed. A total of 48.48% of the respondents wanted to consume seaweed as food. While this rate is 76% in Italy (Palmieri and Forleo, 2020), and its over 70% in Bahrain (Al-Thawadi, 2018). In the literature, it can be stated that the tendency to consume seaweed is generally high. It was observed that this rate in Turkiye was lower than other countries.

Accordingly, in the model, 68 consumers who stated that they would not consume seaweed were coded as "0", and 64 consumers who stated that they would consume it were coded as "1".

Attitude scores towards food neophobia were included in the model by taking the sum of the statements explained in the "Food Neophobia characteristics of survey participants" section. In this study, the lower the score, the higher the consumer's food neophobia (fear of food). On the other hand, the higher the score, the higher the tendency to enjoy new foods.. Thus, the explanation of the model is facilitated. Age and number of households variables were included in the model as open-ended variables, while income and education were included as categorical variables. The model was analyzed using the open source Gretl package program.

Table 3. Descriptive statistics of food neophobia attitudes

Definition		1	2	3	4	5	6	7	Mean	Standard deviation
*If I don't know what a food is, I won't try it	f	12	24	11	9	13	22	41	4.64	2.19
	%	9.1	18.2	8.3	6.8	9.8	16.7	31.1		
I like foods from different cultures	f	16	5	15	4	19	28	45	5.04	2.09
	%	12.1	3.8	11.4	3.0	14.4	21.2	34.1		
* Ethnic food looks too weird to eat	f	27	0	8	8	9	31	49	4.98	2.31
	%	20.5	0	6.1	6.1	6.8	23.5	37.1		
At dinner parties, I will try new foods	f	9	15	11	12	7	37	41	5.03	2.02
	%	6.8	11.4	8.3	9.1	5.3	28	31.1		
*I am afraid to eat things I have never had before	f	11	9	11	16	27	29	29	4.83	1.87
	%	8.3	6.8	8.3	12.1	20.5	22.0	22.0		
*I am very particular about the foods I eat	f	20	9	8	8	11	27	49	4.95	2.25
	%	15.2	6.8	6.1	6.1	8.3	20.5	37.1		
I eat almost anything	f	33	15	15	20	7	16	26	3.80	2.26
	%	25	11.4	11.4	15.2	5.3	12.1	19.7		
I like to try new ethnic restaurants	f	13	14	3	18	16	21	47	4.98	2.09
	%	9.8	10.6	2.3	13.6	12.1	15.9	35.6		
I am constantly sampling new and different foods	f	21	11	11	12	26	20	31	4.48	2.14
	%	15.9	8.3	8.3	9.1	19.7	15.2	23.5		
*I don't trust new foods	f	16	14	12	22	27	14	27	4.36	1.99
	%	12.1	10.6	9.1	16.7	20.5	10.6	20.5		

Choices: 7 Strongly agree, 6 Agree, 5 Somewhat agree, 4 Neither agree nor disagree, 3 Somewhat disagree, 2 Disagree, 1 Strongly disagree

When the model results are examined, it is seen that there is statistical harmony. The classification rate coefficient, which indicates that the dependent variable is classified correctly, is 0.742. The regression results show that the independent variables can explain the dependent variable by 22.25% (R Square = 22.25). The results of Akaike criterion show a value of 156.1776 and the likelihood test value is 40.692 ($p<0.01$).

Accordingly, the relationships between variables can be interpreted keeping in view these values. In the model, there is a positive but statistically insignificant relationship between education and income and the tendency to purchase seaweed. Similarly, it is observed that as the number of households decreases, the tendency to purchase seaweed increases showing an inverse relationship. However, these relationships are statistically insignificant.

On the other hand, statistically significant relationships were determined in terms of food neophobia scale, age and gender. Accordingly, being one year older in age, reduces the seaweed purchasing attitude by 1.02%. Women are 24.76% more likely to purchase seaweed than men. There is a positive relationship between the tendency to consume seaweed and food neophobia. In other words, as participants' interest in consuming new foods increases, their tendency to consume seaweed also increases.

Previous studies have determined that neophobia affects the tendency to consume seaweed (Losada-Lopez, 2021; Blikra et al., 2021). In addition, it has been shown in the literature that women and young people with higher household income and education level are more likely to consume seaweed (Birch et al., 2019). The results from this study are supported by previous literature evidence. The findings also provided new evidence to the literature with regard to Türkiye

Table 4. Factors affecting the tendency to consume seaweed, probit results

Variable	Coefficient	Measurement error	Z statistic	Significance	Marginal effect
Constant	−0.797582	1.08266	−0.7367	0.4613	
Food Neophobia	0.0468243	0.010716	4.37	1.24e-05***	0.0186132
Age	−0.0258345	0.011514	−2.244	0.0248**	−0.0102695
Education	0.0643825	0.221635	0.2905	0.7714	0.0255928
Gender	−0.623043	0.274542	−2.269	0.0232**	−0.247667
Income	0.101086	0.141916	0.7123	0.4763	0.040183
Households	−0.0790720	0.102041	−0.7749	0.4384	−0.0314321

Survey participants' attitudes towards entomophagy

The vast majority of the respondents, 90.2% (119 people), did not want to consume edible insects. On the other hand, 4.5% (6 people) of the survey participants stated that they could consume insects. However, 5.3% (7 people) of the survey participants stated that they were undecided on this issue.

This rate is 43.8% in another relevent study conducted in Romania (Zugravu et al., 2023). In another study conducted in Italy, this rate was 31.1% (Laureati et al., 2016). On the other hand, more than 50% of American consumers, 57.8% of Indian consumers, 63% of Russian consumers, 49% of British consumers and 62% of Japanese consumers are reluctant to consume insect-based foods (Castro and Chambers, 2019). Findings have shown that consumers' reluctance on this issue is greater than consumer groups in other countries.

A significant portion of the participants (68.9%) do not think that consuming insects will cause less harm to the environment. A significant portion of the respondents (72.7%) argue that slaughtering animals by consuming insects cannot be prevented. Additionally, 50.9% think that the cost of consuming insects will not be low. According to the findings, it can be stated that the society's attitudes towards entomophagy are low. In this context, the reasons for the tendency not to consume have come to the fore. In this context, the reasons for the “tendency of not consuming insects” have been tried to be determined in accordance with their degree of importance.

Considering the fact that more than one reason may be important in determining the “tendency not to consume insects”, the fuzzy pairwise comparison method was used. Using previous consumer research, a total of nine criteria that could reveal the reasons for not consuming insects were presented to the participants through pairwise comparisons. This application was carried out with 119 people who did not want to consume.

Criteria were weighted using the fuzzy pairwise comparison method and ranked according to their level of importance.

In this study, the criteria that constitute the reasons for not consuming insects are listed in Table 5.

The averages obtained in Table 5 are listed from largest to smallest according to their weight or, in other words, as per their degree of importance. The validity of the method was tested with Friedman and Kendall's W test. The Friedman test determines whether consumers behave differently when choosing at least one product. Accordingly, the H0 hypothesis was rejected and it was determined that at least one ranking was different from the others ($p<0.01$). Kendall's W test represents the homogeneity between groups in preferences (0.183).

The data reveals the information which can be interpreted here with the help of statistical results. Accordingly, the most important reason for not consuming insects is disgust. The reasons for this are health concerns and appearance, respectively. Belief (0.809) and taste perception (0.799) are ranked 4th and 5th with very close weights. These are followed by ethical and moral values, perception of harshness and perception of fear. The weighting of the perception of disgust, which has the highest importance, is 0.894, and the perception of fear, which has the lowest importance, having a weight of 0.645.

Many studies have shown that the most important reason for the tendency of not to consume insects is disgust (Ruby et al., 2015; Castro and Chambers, 2019; Castro Delgado et al., 2020; Penedo et al., 2022) which supports this study results as well. The findings of this research coincided with these. Other reasons have also been cited in other studies as taste, texture, other sensory properties and culture in the literature (Rumpold and Langen, 2019; Hénault-Ethier et al., 2020; Castro Delgado et al., 2020). In this research, in addition to the literature, the reasons for not consuming insects are listed on the basis their importance. These were determined as disgust, health anxiety, appearance, belief, taste perception, texture perception, ethical and moral values, hardness perception and fear perception. Emotional factors were found to be a significant obstacle to consumption.

Table 5. Reasons for not consuming edible insects (fuzzy paired comparison results)

Description	Sequence	Minimum	Maximum	Mean	Standard Error
Disgust	1	0.200	1.000	0.894	0.016
Health concern (anxiety)	2	0.050	1.000	0.852	0.021
Appearance	3	0.000	1.000	0.816	0.017
Belief	4	0.050	1.000	0.809	0.025
Taste perception	5	0.100	1.000	0.799	0.018
Texture perception	6	0.100	0.980	0.753	0.021
Ethical and moral values	7	0.050	1.000	0.734	0.027
Perception of hardness	8	0.050	0.990	0.648	0.026
Perception of fear	9	0.050	1.000	0.645	0.027

Friedman Test $X^2$167.255; Kendall's W 0.183

CONCLUSION

This research was conducted to reveal consumers' attitudes towards the consumption of seaweed and edible insects as alternative food products. The research observed significant results.

Accordingly, it can be stated that the reluctance to consume insects in Turkey is much higher than in other societies. It has been determined that emotional factors such as disgust, health concern, appearance and belief have a significant impact on not consuming this product. Accordingly, the effect of psychological variables on the acceptance of this new food product has emerged as a phenomenon that requires special attention.

On the other hand, the tendency to consume seaweed is much higher than the tendency to consume insects. Young and female consumer profiles, especially those who are prone to consuming new foods, may constitute a target market for entrepreneurs considering working in this field. Positive emotions can be emphasized to persuade potential consumers to consume seaweeds. Effective packaging, advertising, accessibility (sales in supermarkets) can provide easy access to the target market that is prone to consume new products. In parallel, the increasing health awareness of many consumers may encourage them to try this new product. The results regarding seaweed may develop a business case for its potential as a new industry in Turkiye.

In general, it can be said that insect consumption is very difficult to accept, even if it is supported by organizations such as the United Nations. However, if the perception of healthy food is created and the right target audience is selected, seaweed is more likely to be accepted as food by consumers.

Several limitations are evident in this research. The first of these is the consumer group evaluated within a certain scope. The second is the evaluation of attitudes in a hypothetical market environment. Future research may therefore seek to test alternative approaches based on behavioral economics principles that alter consumer choice environments.

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Havva Nur Ozcan: Conceptualization, Survey application, Data entry, Methodology, Validation, Review & Editing.
Gökhan ÇINAR: Conceptualization, Methodology, Visualization, Validation, Investigation, Writing – Review & Editing. Supervision

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