Original Research

Adaptation and Validation of the Turkish Version of a Single-Item Food Choice Questionnaire

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Abstract

Objectives: The single-item Food Choice Questionnaire (FCQ) is a self-reported instrument with 11 dimensions to assess food choice motives alternative to the multi-item FCQ. This study aimed to examine the validity and reliability of a Turkish version of the questionnaire.

Materials and Methods: In phase 1, forward-backwards translation, cognitive debriefing with thirty participants, and content validity with ten experts were carried out. In phase 2, the psychometric properties were evaluated through a cross-sectional survey. A total of 350 responses were analyzed for convergent validity by comparing dimensions of single-item and multi-item FCQs. The questionnaire was reposted after a month, and 50 readministration data (11.4% retest rate) were examined for test-retest reliability.

Results: The eight dimensions of single-item FCQ (health, mood, convenience, sensory, price, weight, and familiar) were correlated with corresponding factors in multi-item FCQ, ranged between 0.431 to 0.646. The three dimensions (environment friendliness, animal friendliness, and social justice) corresponding to a single factor regarding ethical concern in multi-item FCQ were analyzed separately and significantly correlated (0.569, 0.433, and 0.572 respectively). All correlations were statistically significant at p <0.001 significance level. The Pearson's correlations of test-retest analysis ranged from r = 0.407 to 0.673 (p = 0.000). The intraclass correlation coefficient values ranged between 0.581 to 0.796, indicating moderate to good reliability for all dimensions. The sensory appeal, convenience, and price dimensions were the most crucial motives.

Conclusion: The results indicate that the single-item FCQ is a valid alternative instrument in the Turkish population.

Keywords: food choice motives, validation, single item measure

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Introduction

Nutrition is a basic human need, and unhealthy diets result in all forms of malnutrition and other diet-related non-communicable diseases such as cardiovascular diseases, cancers, and diabetes worldwide. Governments have traditionally focused on nutrition policies to encourage healthy dietary practices (World Health Organization, 2020). However, the outcomes of meeting nutritional needs are no longer evaluated only at the level of health. Many social, environmental, and economic outcomes significantly share the challenges that put present and future generations at risk (Food and Agriculture Organization & World Health Organization, 2019). Although environmental outcomes such as water pollution and greenhouse emission are among the most notable of these challenges, there are also a wide variety of social and economic outcomes, from unfair trade practices to food loss and waste (Hendriks et al., 2021). For this purpose, changing food systems and nutrition models is one of the key points in the transition to sustainability in global development goals (Independent Group of Scientists appointed by the Secretary-General, 2019). To achieve success at all stages of this strategy, it is crucial to evaluate and underlie the rationales behind food choice motives (Blake et al., 2021; Chen & Antonelli, 2020).

Food choice is related to all aspects of food-related behaviors, and research in this area is mainly concerned with the broad range of decision drivers (Blake et al., 2021). Sobal and Bisogni (2009) pointed out the characteristics of food choice as multifaceted, situational, dynamic, and complex, which makes it difficult to determine and categorize all the factors. However, food choice interacts with individual differences and environmental factors, including food-related and society-related features (Chen & Antonelli, 2020). This nature of food choice attracts the attention of several disciplines, leading to research conducted using various methodologies (Perez-Cueto, 2019).

Qualitative research is one of the approaches to evaluate food choice motives. For this purpose, the Food Choice Questionnaire (FCQ), developed by Steptoe et al. (1995) to measure consumer motives, is a self-administered 4-point Likert questionnaire and comprised 36 items in 9 factors (health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical concern). Five years after the original FCQ was published, Lindeman and Väänänen (2000) added complementary 11 items to scale regarding ethical food choice motives that create 3 factors (ecological welfare, political values and religion). Taking this addon into account, Onwezen et al. (2019) developed a single-item alternative version of the FCQ, which consists of single-item and 11 dimensions. Although different forms of the questionnaire have been revised and applied (Fotopoulos et al., 2009; Konttinen et al., 2013; Milošević et al.,

2012; Pieniak et al., 2009), only the original multi-item form has been adapted into Turkish by Dikmen et al. (2016). This study aimed to test the psychometric properties of the Turkish version of the single-item FCQ developed by Onwezen et al.

Material and Methods

Study design and sample

The methodological study consisted of two phases. In phase 1, the questionnaire was translated and culturally adapted into Turkish. In phase 2, the psychometric properties of the translated version were evaluated through a cross-sectional survey. The process was created in line with the recommendations of guidelines from Beaton et al. (2000) and Sousa and Rojjanasrirat (2011).

Phase I: Translation and cultural adaptation

The translation and transcultural adaptation processes were carried out in three stages; 1) forward-backwards translation, 2) cognitive debriefing, and 3) content validity.

Translation. First, we obtained permission to translate the questionnaire into Turkish from one of the original authors, Harriette Snoek, PhD (Onwezen et al., 2019). The questionnaire was translated from English into Turkish by two independent researchers fluent in both languages. The two translations were combined into a single form by authors with agreement. Then, the combined translation was back-translated by another two independent researchers. All the forms were reported, and the authors created a final version. Any disagreement was resolved by discussion.

Cognitive debriefing. The cognitive briefing was carried out to determine the clarity and comprehensibility of the translated instrument. Thirty adults were asked to fill out the questionnaire and then rate the dimensions using a dichotomous scale (clear or unclear). Participants were asked to provide criticism and suggestions for responses that were evaluated as unclear. Two dimensions (animal friendliness and social justice) were re-evaluated as more than 20% of participants answered unclear. The animal friendliness dimension has been revised in terms of translation. For the dimension regarding social justice food choice motive, the participants reported that although the dimension was clear, the definition of fair trade needed to be understandable and fully comprehended. The definition of "fairly traded" has been added to the dimension because, despite being known, its Turkish equivalent has not yet gained widespread usage (Table 1).

Content validity. After the revision based on the feedback obtained from cognitive debriefing, a single round of Delphi expert consultation was conducted. Ten experts specialized

in nutritional sciences (at least a PhD degree) were involved and asked to assess the dimensions for clarity using a 4-point rating scale (no appropriate; somewhat appropriate; appropriate; definitely appropriate). The content validity index was calculated at both dimension-level (D-CVI), the proportion of agreement on the clarity of each single-item dimension, and questionnaire level (Q-CVI), the proportion of total dimensions judged content valid. All experts agreed that all of the dimensions were appropriate. Therefore, the content validity indices were all equal to one, indicating perfect agreement (Zamanzadeh et al., 2015). In line with recommendations from experts, minor changes were made to only two phrases that did not result in any changes to the meaning or structure. The results of the cognitive debriefing and content validity are presented in Table 1 (see supplemental material 1 for the Turkish version).

Table 1: Cognitive Debriefing and Subsequent Content Validation Results of the Single-Item Food Choice Ouestionnaire

	Cognitive deb	oriefing $(n = 30)$	Content validation $(n = 10)$			
	Reported	l "unclear"	Expert in	agreement		
	n	%	n	%		
Health	2	6.7	10	100		
Mood	2	6.7	10	100		
Convenience	3	10.0	10	100		
Sensory appeal	-	-	10	100		
Natural content	5	16.7	10	100		
Price	-	-	10	100		
Weight control	1	3.3	10	100		
Familiarity	-	-	10	100		
Environment	5	16.7	10 100			
friendliness						
Animal friendliness	16	53.3	10	100		
Social justice	20	66.7	10	100		
J	Cronbach's a coefficient = .947		Q-CVI	/UA*= 1		

^{*} Questionnaire-level content validity index/universal agreement

Phase 2: Psychometric testing procedures

The psychometrics testing of the translated version comprised convergent validity and test-retest reliability by a cross-sectional survey.

Data collection. The data was collected online using Google Forms between 21 - 28 January 2023. An anonymous questionnaire was distributed using phone groups and social media sites. Additionally, the survey link was shared with participants, and kindly encouraged to forward it to others. The inclusion criteria were current Türkiye residency and age between 18 - 65, and the exclusion criteria were following a specific food or food group's restricted diet for health reasons or voluntarily. A total of 360 responses were collected. Since the data was collected through the online survey method. The data was checked, and 10 participants were

removed who were not eligible and provided invalid, inconsistent or illogical data, resulting in a total of 350 study population.

The questionnaire consisted of four sections. In the first section, participants were asked to provide demographic information, including their gender, age, city of residence, education level, income status and occupation. The questionnaire options were the same as listed in the results (see Table 2). Participants were also asked to indicate their height (cm) and current weight (kg) by the open-ended response. For nutritional status, their body mass index (BMI) was calculated and categorized as underweight (<18.5 kg/m²), ideal (18.5–24.9 kg/m²), overweight (25–29.9 kg/m²) and obese (>30.0 kg/m²) (Centers for Disease Control and Prevention, 2022).

Convergent validity. The convergent validity was performed by comparing dimensions of single-item and multi-item FCQs which constituted the questionnaire's second and fourth sections, respectively. Although the eight dimensions of the single-item FCQ (health, mood, convenience, sensory appeal, natural content, price, weight control, and familiarity) are similar to the multi-item FCQ factors, the three dimensions (environment friendliness, animal friendliness and social justice) are corresponding to single factor regarding ethical concern in multi-item FCQ, which are analyzed separately with the ethical concern factor for convergent validity. In this context, supplementary validity for these ethical dimensions was examined using various selected subscales that served a similar purpose. The quality labels and animal welfare factors of the Sustainable and Health Eating Behaviors questionnaire (Żakowska-Biemans et al., 2019; Köksal et al., 2019) were compared to environmental friendliness and animal friendliness dimensions, respectively. And the attitude construct of the short version Sustainability Consciousness Questionnaire's economic dimension (Gericke et al., 2019; Michalos et al., 2012; Yüksel & Yıldız, 2019) was compared to social justice dimension. In the third section, these subscales were added.

Test-retest reliability. For the test-retest reliability, the single-item FCQ was reposted after a month via mail to the participants who agreed to participate and shared their e-mail addresses in the first data collection. Re-administration was received from 56 of the 113 participants. After removing 6 participants due to invalid data, 50 participants' data (11.4% retest rate) were examined.

Statistical analysis. Statistical analyses were performed using the SPSS 21.0 (IBM SPSS Statistics for Windows, Version 21.0). The significance level of p<0.05 was accepted. The Pearson correlation was applied in the statistical analysis for convergent validation. And the scores between 0.40-0.69 were interpreted as a moderate correlation (Schober et al., 2018).

For test-retest analysis, Pearson's correlation and intraclass correlation coefficients (ICCs) were investigated. ICCs were interpreted as poor reliability less than 0.5, moderate between 0.50 and 0.75, good between 0.75 and 0.90, and excellent greater than 0.90, according to Koo and Li (2016).

The hypothesis that the single-item FCQ is valid for the Turkish population in line with the aim of our study was clearly specified prior to data collection. Our study followed a predefined analytic plan, ensuring transparency and accuracy in data-driven analyses.

Ethical approval

The study protocol was approved by the Ethics Committee of the University of Hacettepe (Ref: GO 22/1262) and was conducted under the Declaration of Helsinki. The survey was formatted into Google Forms (Google LLC, CA, USA), and the survey link was shared online. After following the link, participants were presented with further information about the study's aims for using their data, their rights, and the researchers' contact details. Participants were required to consent to participate before entering the survey's main body. No compensation was offered to the participants.

Results

Participants

Participant characteristics of this study is shown in Table 2. The mean age was 32.3 years, with a range between 18-61 years old. Among them, the most significant number of respondents were females (76.3%, n = 267), government workers (42%, n = 147), and had a bachelor's or equivalent level degree (64%, n = 224), an ideal BMI status (55.7%, n = 195), and monthly income to just enough to live (31.4%, n = 110).

Convergent validity

The eight dimensions of the single-item FCQ (health, mood, convenience, sensory, price, weight, and familiarity) had a significant correlation with their corresponding factors in the multi-item FCQ. The correlations between the ethical concern factor of multi-item FCQ and the three dimensions (environment friendliness, animal friendliness and social justice) of single-item FCQ were also correlated $(0.569,\,0.433,\,\text{and}\,0.572,\,\text{respectively})$. All dimensions demonstrated statistically significant moderate correlation at p=0.01 significance level (Table 3).

 Table 2:Characteristics of the Participants

Variable	Female	Male	Total
Age in years (M ± SD)	31.8 (9.77)	33.8 (8.3)	32.3 (9.46)
	n (%)	n (%)	n (%)
Education level			
Primary and lower secondary	11 (4.1)	2 (2.4)	13 (3.7)
Upper secondary	29 (10.9)	8 (9.6)	37 (10.6)
Bachelor's or equivalent level	169 (63.3)	55 (66.3)	224 (64)
Master's and doctoral level	58 (21.7)	18 (21.7)	76 (21.7)
Monthly income			
Enough to live comfortably	67 (25.1)	20 (24.1)	87 (24.9)
Enough to live without too much trouble	78 (29.2)	25 (30.1)	103 (29.4)
Just enough to live	84 (31.5)	26 (31.3)	110 (31.4)
Not enough	38 (14.2)	12 (14.5)	50 (14.3)
Occupation			
Government worker	112 (41.9)	35 (42.2)	147 (42)
Student	71 (26.6)	12 (14,5)	83 (23.7)
Employee	27 (10.1)	30 (36,1)	57 (16.3)
Unemployed*	46 (17.2)	1 (1,2)	47 (13.4)
Other**	11 (4.1)	5 (6)	16 (4.6)
BMI classification			
Underweight	21 (7.9)	1 (1.2)	22 (6.3)
Normal weight	164 (61.4)	31 (37.3)	195 (55.7)
Overweight	55 (206)	37 (44.6)	92 (26.3)
Obesity	27 (10.1)	14 (16.9)	41 (11.7)
Total	267 (76.3)	83 (23.7)	350

Note. M (SD) = mean (standard deviation); BMI = body mass index

^{*} Includes homemaker

^{**} Includes business owners, retired, and others.

Table 3: Dimensions Correlation of Single-Item FCQ with Multi-Item FCQ Factors and Cronbach's Values	nsions Cor	rrelation of	Single-Iten	n FCQ with	Multi-Item	FCQ Facto.	rs and Cror.	bach's Valu	tes		
		M_health	M_mood	M_conven	M_sensory	M_natural	M_price	M_weight	M_famil	M_ethic	C_a
	M (SD)	2.95 (± .68)	2.67 (± .74)	2.91 (± .64)	3.09 (± .63)	2.98 (± .82)	3.08 (± .67)	2.57 (±.81)	2.67 (±.73)	2.45 (±.86)	
S_health	5.08 (± 1.34)	.505**									.862
S_mood	4.34 (± 1.72)	010	.453**								.837
S_convenience	5.20 (± 1.47)	.014	.077	.434**							.751
S_sensory appeal	5.72 (± 1.37)	960.	.235**	.104	.439**						.704
S_natural	5.02 (± 1.57)	.538**	.067	041	.070	.646**					.823
S_price	5.15 (± 1.54)	.023	.128*	.196**	.139**	047	.580**				.664
S_weight control	4.58 (± 1.80)	.493**	.225**	.093	.134*	.451**	.061	.638**			908.
S_familiarity	4.65 (± 1.67)	.053	.129*	.167**	.145**	039	650.	060.	.431**		.676
S_environment friendliness	4.48 (± 1.74)	.528**	.220**	.049	.178**	.482**	7.00.	.360**	.229**	**695	.751
S_animal friendliness	3.95 (± 1.83)	.400**	.271**	.043	.160**	.328**	.064	.268**	.191**	.433**	.788
S_social justice	4.54 (± 1.93)	.436**	.308**	.063	.192**	.412**	.040	.323**	.200**	.572**	.865

Note. Starting with the letter "S" belong to the single-item FCQ. while those starting with "M" belong to the multi-item FCQ; $C_a = \text{Cronbach's } a$; M (SD) = mean (standard deviation); conven = convenience; sensory = sensory appeal; weight = weight control; famil = familiarity; ethic = ethical concern * Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed)

 Table 4: Supplementary Correlation of Single-Item FCQ Ethical Dimensions with Selected Measures

		Constructs	
Dimensions	Quality Labels ^a	Animal welfare ^b	Economic attitude ^c
S_environment friendliness	.564*	.372*	.010
S_animal friendliness	.495*	.361*	.010
S_social justice	.539*	.331*	.03

^{a, b} the quality labels and animal welfare factors of Sustainable and Health Eating Behaviors questionnaire

Table 5: Test–Retest Reliability Results of the Single-Item Food Choice Questionnaire's Dimensions (n=50)

Dimensions	Time 1 M (SD)	Time 2 M (SD)	r	ICC	%95 CI
S_health	4.80 (1.25)	5.2 (1.21)	.622	.746*	.540 – .858
S_mood	4.2 (1.40)	4.44 (1.20)	.506	.664*	.412808
S_convenience	5.38 (1.05)	5.44 (1.11)	.468	.641*	.364 – .797
S_sensory	5.62 (1.28)	5.66 (1.15)	.604	.754*	.565 – .861
S_natural	4.46 (1.36)	4.84 (1.35)	.544	.691*	.458824
S_price	4.98 (1.27)	4.9 (1.18)	.407	.581*	.258763
S_weight	4.00 (1.5)	4.22 (1.66)	.510	.673*	.425814
S_familiarity	4.86 (1.48)	4.42 (1.49)	.619	.748*	.551858
S_environment	4.08 (1.37)	4.38 (1.07)	.552	.688*	.455822
S_animal	3.46 (1.36)	4.38 (1.41)	.662	.706*	.204868
S_social justice	3.94 (1.70)	4.30 (1.64)	.673	.796*	.641884

Note. r = Pearson's r correlations; ICC = intraclass correlation coefficients; %95 CI = 95% confidence level * (r) values significant at p = 0.000

The results showed a statistically significant correlation for supplementary comparison of environment and animal friendliness dimensions with Sustainable and Health Eating Behaviors questionnaire's quality labels and animal welfare factors. However, the social justice dimension of single-item FCQ did not show a statistically significant relationship with a selected attitude construct of the short version Sustainability Consciousness Questionnaire's economic dimension (Table 4).

Test-retest reliability

Table 5 sets out the test-retest analysis results of the questionnaire. The Pearson's correlations ranged from r = 0.407 to 0.673, and all correlations were statistically significant (p = 0.000).

^c the attitude construct of the short version Sustainability Consciousness Questionnaire's economic dimension

^{*} Correlation is significant at the 0.01 level (2-tailed)

The ICC values ranged between 0.581 to 0.796, indicating moderate reliability for all dimensions except the social justice dimension which has good reliability with 0.796 score.

Discussion and Conclusion

The present study aimed to develop the Turkish version of the single-item FCQ and evaluate its validity and reliability. As far as we have searched the literature, this is the first study conducted to validate the Turkish version of single-item FCQ. The single-item FCQ was proposed by Onwezen et al. (2019) as an alternative to the multi-item FCQ developed by Steptoe et al. (1995). Onwezen et al. emphasized the need for the short version due to factors such as the response quality, drop-out rate, and explained variance level that can be encountered in the long questionnaires. We decided to carry out this study, particularly considering the growing preference for online data collection same as the approach preferred in this study, and the length of the questionnaire is a crucial factor, particularly impacting the response rate (Evans & Mathur, 2018).

The convergent validity of the single-item FCQ's Turkish version with the first version demonstrated an acceptable correlation with the multi-item version. All the correlations between the survey's paired dimensions are in a similar range at a moderate level. The sensory appeal dimension was the most crucial motive in single-item FCQ, followed by convenience, price, and health. Although the primary motivation remains the same in the multi-item version, it has been found that it is followed by price and health, respectively. As far as we have searched the literature, although there is no study explicitly addressing the adaptation of the short version in different cultures, there are many versions of the multi-item version (Cunha et al., 2018). In their compilation of the application of the multi-item version in different cultures, noticed that sensory characteristics, price, and health were generally identified as the most important motivations and similar findings were obtained in our study.

In the validated Turkish version of the original multi-item version, there was a single factor questioning ethical consumption. Onwezen et al. (2019) divided ethical consumption into three dimensions: environment friendliness, animal friendliness, and social justice. The convergent validity of three dimensions with the single ethical consumption factor showed a statistically significant correlation. Additional validity analysis with similar Sustainable and Health Eating Behaviors questionnaire's quality labels factor with environment dimension and animal welfare factor with animal friendliness dimension showed a statistically significant correlation. The dimension we focused on most in the study was social justice which did not show a statistically significant correlation with selected the attitude construct of the short

version Sustainability Consciousness Questionnaire's economic dimension. The reason for this could be attributed to the research team not selecting an appropriate scale for comparison, along with its potential association with the current state of fair trade in Türkiye.

Consumers' motivation to fair trade in food choices is questioned in the social justice dimension. Fair trade is a growing partnership aimed at decent working conditions and fair income for producers and workers (European Parliamentary Research Service, 2014). To date, a range of fair-trade foods, mainly coffee, bananas, sugar, and cocoa, have been included in food systems. Fairtrade International organization reported licensed 2,568 companies in 70 countries. However, in Türkiye, only one company is currently licensed and operates in the coffee industry (Fairtrade International, 2022). Considering that fair trade has yet to become widespread in Türkiye, it was an expected finding that the expression would be reported as unclear both in the content validation and in the cognitive debriefing. To prevent this, the definition of fair trade has been added to the survey, but the motivation score obtained from the participants was higher than our expectations. This finding could be related to the participants' social desirability bias. The fact that we did not include a social desirability bias scale can be a limitation of our study, which could have helped to understand this finding (Larson, 2018). However, a comprehensive Food Trust Report (EIT Food, 2020) conducted in Europe reports that people's responses regarding ethical motivations in food consumption can differ from their actual practices. We advise readers to consider that the result we obtained may not currently reflect actual food choice behaviors.

The result obtained from the test-retest reliability analysis demonstrated that the survey is a reliable alternative at an acceptable level. However, while the test-retest reliability of the price dimension has been found to be at a moderate level, it appears to be lower compared to the other dimensions. The COVID-19 pandemic and the ongoing Ukraine-Russia conflict have had significant global repercussions, particularly in the realms of energy and food price (Allam et al., 2022). Türkiye, in particular, has been experiencing a higher-than-average food inflation rate compared to global averages. According to data from the World Bank (The World Bank, 2023), Türkiye ranked among the top countries in nominal food inflation, ranking fifth with a rate of 67%, and in real food inflation, ranking eighth with a rate of 17% during the period from January to April 2023, which also coincides with the collection of our study data. Our research further reveals that the price as the third most important food choice motive. The findings obtained from consumers experiencing such an inflationary living condition may have influenced the test-retest reliability of the price dimension. However, it needs to be studied separately to determine its specific impact.

These validity and reliability results indicate the short version is a valid alternative to the multi-item version in the Turkish population. However, this study has several limitations. Firstly, our sample only consisted of adults, and it is necessary to evaluate different age groups as well. And the fact that the majority of participants were women reduces its generalizability. Additionally, the study was solely designed methodologically, and it is essential to assess its applications in daily life, apart from motivations. Furthermore, Verain and colleague's (2022) study showed the different findings obtained under different conditions for food choice motives by single-item FCQ. Examining this approach in the Turkish community will contribute to the future development and better understanding of the survey.

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Conflict of interest

The authors declare that there is no conflict of interest among any institutions, organizations, or researchers involved in the study.

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Supplementary Material 1. The final version of translated version

TEK MADDE BESİN SEÇİMİ TESTİ

Besin seçimlerinize yönelik verilen ifadeleri birden yediye kadar değerlendiriniz. 1 seçeneği "Hiç önemli değil", 7 seçeneği "Çok önemli" bildirimine denk gelmektedir.		1 Hiç önemli değil				7 Çok önemli →		
Normal bir günde tüketeceğim besinde benim için önemli olan 1. Sağlıklı olmasıdır		1	2	3	4	5	6	7
2.	Duygu durumuma yönelik olmasıdır (örneğin iyi hissederken veya stresle başa çıkarken)							
3.	Elverişli olmasıdır (bulması kolay ve hazırlaması pratik)							
4.	Hoşuma giden duyusal özelliklere (dokusu, görünüşü, kokusu, tadı vb.) sahip olmasıdır							
5.	Doğal olmasıdır							
6.	Fiyat olarak uygun olmasıdır							
7.	Vücut ağırlığımı kontrol etmemde bana yardımcı olmasıdır							
8.	Alıştığım bir besin olmasıdır							
9.	Çevre dostu olmasıdır							
10.	,							
11.	Adil ticaretle üretilmiş olmasıdır (Adil ticaret, ürünün üretim ve							