İSTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SCIENCE AND TECHNOLOGY

TURKISH AND FRENCH CROSS-CULTURAL DIFFERENCES IN CONSUMER ATTITUDES TOWARDS FUNCTIONAL FOODS AND THEIR PERCEPTION FOR FRUIT AND VEGETABLE JUICES

M.Sc. Thesis by
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İSTANBUL TEKNİK ÜNİVERSİTESİ ★ FEN BİLİMLERİ ENSTİTÜSÜ

FONKSİYONEL GIDALARA KARŞI TUTUM VE MEYVE VE SEBZE SULARINDAKİ ALGISINDA TÜRK VE FRANSIZ TÜKETİCİLER ARASINDAKİ KÜLTÜRLERARASI FARKLILIKLAR

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FOREWORD

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I would like to express my deep appreciation and thanks for my advisor, Dilek Boyacıoğlu, who has always supported me and given me consultancy for not only my thesis but also my carreer.

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ABBREVIATIONS

EU	**:** International code of European Union
EUR	**:** International code of Euro
FAO	**:** Food and Agricultural Organization
FDA	**:** Food and Drug Administration
RMS	**:** Retail Measurement Service
RTD	**:** Ready to Drink
SPSS	**:** Statistical Program for Social Scientist
TRY	**:** International code of New Turkish Lira

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TURKISH AND FRENCH CROSS-CULTURAL DIFFERENCES IN CONSUMER ATTITUDES TOWARDS FUNCTIONAL FOODS AND THEIR PERCEPTION FOR FRUIT AND VEGETABLE JUICES

SUMMARY

Functional foods can be defined as foods or food components in appearance similar to conventional food that is intended to be consumed as a part of a normal diet, but has been modified to subserve physiological roles beyond the provision of simple nutrient requirements and may provide health benefits beyond basic nutrition. Within the food category, functional food products are designed to offer nutritional elements that promote better health; in addition to the nutritional elements they naturally contain. On the other hand, in the past few decades, the demand of the fruit juices which have natural functional properties has been increased consistently with an increasing demand of functional foods. Moreover, the absence of allergens such as lactose in milk in juices increases the popularity and consumption of fruit juices.

This study provides the first evidence of cross-cultural differences in attitude towards functional food concept and sensorial perception of functional fruit juices; although the scope of current research is limited to only about 100 participants in university campuses. In the findins of the study, Turkish and French panelists have similar sensitivities for a healthy diet, whereas they differ in specific expectations such that Turkish participants pay attention for the presence of saturated fat and French participants for sugar level of foods. On the other hand, Turkish participants are willing to pay more for a tastier and high quality of food whereas French panelists are more price-oriented in their food shopping choice.

The general perceptions of participants for functional foods are greatly different. In terms of general attitude towards to functional foods, Turkish panelists are more positive than French panelists. French panelists believe that functional foods are only necessary for people who have specific health problems. As opposite to Turkish participants, French panelists do not agree that functional foods are healthier and more nutritious than the regular foods. In addition, Turkish panelists found the functional foods more attractive than the regular ones while French panelists do not. Both French and Turkish participants believe that functional foods are more expensive than the conventional ones, and they both still pay attention to the good taste of product rather than its healthy attributes.

In general, purchase decision of Turkish and French panelists is based on taste and nutritional value of fruit juice and their consumption habits. However, their purchase intents for vegetable juice highly depend on nutrition value, taste and convenience of product. In other words, panelists found the vegetable juices more suitable for functional foods rather than the fruit juices.

It may be obviously said that Turkish and French panelists are differentiated in fruit flavor choices for fruit and vegetable juices. While Turkish participants prefer mostly sour cherry, pomegranate, grape and raspberry in a fruit juice, French panelists prefer flavors of grape, raspberry, blackcurrant, and apple. Similar differences were also observed in flavor choices of both cultures for a vegetable juice. Turkish panelists prefer tomato and carrot as major vegetables in juice in addition to basil, lemon and cucumber. On the other hand, tomato, basil and carrot are the vegetables most preferred by French panelists as well as celery, parsley and onion.

In conclusion, the research including a very limited number of participants showed that there are significant differences in the knowledge and behaviors of both cultures towards functional foods and functional fruit and vegetable juices.

FONKSİYONEL GIDALARA KARŞI TUTUM VE MEYVE VE SEBZE SULARINDAKİ ALGISINDA TÜRK VE FRANSIZ TÜKETİCİLER ARASINDAKİ KÜLTÜRLERARASI FARKLILIKLAR

ÖZET

Fonksyinel gıdalar, görünüş olarak geleneksel gıdalarla benzerlik gösteren, normal diyetin bir parçası olarak tüketilen, ancak nasit besinsel gereksinimleri sağlamasının ötesinde olumlu fizyolojik rolleri olan ve temek besin faydalarının yanında sağlık faydaları da sunan gıda veya gıda bileşenleridir. Gıda kategorisi içinde fonksiyonel gıdalar, doğal olarak içerdikleri besin elementlerine ek olarak, sağlığı iyileştirici besin öğeleri de sunmak için tasarlanmaktadır. Diğer yandan, son birkaç on yılda fonksiyonel gıdalara olan talebin artmasıyla, doğal fonksionel özelliklere sahip meyve sularına olan talep de sürekli artış göstermektedir. Üstelik, meyve sularının sütteki laktoz gibi alerjen madde içermemesi de meyve sularının popüleritesini arttırmaktadır.

Bu çalışmanın kapsamı üniversite kampüslerinde 100 katılımcı ile sınırlandırılmış olmasına rağmen, fonksiyonel gıda kavramı ve fonksiyonel meyve sularının duyusal algısındaki kültürler arası farklılıkların ilk bulgularını vermektdir. Çalışmanın bulgularında, Türk ve Fransız panelistler sağlıklı beslenme alışkanlıklarına karşı eşit derecede hassasiyet gösterirken, Türkler gıdalarda doymuş yağa, Fransız panelistler ise gıdaların şeker miktarına daha fazla önem göstererek, gıdalardan özel beklentileri konusunda farklılaşmaktadırlar. Diğer yandan, Türk katılımcılar daha lezzetli ve kaliteli gıdalar için daha fazla para vermeye razıyken, Fransız katılımcılar gıda alışveriş tercihlerinde daha fiyat odaklı bir davranış bir davranış sergilemektedir.

Fonksiyonel gıda kavramının genel algısı konusunda büyük farklılıklar görülmektedir. Fonksiyonel gıdalara karşı genel tutum konusunda, Türk panelistlerin Fransızlardan daha pozitiftir. Fransız panelistler, fonksiyonel gıdaların, özel bir sağlık sorunu olan kişiler için gerekli olduğuna inanmaktadır. Türk katılımcıların aksine, Fransız panelistler fonksiyonel gıdaların geleneksel gıdalardan daha sağlıklı ve besleyici olduğu görüşüne katılmamaktadır. Buna ek olarak, Fransız katılımcılar tam tersi bir davranış içindeyken, Türk panelistler fonksiyonel gıdaları geleneksel gıdaya göre daha ilgi çekici bulmaktadır. Türk ve Fransız katılımcılar fonksiyonel gıdaların, geleneksel gıdalara göre daha pahalı olduğunu ve gıdaların lezzetinin, sağlık faydasından daha önemli bir özellik olduğuna inanmaktadır.

Genel olarak, meyve sularının satın alımı ve tüketilmesinde Türk ve Fransız katılımcıların satın alım kararları temel olarak lezzet ve besin değeri özelliklerine dayanmaktadır. Ancak; sebze suyu satın alımları büyük ölçüde besin değer, lezzet ve kullanım kolaylığına bağlıdır. Diğer bir deyişle panelistler sebze suyunu fonksiyonel gıda konseptine meyve suyundan daha uygun bulmaktadır.

Açıkça görülmektedir ki, Türk ve Fransız panelistler meyve ve sebze suyunda tatlar konusunda da farklılık göstermektedir. Türk katılımcılar meyve suyunda çoğunlukla vişne, nar, üzüm ve frambuaz tercih ederken, Fransız panelistler üzüm, frambuaz, frenk üzümü ve elmayı tercşh etmektedir. Benzer farklılıklar sebze suyunda her iki kültürde görülmektedir. Türk panelistler sebze suyunda domates ve havuca ek olarak fesleğen, limon ve salatalığı tercih etmektedir. Diğer yandan, domates, fesleğen ve havucun yanında kereviz, maydonoz ve soğan Fransız panelistler tarafından en çok tercih edilen sebzeler.

Sonuç olarak, kısıtlı sayıda katılımcı ile elde edilen bu çalışmanın bulguları, fonksiyonel gıdalar ve fonksiyonel meyve ve sebze suları konusunda bilgi ve davranış bakımından iki kültür arasında önemli farklılıklar olduğunu göstermektedir.

1. INTRODUCTION

Functional foods are foods or food components which help human beings to be protected against illnesses and to reach a healthier life status and, thus, provide additional health benefits to physiological and metabolic functions apart from their properties for meeting basic nutrition requirements of body (Bech-Larsen and Grunert, 2003; Labrecque *et al.*, 2006). In the past few decades, therefore, the demand of the fruit juices which have natural functional properties has been increased consistently with an increasing demand of functional foods (Verbeke, 2005).

Fruit juices provide nutritional benefits because of their high contents in phytochemicals, antioxidants, antocyanins, folic acid, calcium and vitamins such as A, C and E (Shahidi and Naczk, 2004). Moreover, the absence of allergens increases the popularity and consumption of fruit juices. Current literature shows that consumption of functional food sector is highly associated to the nutrition knowledge of consumers. Sensory property of a food is a critical factor affecting the acceptance and preference of consumers besides the nutritional benefits of a food product (Thor and Savitry, 2007; Luckow and Delahunty, 2004; Kowalczuk, 2000).

In general, it is known that sensory property is the primary driving force determining the purchase intent of consumer, and it is followed by nutritional health benefits as the secondary factor (Lopetcharat and McDaniel, 2005). Food consumption is not only for meeting the physiological needs but also for the satisfaction of flavor. However, sensory preferences are influenced by many factors such as culture and region, presence of food, technology, religion, social conditions, economy, income, and nutrition. Therefore, consumers living in different countries and regions may have different sensory preferences. Globalization and development of international food trade make research inevitable on understanding the differences in sensory acceptance and preference of different cultures (Lopetcharat and McDaniel, 2005).

In this project, consumers in university campuses in Turkey and France were investigated for their hedonic preferences by sensory consumer panels and knowledge on functional foods by questionnaire. Statistical analysis performed on the sample was used to assess the impact of food attitudes and attitudinal factors on the general attitude toward functional foods. The consumer likings, in both countries, for functional fruit juices and their knowledge in functional foods were compared

statistically in the “Results and Discussions” part. The significance of findings in the light of current literature was presented in the conclusion section, which was followed by a list of the references.

2. LITERATURE SUMMARY

2.1 Functional Foods

The functional foods include a wide range of food product. In the future it is expected that these varieties will be even wider. The functional foods include many kind of compositions improving health and reducing the risk of the disease. There is no simple and universal definition for functional foods (Roberfroid, 2002).

Functional food products represent a new category of product with an added value, created to meet the expectations of consumers who are more health conscious than ever. Within the food category, functional food products are designed to offer nutritional elements that promote better health; in addition to the nutritional elements they naturally contain (Labrecque *et al.*, 2006).

Functional foods can be defined as foods in appearance similar to conventional food that is intended to be consumed as a part of a normal diet, but has been modified to subserve physiological roles beyond the provision of simple nutrient requirements and may provide health benefits beyond basic nutrition (Bech-Larsen and Grunert, 2003; Labrecque *et al.* 2006).

The functional foods were developed in Japan. In 1980 three programs called "Systematic analyses and development of functional foods", "The Regulation Of The Analyses Of The Function To Physiologiques Of The Foods" and "The Analyses Of Functional Foods And Their Molecular Configuration" were supported financially by Japanese government (Roberfroid, 2002).

Although there are many of definitions for functional foods, their main properties are in common. In general, they have special effects on human health due to their composition or they are eliminated from allergens, and when they are consumed they provide a positive effect on human health (Roberfroid, 2002).

The functional foods have the following characteristics:

- They are traditionally known products
- They are consumed in a normal diet with normal amounts.
- They are included in natural composition of foods.
- The have beneficial effect(s) or have a nutritive value.

- They have capacity to maintain the good health or reduce the risk of the disease.
- They have capacity to bring beneficial physiological effects and develop the life quality.
- They should be admitted scientifically and be authorized (Roberfroid, 2002).

2.1.1 Functional food and beverage market

During the last decade, tendency of functional food consumption showed a high growth rate with the change of life conditions (Verbeke, 2005). According to Euromonitor International (2007), the global functional / fortified food and beverages' market size was 152.2 billion US $, while fruit/vegetable juice market was 11 billion US $ (Table 2.1). The growth of global market size of fortified / functional fruit / vegetable juice increased by 8.1% in 2004 and 8.3% in 2007. It is obvious that global functional market is constantly being increasing.

Table 2.1: Global market size of fortified/functional food and beverages (millions of US $) (Euromonitor International, 2007)

	2004	**2005**	**2006**	**2007**
Fortified/functional food and beverages	118.687,00	128.760,00	137.934,90	152.152,50
Fortified/functional beverages	39.752,40	45.137,20	50.311,40	56.214,70
Fortified/functional fruit/vegetable juice	8.823,50	9.538,90	10.321,40	11.178,50

On the other hand, as given on Figure 2.1, market size of all types of functional food is also constantly increasing (Euromonitor International, 2007). In addition, it is apparent that the beverage market size is slightly higher than that of the total fortified / functional foods and beverages (Table 2.1 and Figure 2.1).

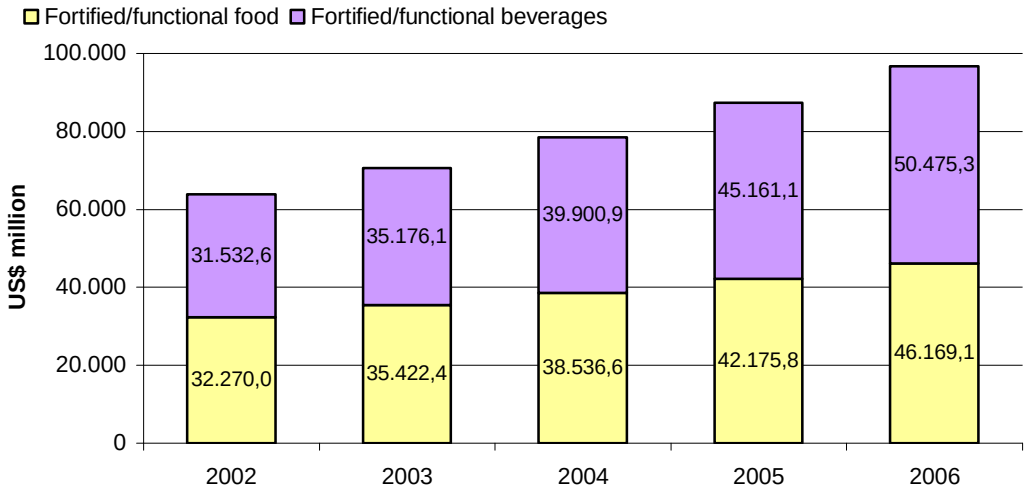

Figure 2.1 : Global market size of functional/fortified food and beverages (excluding beverages) (Euromonitor International, 2007)

As given on Table 2.2, United Kingdom is ranked the first with a size of 2.82 billion US $ in the functional drink market size of the European countries. While France is on the 7th rank with 340.6 million US $, Turkey has 156.6 million US $ market size and placed on 14th rank. It is obvious that Turkey has lower functional drink consumption per capita than that of France (Euromonitor International, 2008). In other words; functional food and beverage consumption in Turkey is still low. It is estimated that functional food market size will be about 130 billion US $ by the end of 2011 (Euromonitor International, 2008).

Table 2.2: Functional drinks market value by country in Europe in 2007 (millions of US $) (Euromonitor International, 2008)

Europe	**8.686,5**
United Kingdom	2.816,8
Germany	1.327,3
Italy	636,1
Spain	618,2
Austria	455,0
Netherlands	432,4
France	340,6
Russia	290,5
Belgium	289,4
Ireland	263,0
Sweden	204,0
Switzerland	169,1
Finland	158,2
Turkey	156,6
Denmark	101,8

It is also interesting to note that about 54% of global functional drinks consumption by value is realized by 15-34 year-old consumers (Table 2.3). Consumption of

functional drinks decreases by the age increases. On the other hand, males are the major consumer group in global functional drinks (males' consumption is 67% while females' consumption is 33%).

Table 2.3: Age breakdown of global functional drink consumption (Euromonitor International, 2008)

Age	
15-24	31%
25-34	23%
35-44	16%
0-14	12%
55+	10%
45-54	9%
Total	100%

2.1.2 Global legislation of the functional foods

Under European Union law, functional foods have not been defined as a specific category. Therefore, the term may be used for or attributed to many different foods (Stappen, 2008).

The separate nutrition and health claims regulation already propose the use of "nutrient profiles" to establish whether products can carry claims. In the vast majority of cases, manufacturers that add vitamins and minerals to food wish to make a claim about that addition. Therefore, it was not considered necessary for a regulation on fortification of food to establish nutrient profiles also as a criterion for the food to which the addition of vitamins and minerals should be allowed (Euromonitor International, 2006).

Functional foods are the foods that may claim a nutritional or health benefit based on:

- Novel foods
- Fortified foods
- Food supplements
- Dietetic foods (Stappen, 2008).

There is not, as such, a regulatory framework for 'functional foods' or 'nutraceuticals' in EU Food Law. The rules to be applied are numerous and depend on the nature of the foodstuff (Coppens *et al.*, 2006).

Historically, the 1997 Green Paper on Food Law, preceding the major food scares of the late 1990s, gave a new impetus to the foundation of European Food Law. It laid down for discussion a number of important principles for the revision of EU Food

Law and was followed by the 2000 White Paper on Food Safety announcing some 80 proposals for new and improved legislation in this field. In particular, it foresaw the establishment of a General Food Law Regulation, laying down the principles of food law and the creation of an independent Food Authority, endowed with the task of giving scientific advice on issues based upon scientific risk assessment with clearly separated responsibilities for risk assessment, risk management and risk communication (Coppens *et al.*, 2006).

In the recent years, companies attempting to launch a functional food in Europe have faced a variety of legislative frameworks regulating the approval of products, the kinds of nutrition information required on labels, and the types of functional and health claims that were allowed in connection with a product, often in a way that was highly inconsistent between EU member states (Bech-Larsen & Scholderer, 2007; Butris, 2007; Kühn, 2007). After a first attempt at harmonization, which technically prohibits all product-related communications from attributing properties for prevention, treatment or cure of human diseases to food, the situation changed again.

In December 2006, the regulation on the use of nutrition and health claims for foods was adopted by the Council and Parliament of Europe (European Parliament & Council of Europe, 1924/2006 EC).

For the purposes of this regulation, the following definitions have been given:

- "claim": any message or representation, which is not mandatory under Community or national Legislation, including pictorial, graphic or symbolic representation, in any form, which states, suggests or implies that a food has particular characteristics;
- "nutrition claim": means any claim which states, suggests or implies that a food has particular beneficial nutritional properties
- "health claim": means any claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health;
- "reduction of disease risk claim": means any health claim that states, suggests or implies that the consumption of a food category, a food or one of its constituents significantly reduces a risk factor in the development of a human disease.

It is important that claims on foods can be understood by the consumer and it is appropriate to protect all consumers from misleading claims. Regulation takes as a benchmark the average consumer, who is reasonably well-informed and reasonably observant and circumspect, taking into account social, cultural and linguistic factors,

as interpreted by the Court of Justice, but makes provision to prevent the exploitation of consumers whose characteristics make them particularly vulnerable to misleading claims. Where a claim is specifically aimed at a particular group of consumers, such as children, it is desirable that the impact of the claim be assessed from the perspective of the average member of that group (European Parliament & Council of Europe, 1924/2006 EC).

Scientific substantiation should be the main aspect to be taken into account for the use of nutrition and health claims and the food business operators using claims should justify them. A claim should be scientifically substantiated by taking into account the totality of the available scientific data, and by weighing the evidence (European Parliament & Council of Europe, 1924/2006 EC). Any claim considered to have the same meaning for consumers as a nutrition claim included in the above mentioned list should be subject to the same conditions of use indicated therein. For example, claims related to the addition of vitamins and minerals such as 'with …', 'restored …', 'added …', or 'enriched …' should be subject to the conditions set for the claim 'source of …'. The list should be regularly updated in order to take into account scientific and technological developments. Furthermore, for comparative claims it is necessary that the products being compared be clearly identified to the final consumer (European Parliament & Council of Europe, 1924/2006 EC)

Without prejudice to Directives 1924/2006 EC, the use of nutrition and health claims shall not:

- be false, ambiguous or misleading;
- give rise to doubt about the safety and/or the nutritional adequacy of other foods;
- encourage or condone excess consumption of a food;

Health claims shall only be permitted if the following information is included in the labeling, or if no such labeling exists, in the presentation and advertising:

- a statement indicating the importance of a varied and balanced diet and a healthy lifestyle;
- the quantity of the food and pattern of consumption required to obtain the claimed beneficial effect;
- where appropriate, a statement addressed to persons who should avoid using the food; and

- an appropriate warning for products that are likely to present a health risk if consumed to excess (European Parliament & Council of Europe, 1924/2006 EC)

Nutrition claims and conditions applying to them:

- Source Of [Name Of Vitamin/S] And/Or [Name Of Mineral/S]

A claim that a food is a source of vitamins and/or minerals, and any claim likely to have the same meaning for the consumer, may only be made where the product contains at least a significant amount as defined.

- High [Name Of Vitamin/S] And/Or [Name Of Mineral/S]

A claim that a food is high in vitamins and/or minerals, and any claim likely to have the same meaning for the consumer, may only be made where the product contains at least twice the value of 'source of [name of vitamin/s] and/or [name of mineral/s]'.

- Contains [Name Of The Nutrient Or Other Substance]

A claim that a food contains a nutrient or another substance, for which specific conditions are not laid down in this Regulation, or any claim likely to have the same meaning for the consumer, may only be made where the product complies with all the applicable provisions of this Regulation. For vitamins and minerals the conditions of the claim 'source of' shall apply (European Parliament & Council of Europe, 1924/2006 EC).

Although Turkey is in the process of harmonization of food legislation for the European directives and regulations, there is no attempt yet to adopt the EC Directive (2006).

Nutritional labeling is only required if the product is for a particular dietary requirement (such as diabetic) and if it is modified for that purpose. Turkish Food Codex permits some claims such as "low cholesterol, low fat and low saturated fatty acid help to reduce coronary and heart disease". According to "General and Nutritional Labeling of Foods" 2002/58, nutrient declaration is voluntary in general. However, it is mandatory for special dietary foods and in case of foods declared to be subject to changes in their composition.

Currently, the "General and Nutritional Labeling of Foods" decree (2002/58) and its final revision (23/08/2007) specify the conditions for nutritional labeling and health claims permitted (Turkish Food Codex, 2002). In near future, it is expected that the European legislation about the health claims will be adopted.

Similar to EU legislation the US Food and Drug Administration (FDA) does not provide a legal definition for the term 'functional foods', which is currently used

primarily as a marketing idiom for the category (Gulati and Ottaway, 2006).Currently, Food and Drug Administration (FDA) has neither a definition nor a specific regulatory rubric for foods being marked as "functional foods", they are regulated under the same regulatory framework as other conventional foods under the authority of the Federal Food Drug and Cosmetic Act. Health claims in USA describe a relationship between a food substance and a disease or health-related conditions. There are three sets of legislation by which FDA exercises its oversight in determining which health claims may be used on a label or in labeling for a food or dietary supplement:

- Health Claims - Health claims describe a relationship between a food substance and a disease or health-related conditions.
- Nutrient Content Claims - The Nutrition Labeling and Education Act of 1990 permits the use of label claims that characterize the level of a nutrient in a food (i.e., nutrient content claims) made in accordance with FDA's authorizing regulations. Conditions for nutrient content claims are described in the FDA food labeling guide. Most nutrient content claim regulations apply only to those nutrients or dietary substances that have an established daily value.
    - Structure/Function Claims - Structure/function claims have historically appeared on the labels of conventional foods and dietary supplements as well as drugs. However, the Dietary Supplement Health and Education Act of 1994 established some special regulatory procedures for such claims for dietary supplement labels (FAO, 2007).
    - Structure/function claims describe the role of a nutrient or dietary ingredient intended to affect normal structure or function in humans, for example, "calcium builds strong bones." In addition, they may characterize the means by which a nutrient or dietary ingredient acts to maintain such structure or function, for example, "fiber maintains bowel regularity," or "antioxidants maintain cell integrity," or they may describe general well-being from consumption of a nutrient or dietary ingredient.
    - Structure/function claims may also describe a benefit related to a nutrient deficiency disease (like vitamin C and scurvy), as long as the statement also tells how widespread such a disease is in the United States. The manufacturer is responsible for ensuring the accuracy and truthfulness of these claims; they are not pre-approved by FDA but

must be truthful and not misleading. If a dietary supplement label includes such a claim, it must state in a "disclaimer" that FDA has not evaluated the claim. The disclaimer must also state that the dietary supplement product is not intended to "diagnose, treat, cure or prevent any disease," because only a drug can legally make such a claim (FAO, 2007).

2.2. Production and Consumption of Fruit and Vegetable Juices

Fruit juice consumption is encouraged as an important part of any diet leading towards good health and ease of consumption in the functional foods market (Thor and Savitry, 2007).

Fruit juice is positioned as a healthy food product, and is currently consumed frequently and loyally by a large percentage of the global consumer population. Furthermore, juice does not contain any dairy allergens (e.g., lactose) that might prevent usage by certain segments of the population. An important factor influencing the increase of juice is the fact; juices are more available in various catering outlets. Juice is served both on its own or accompanying a meal, breakfast, lunch, dinner. It is also very popular to serve alcohol mixed with juice (Luckow and Delahunty, 2004).

2.2.1 Production of fruit juice

Fruit juice process starts with sound fruit, freshly harvested from the field or taken from refrigerated or frozen storage. Thorough washing is usually necessary to remove dirt and foreign objects and may be followed by a sanitation step to decrease the load of contaminants. Sanitizing is especially important for minimally processed juices that rely on hygienic conditions to ensure the safety of perishable products. Sorting to remove decayed and moldy fruit is also necessary to make sure that the final juice will not have a high microbial load, undesirable flavors, or mycotoxin contamination. For most fruits, preparation steps such as pitting and grinding will be required prior to juice extraction. Heating and addition of enzymes might also be included before the mash is transferred to the extraction stage. Juice extraction can be performed by pressing or by enzymatic treatment followed by decanting. The extracted juice will then be treated according to the characteristics of the final product. For cloudy juices, further clarification might not be necessary or may involve a coarse filtration or a controlled centrifugation to remove only larger insoluble particles. For clear juices, complete depectinization by addition of enzymes, fine filtration, or highspeed centrifugation will be required to achieve

visual clarity. The next step is usually a heat treatment or equivalent nonthermal process to achieve a safe and stable juice and final packaging if single-strength juice is being produced. For a concentrate, the juice is fed to an evaporator to remove water until the desired concentration level is obtained. Other processes used for water removal include reverse osmosis and freeze concentration, which are best suited for heat-sensitive juices. The concentrate is then ready for final processing, packaging, and storage (McLennan and Padilla-Zakour, 2005; Downing, 1996). Processing of commercial fruit and vegetable juices is given on Figure 2.2.

Fruit and vegetable juices are generally rich with regard to many of substances such as phytochemicals, antioxidants, anthociyanin, minerals and vitamins which are benecifal to human health. For example; citrus flavonoids possess health-promoting activities; these compounds show activity against myeloid leukemia and possess antiinflammatory, antianalgesic, anticarcinogenic, antihypertensive, diuretic and hypolipidemic activities (Shahidi and Naczk, 2004).

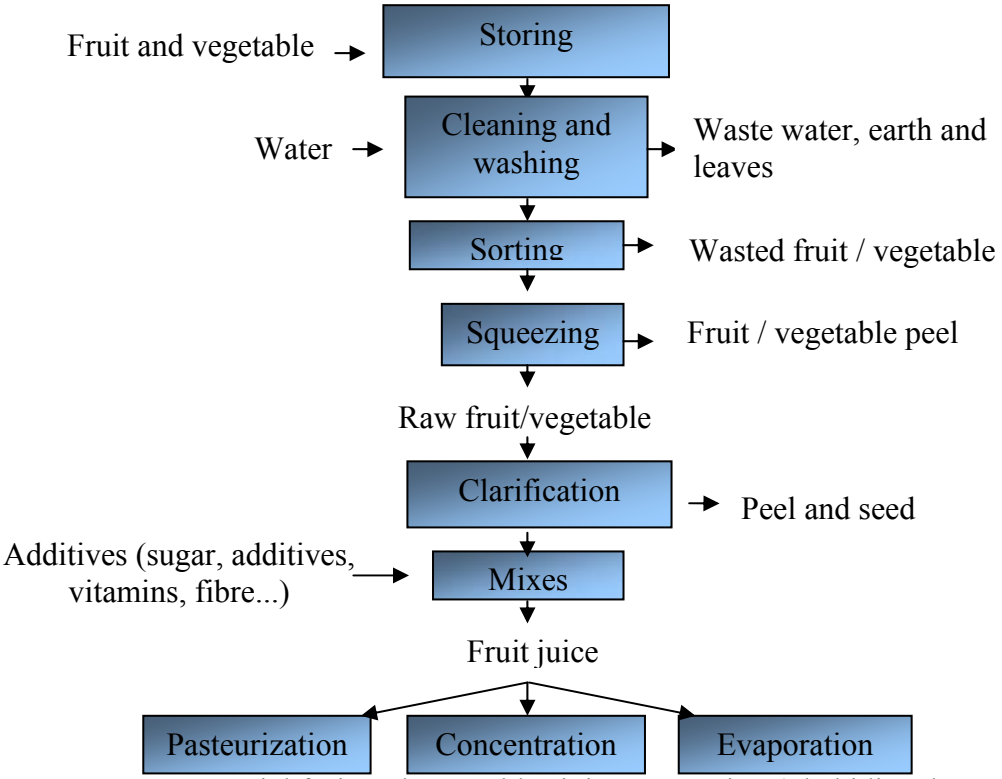

Figure 2.2: Commercial fruit and vegetables juice processing (Shahidi and Naczk, 2004)

Fruit and vegetable juices are health promoter due to the ingredients they include. For example, drinking fruit or vegetable juices at least 3 times per week reduces the Alzheimer risk (Dai *et al.*, 2006).

2.2.2 Consumption of fruit and vegetable juice

Many species of fruits and vegetables, ranging from a few tropical, many subtropical and almost all temperate zone species are produced in Turkey. The Turkish fruit juice industry started its production in the late 1960's and has flourished rapidly due to modern production units, and it reaches approximately 370.000 tons and the rate of production increases every year. There are currently more than 40 brands of about 35 producer companies, some of which have both fruit processing and bottling lines while, some others only deal with either fruit processing or the bottling of fruit juices. Exports of fruit juices and concentrates started with a symbolic quantity of 6 tons in 1970, and then showed a rapid and steady increase, reaching approximately 100 thousand tons in 2005 and 92.198.000 $ was achieved (Göksu, 2006).

Juice consumption is in an increasing trend globally. It is estimated that the juice market is expected to reach 76 billion $ by the end of year 2010 in the world. The most growing category in juice consumption is 100% fruit juice as given on Table 2.4 (Datamonitor, 2008).

Table 2.4: Global juice consumption (millions of US $)[1] (Datamonitor, 2008)

	2006	**2007**	**2008**	**2009**	**2010**
100% fruit juice (not from concentrate)	13.005,80	14.452,20	*15.973,00*	*17.560,90*	*19.261,70*
Fruit drink (0-29% juice)	19.002,20	19.319,00	*19.631,20*	*19.971,20*	*20.329,90*
100% fruit juice (from concentrate)	18.445,00	18.442,00	*18.516,50*	*18.657,70*	*18.860,00*
Nectar (30%-99% juice)	11.342,70	11.662,80	*12.004,00*	*12.359,40*	*12.759,40*
Vegetable juice	4.529,20	4.630,20	*4.735,20*	*4.839,90*	*4.950,40*
Total	66.324,80	68.506,10	*70.859,70*	*73.389,20*	*76.161,30*

[1]Italic figures indicate the forecast

The heaviest consumption in age breakdown is realized by over 55 years old while the lowest one ironically is 45-54 years old. Consumers who are 0-34 years old have relatively low consumption (Table 2.5).

Table 2.5: Global juice consumption in age breakdown (% value)

Age	
55+	22%
35-44	18%
15-24	15%
25-34	15%
0-14	15%
45-54	14%

According to Datamonitor (2008), females and males have almost the same juice consumption rate (55% and 45%). However, consumers who are married are realized 56% of global juice consumption by value (Table 2.6).

Table 2.6: Global juice consumption in status breakdown (% value)

Status	
Married/Living as Married	56%
Single	32%
Divorced	7%
Widowed	5%

2.3 Consumer Trends

In the industrialized countries, by the increasing proportion of woman in the labor force over the 30 years and using more sophisticated food technology, the demographic patterns changed, and this have profoundly modified the food universe. These phenomena have prompted researches to examine how consumers have adopted to these changes. Due to food decision is complicated for consumers, researchers have focused on many factors that influence food choice, ranging from the attributes of food itself to attitudes to motives, intentions, and the influences of environment on decision making (Labrecque *et al.*, 2006).

At the dawn of the 21st century, sensory evaluation has become more important than ever. The marketplace is consumer driven and studying foods using only machines and chemical reactions is not enough any more. Since the consumer preferences are different and influenced by factors such as culture, experiences, and environments, measuring their responses with precision and accuracy is a difficult task (Lopetcharat and McDaniel, 2005). Consumers change their food habits with the change of lifestyle and socio-demographic environment (Labrecque *et al.*, 2006). For example; a research conducted in France showed that; French men prefer wine, red meat, salty food; while French women prefer water and milk, white meat, sweet food. Good diet means variety for 25-49 aged French consumers; it means pleasure for 50 over consumers (Ferrandi, 2008).

Given food product diversification and food industry globalization, food companies need more information on differences in food attitudes in order to target the right type of products to the right type of consumers in each country (Labrecque *et al.*, 2006). Consumer science determines the differences of sensory properties and product choice by sensory analyses and questionnaire and, it optimizes the products by the results obtained from the consumer research (Lopetcharat and McDaniel, 2005).

There are at least four reasons making consumer research difficult: first, in consumer research, the goal is to predict consumer purchase decisions, while the main goal is in the sensory research is to understand how individuals process and respond to exposure to sensory information; second, in consumer research, individual differences between consumers are significant; third, consumers attitudes in a dynamic, complex and intrusive competitor environment; and, fourth, individual promotional elements such as food color strongly interact with all other aspects of the marketer's promotional plan to influence the consumer (Garber *et al.*, 2003). The imposition of experimental controls to solve this complexity is difficult due to the highly interactive nature of all of these complex elements, making it difficult to remove the consumer to a highly controlled laboratory setting, and not have the consumer behave differently than she or he would when routinely shopping on their own (Garber *et al.*, 2003; Thomson, 1998).

Consumer attitudes, especially in the early phases of market penetration of functional foods are negative; however, the reactions to the conventional product examples have been more positive. The reactions may vary depending on the product type, on the function, and on consumer segment (Saher *et al.*, 2004; Fewer *et al.*, 2001).

2.4 Consumer Acceptance of Functional Foods

Functional foods can be described as representing a food category in which the products are either modified or fortified with substances that have a preventive or therapeutic effect beyond their nutritional value. Functional foods tend to be perceived as a more "natural" way of achieving health benefits compared to traditional medicine, and as less likely to produce negative side effects (Fewer *et al.*, 2001).

Development of new functional components and the technological solutions can be very challenging and expensive. To avoid major failures in investments, manufacturers have also to apply new methods to consumer research, although increasing the functionality of the food should not necessarily change its sensory quality (Fewer *et al.*, 2001). A relevant issue is whether any consumers are willing to

accept functional foods that taste worse than substitute conventional foods, and if so, what is their profile and what are the determinants of their willingness to compromise on taste (Urala and Lahteenmaki, 2004).

More than two-thirds of the EU population believes that for the general population healthy nutrition has a positive effect on the protection of health and the prevention of diseases (Lappalainen *et al.*, 1998). Moreover, weight control, fitness and a high quality of life are reported to be important by nearly half of the population (Fewer *et al.*, 2001). Other benefits such as looking attractive, longer life, high level of energy and doing well in sports are not seen to be as relevant. Although healthy eating seems to be regarded positively in terms of benefits, by the general population this may not translate into practice. The efforts of nutritional policy have not resulted in any convincing success at population level (Lappalainen *et al.*, 1998).

Awareness and knowledge about functional foods are essential prerequisites for any potential benefits that might be derived from this new food category. Several European studies showed that the majority of the population could not identify the term "functional foods" and those who could displayed low knowledge about it (Urala and Lahteenmaki, 2004). When consumers unfamiliar with the term were asked for their initial associations, responses often included phrases such as "junk food" and "unnatural food" (Chadwick *et al.*, 2003).

Research on attitudes towards functional foods suggests that many consumers are confused about the concept of functional foods. Further, many consumers simultaneously hold both positive and negative attitudes towards functional foods (Chadwick *et al.*, 2003). From the consumer point of view, the success of functional foods relies on a number of inter-relating factors, including a level of concern about general health and different medical conditions, the belief that is possible to an effect own health an awareness and knowledge of the foods/ingredients that are supposed to be of benefit (Hilliam, 1998). However, the essential element of public perceptions on functional foods is trust. Trust in both the sources of information and the relevant regulations have to be high to ensure acceptance of new food (Chadwick *et al.*, 2003; Peters-Texeira, and Badrie, 2005). Likewise, it was found that believing in the health effects of functional foods is the most crucial factor affecting the consumers' acceptance and it was also found that the perceived efficacy accounted well for the intention to consume functional foods that were said to improve memory (Urala and Lahteenmaki, 2007). Cervellon and Dube (2005) proposes that culture may be one of the most powerful determinants of attitudes and behaviors.

Generally, numerous consumer studies have yet pointed to the primary role of health and taste as a factor food liking and consumption. Also in the specific case of

functional foods, taste expectations and experiences have been reported as extremely critical factors when selecting this food category (Verbeke, 2006; Roininen *et al.*, 1999). On the other hand, belief in the health benefits of functional foods is the main determinant of acceptance, followed by the presence of an ill family member, but decreases disproportionately with the claimed awareness of the concept (Verbeke, 2005).

Consumers' perception of functional foods can be summarized as following (Datamonitor, 2008).

- Consumers are skeptical about pharmaceuticals which may impact long-term adoption of functional products.
- Consumers find health claims confusing and contradictory.
- Consumers are beginning to recognize the role that certain foods or food components play in reducing the risk of certain diseases.
- The credibility of functional claims is enhanced in certain scenarios.
- Consumers are skeptical about the price of functional food and drink.
- Consumers are showing a distrust towards food and drink with artificially inserted ingredients.

Food functionality enhancement poses a dilemma for functional food designers because of potential aversive consumer reactions to the resulting taste (Tuorila and Cardello, 2002). Development in the functional foods market is mostly being driven by the following factors (Hilliam, 1998; Cherie and Glenn, 1994 and Zellner *et al.*, 1999);

- Consumer attitudes and expectations
- Understanding of the link between dietary constituents and physiological processes
- Advances in food science and technology
- Changes in the regulatory environment.

In general, taste, quality, price/value, convenience and the health effects of functional foods are the key factors in purchase intention. It is also observed that functional foods have to answer the consumers' needs for convenience, health and good taste. It is stated that consumers are not ready to compromise on the taste of functional foods for health and thus, the health benefits do not allow any trade-off with taste. In addition to be an excellent food product as such, a functional food has to offer the specific health effect.

Among the functional foods, functional fruit / vegetable juice is on the 7th rank among the most popular functional food in European market in 2006-2007 (Datamonitor, 2008).

The key health ingredients used for fortified/functional fruit/vegetable juice are vitamins, especially vitamin C. Calcium has also become an important added ingredient in fruit/vegetable juice. Calcium is widely recognized by French consumers as a major asset to their health, especially for children, due to its importance to bone development (Euromonitor International, 2006).

According to data belonging to year 2006, when looked at functional beverage market, nearly half of the value is coming from fruit and vegetable juices (Figure 2.3). In other words; fruit and vegetable juice is the most significant sector in the functional beverages market (Euromonitor International, 2007).

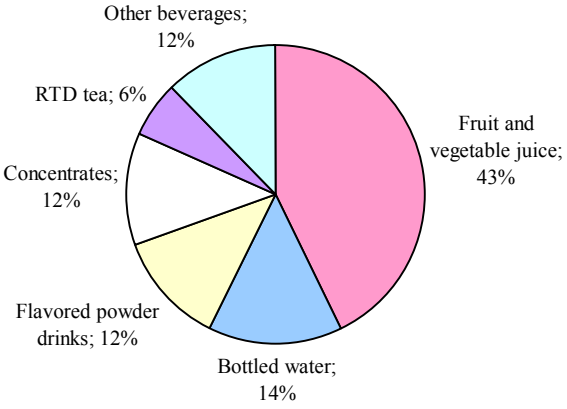

Figure 2.3: Fortified / functional beverages by sector, 2006 (% value) (Euromonitor International, 2007)

2.4.1 Consumer acceptance of functional foods in France

There is a wide and growing range of functional foods on the European market, especially in France, reflecting the interest in food and drinks manufacturers in developing added-value business by offering innovative products with demonstrable health benefits (Hilliam, 1998).

Fortified fruit juices are developing because consumers perceive them as offering a real added value. Sales of fortified/functional products increased by 18% in value between 2002 and 2005. The sales are predicted to increase by a further 19% over the forecast period in France. Fortified fruit juices, such as Sunny Delight Multivitamins, are marketed on the basis of remedying vitamin deficiency. They are attractive to parents who are concerned about their children's diets, and people with hectic lifestyles (Euromonitor International, 2006).

Market increase in France is less than the increase observed at global levels as mentioned. However, the demand of functional food (excluding fortified food and beverages) is constantly increasing in France as given on Table 2.7 (Euromonitor International, 2008). On the other hand, its market value is estimated as 807.9 millions US $ in 2007 in France (Datamonitor, 2008).

Table 2.7: Fortified/functional food and beverages market size in France (millions of US $) (Euromonitor International, 2008)

	2004	**2005**	**2006**	**2007**
Fortified/functional food and beverages	1.802,90	1.935,30	2.062,10	2.201,40
Fortified/functional beverages	334,20	374,90	413,60	455,90
Fortified/functional fruit/vegetable juice	221,7	228,5	244,5	258,6

In the study conducted in 1993 by European research program, it was found that diet was perceived to be the most important factor, cited by 55% of French participant, well ahead of exercise and genetic factors (Hilliam, 1998). French people concern more stress migraine, heart disease, obesity and memory decline about health. Their interest focuses on foods giving energy, promoting healthy teeth and bones, preventing cancer, reducing risk of heart disease and increasing resistance to disease as health claims (Hilliam, 1998). But the American attitude to food contrasts with what seems to be a much more relaxed, pleasure-oriented attitude to food among the French (Rozin *et al.*, 1999; Pettinger *et al.*, 2004).

In another study, contemporary food habits has been investigated by exploring different aspects of the organization of daily food intake. It was described how social change and an abundant food supply have impacted French consumers' food habits and structured meals taken in social context (Poulin, 2002).

According to a study conducted by Labrecque et al in 2006 in France, 63.8% of French students have not heard of the term functional foods before the study. In this study French Canadian students showed a more favorable attitude associated higher health benefits, and also it has been reported that more trust in the information resulted in a greater purchase intention (Labrecque *et al.*, 2006).

The functional drinks consumption in France is heaviest in the consumers who are 15-24 years old. Consumption breakdown in terms of age is in line with the global consumption. In addition, gender breakdown in juice consumption is the same with the global trend (Datamonitor, 2008). Fruit/vegetable juice is already mature in France and the industry needs innovation and creativity in order to boost sales. The health and wellness category will provide the foundation for much of this innovation. The main development is likely to happen in the fortified / enriched beverage category with innovations such as lighter fruit nectar and perhaps even a zero calorie fruit juice. Fortified / enriched beverage category is predicted to increase by 32% in

value terms between 2005 and 2010, whilst the organic category is forecast to grow by 22% and the fortified/functional category by 19% (Euromonitor International, 2006). The key player companies in the French market are provided in Table 2.8.

Table 2.8: Major players in fortified/functional beverages in France (Euromonitor International, 2006)

Company	**Key brands**
Eckes-Granini France	Joker, Joker Affinités, Réa, Granini
PepsiCo Inc	Tropicana
Karlsberg Brauerei GmbH & Co	Cidou, Cidou Plume
Orangina-Schweppes	Oasis, Pampryl
Groupe Louis Delhaize	Cora

Similar to the European legislation, there is no official definition of functional food in France, but the French Ministry of Health recognizes a difference between packaged food with the addition of vitamins and/or minerals and functional food. According to the Ministry of Health, functional food is a product that includes a food or non-food component and claims to have a positive impact on one or several functions of the human body. In addition, the ministry recognizes that most of the time functional food has a significant psychological impact on consumers besides the direct physiological one. This means that products which are naturally rich in a particular ingredient (for example, bran bread and vegetables are naturally rich in fibre, which impacts on bowel movement) cannot be considered as functional food (Euromonitor International, 2006).

The first health claim approved by French legislation for a fruit as a product ingredient was for cranberry. The first brand to introduce cranberry in the fruit juice sector in France, Ocean Spray, can now communicate the proven health benefits of cranberry to consumers (Euromonitor International, 2006).

The addition of vitamins that initially existed in some products but which have been eliminated in the production process is authorized under certain circumstances. “Teneur garantie” (guaranteed content) must appear on the packaging. This process is particularly used for fruit and vegetables juices (Euromonitor International, 2006).

2.4.2 Consumer acceptance of functional foods in Turkey

As given on Table 2.9, all beverage consumption in Turkey, fruit juice has kept its 4th rank position for 3 years and kept its 3rd rank in sales value. For example, Table 2.10 shows that 100% fruit juice and fruit nectar consumption grew about 29.3% from 2006 to 2007. On the other hand, in 2007, 1,009,000 TRY has been gained in consideration of 385,000 liters of vegetable juice (Nielsen[a] RMS, 2008 and Nielsen[b] RMS, 2008).

Table 2.9: Consumption and sales value of ready to drink beverages in Turkey for the last 3 years (Nielsen[a] RMS, 2008 and Nielsen[b] RMS, 2008)

	Sales Volume (000 lt)			Sales Value (million TRY)		
	2005	**2006**	**2007**	**2005**	**2006**	**2007**
Carbonated soft drinks	1,606,170	1,777,223	1,890,081	976.3	1,859.5	2,093.2
Milk	419,213	467,223	493,386	622.1	683.5	814.6
Fruit juice	242,605	431,919	491,607	384.3	570.8	718.0
Ayran	32,526	40,125	50,794	53.5	67.2	91.8
Ice Tea	9,021	10,636	14,953	12.1	25.8	38.2
Sport drinks	2,274	2,935	2,921	8.1	11.5	11.5
Energy drinks	2,684	3,350	5,125	27.9	34.5	59.2
Fermented milk based	2,019	2,995	2,439	7.5	11.1	9.6

In Turkey, key players in fruit juice category are respectively Coca Cola, Dimes and Aroma (Nielsen[a] RMS, 2008 and Nielsen[b] RMS, 2008).

Table 2.10: Consumption of 100% fruit juice, nectar and vegetable juice in Turkey (Nielsen[a] RMS, 2008 and Nielsen[b] RMS, 2008)

	SALES VOLUME (1000 Liters)		SALES VALUE (000 TRY)	
	2006	**2007**	**2006**	**2007**
%100 Juice+Nectar	271.412	333.255	484.010	625.740
%100 Juice	32.612	35.434	74.305	90.151
Vegetable Juice	-	385	-	1.009

Functional drinks are the trend increasing also in Turkey similar to the trend in France and global as mentioned before. The age and gender breakdown detail shows that functional drinks are heavily consumed by young consumers (15-34 is realized 56% of total consumption). However; over 55 years old have the lowest consumption in Turkey, while this is corresponding to the 45-54 age groups in France (Table 2.11).

Table 2.11: Age breakdown of functional drinks consumption in Turkey (Datamonitor, 2008)

Age	
15-24	31%
25-34	25%
35-44	17%
0-14	15%
45-54	7%
55+	4%
Total	100%

On the other hand, gender breakdown of juice consumption in Turkey (45 % is male) is in line with consumption values with France (Datamonitor, 2008).

3. METHODOLOGY

3.1 Materials

3.1.1 Panelists

Consumer likings of 104 French and 104 Turkish panelists were evaluated in France and Turkey. The students from the canteen or students' clubs and university staff were randomly invited to sensory tests. Consumer oriented sensory tests require at least 100 panelists in order to have meaningful results study (Resurreccion, 1998).

Research field in Turkey and France was selected as university campuses due to a need for sensory laboratories. Sensory panels need to be isolated from any environmental effects (Lawless and Heymann, 1998; Stone and Sidel, 2004; Roberfroid, 2002).

3.1.2 Fruit and vegetable juices samples

In France, one brand fruit juice and vegetable juice were purchased from supermarkets (Brand M for fruit juice and Brand U for vegetable juice). On the other hand; two Turkish brands, one fruit juice (Brand D) and one vegetable juice (Brand T) were purchased from supermarkets in Turkey. Plastic and transparent glasses, paper napkin and water were used during sensory panels.

As given on Table 3.1, ingredients in the juices in France and Turkey are different. Apple (69.9%), raspberry (15%), red grape (10%), black currant (5%), natural aroma and grape extract were the ingredients in the fruit juice used in France, while raspberry, strawberry, blueberry, blackcurrant, pomegranate, sour cherry, apple and grape for the fruit juice purchased from Turkey. The Turkish brand vegetable juice consisted of water, vegetable puree and vegetable juice concentrate (tomato, carrot, pepper, beetroot, cucumber, celery, black carrot, lemon, cabbage, onion, lettuce), salt, vinegar, spice mix, natural aromas, vegetable oil, and basil extract. The composition of French brand vegetable juice included tomato, celery, carrot, parsley, onion, red beetroot, basil, spinach, lettuce, salt and lemon. As the samples used in the both countries are different in terms of raw materials and the portion of ingredients, the sensory part has been separately evaluated.

Table 3.1. Ingredients in the juice samples

France		Turkey	
Fruit juice	**Vegetable juice**	**Fruit juice**	**Vegetable juice**
Apple (69.9%)	Tomato	Raspberry	Tomato
Raspberry (15%)	Celery	Strawberry	Carrot
Red grape (10%)	Carrot	Blueberry	Pepper
Black currant (5%)	Parsley	Blackcurrant	Beetroot
Natural aroma	Onion,	Pommegranate	Cucumber
Grape extract	Red beetroot	Sour cherry	Celery
	Basil,	Apple	Black carrot
	Spinach,	Gape	Lemon
	Lettuce,		Cabbage
	Salt		Onion
	Lemon		Lettuce
			Salt
			Vinegar
			Spice mix
			Natural aroma
			Vegetable oil

3.2 Methods

3.2.1 Questionnaire method

In this study, questionnaire was conducted by personnel interview and quantitative analyses method (Meullenet, 2004; Labrecque *et al.*, 2006). An initial qualitative study has been conducted with 10 French consumers to better understand their life styles, shopping behaviors, and attitudes towards functional foods etc. in order to be facilitated during the preparation of the questionnaire. Based on this previous qualitative study, a survey questionnaire was prepared to understand consumers' knowledge about healthy diet, behavior during food and beverage shopping.

The questionnaire included the questions towards the acceptance of functional foods, the understanding level for health benefits, the amount of fruit juice consumption per person, the most consumed fruit juice variety, the expectation for future of functional foods, acceptance of functional foods and the influence of food attitudes and other cognitive or attitudinal factors on the acceptance of functional foods (Appendix A, Appendix C and Appendix E).

3.3.2 Sensory test method

Participants were invited to the sensory analysis laboratories for tests in the universities in both countries. Each test took approximately 15-20 minutes.

The panelists evaluated the samples using the form (Appendix B, Appendix D and Appendix F) based on the measurement of their likings for the acceptance of fruit and vegetable juices. Panelists were asked to rate the taste, overall appearance, turbidity, color and overall satisfaction for the sensory evaluation using a 7-point hedonic scale (Meullenet, 2004; Labrecque *et al.*, 2006).

About 50 ml fruit and vegetable juice samples at 5 – 9 ^{o}C in transparent disposable glasses were served to the panel following shaking of their original boxes as recommended by Resurreccion (1998). All the samples were kept in a refrigerator, and they were allowed to stand for about one hour prior to serving to the panel at room temperature.

The presentation of functional fruit and vegetable juice samples to the panelists was balanced. In other words, samples were randomly delivered to the panelists; each sample had equal chance to be presented as a first sample to the panelists. The panelists evaluated their sensory acceptance of each sample sequentially and then they evaluated their sensory acceptance of each sample sequentially. Panelists were instructed to drink water between tasting of samples.

3.3 Statistical Method

The responses of Turkish and French consumers were compared using t-test in 95% confidence interval on SPSS version 13.0 to determine the differences in perceptions of functional fruit and vegetable juices. In addition, simple Pearson correlation analysis was carried out between the factors affecting consumers' likings.

4. RESULTS AND DISCUSSION

4.1 Demographics of Panelist

The demographic information of panelists is represented in Table 4.1. About 40% of participants in Turkey are male, whereas 21% was male in France (Table 4.1). The majority of panelists were 18-27 years old in both countries (83-86%). In parallel with this, the majority of panelists were single in Turkey (93%) and France (79%). Only about 6% of Turkish panelists are married while 21% of French are married. Most of the Turkish panelists have no children (96%), while 8% of French panelists have children. The majority of Turkish and French panelists are students (75% and 81%, respectively). In general, rests of the panelists are employed in both countries (except for 1% in French). In addition, most of the panelists have university level education in both countries.

Table 4.1 Demographic information of the panelists (%)

	Turkish			**French**		
Gender	**Male** 40		**Female** 60	**Male** 21		**Female** 79
Age	**18-27**	**28-49**	**50+**	**18-27**	**28-49**	**50+**
	86	14	-	83	15	3
Marital Status	**Single**	**Married**	**Widowed**	**Single**	**Married**	**Widowed**
	93	6	1	79	21	-
Number of children	**0**	**1**	**2 or more**	**0**	**1**	**2 or more**
	96	1	3	92	1	7
Occupation	**Student**	**Employee**	**Unemployed**	**Student**	**Employee**	**Unemployed**
	75	25	-	81	18	1
Educational Background	**University**	**Academy**	**High Sc.**	**University**	**Academy**	**High Sc.**
	97	3	-	98	-	2

4.2 Evaluation of Questionnaire

Questionnaire involves seven parts which are healthy diet perception, healthy diet information sources, factors effecting on food choice, neophobia, awareness and perception of functional foods, functional foods consumption, and fruit and vegetable juice perception.

4.2.1 Healthy diet perception

The responses on healthy diet awareness of the panelists are represented in Table 4.2. Both Turkish and French panelists generally read the ingredients on food labels. Based on the results of t-test (Table 4.2), there is no difference between French and Turkish panelists on their behaviors of reading the food packages. According to a study conducted in 2006, about 42% of French panelists explained that they use nutritional information on product packages when they make their food and drink choices (Datamonitor, 2006). On the other hand, food label is one of the most used and trusted sources of information by European citizens. Regulations on food and nutrition labeling are intended to provide panelists with information that will help them to make choices. Industry, while following these rules, uses labels as product promoters as well as health promoters. In general, European panelists have positive attitudes towards food product labels as indicated by Lappalainen *et al.* (1998).

The second question aimed to clarify if the panelists pay attention to high saturated fat content of foods. Turkish panelists are more cautious for food products having high saturated fat level when their answers were compared to these of French panelists (Table 4.2). There is a significant difference between Turkish and French panelists in terms of their attention for highly saturated fat content of foods ($P<0.05$).

Table 4.2: Responses on healthy diet[1]

	Mean value[2]		
	Turkish	**French**	**p value**
1. I usually read the ingredients on food labels.	5.47	5.23	0.095 > 0.05
2. I always care not to eat the food products including high saturated fat level.	**5.12**	4.21	**0.001 < 0.05**
3. High sugar level is very acceptable reason for me not to buy the food product.	3.93	**4.50**	**0.012 < 0.05**
4. I always buy food products having lesser salt level.	**4.03**	3.22	**0.000 < 0.05**
5. I am interested in information about my health.	5.63	**6.07**	**0.012 < 0.05**

[1]Figures in bold indicate the significant difference in 95% confidence interval,

[2]Questions were evaluated in 7-point scale

French panelists, opposite to their reaction for high fat content of foods, were more concerned for the sugar content of foods. On the other hand, Turkish panelists paid less attention for the sugar level of a food product. A significant difference was observed between two cultures in their responses to sugar content ($P<0.05$).

Similar to these findings, the interests for salt level of panelists of both cultures were significantly different (Table 4.2). Turkish panelists have a more desire in buying

food with lesser salt level, however, French panelists do not care for salt content enough.

The final question involved the measurement of interest of individuals on healthy diet. The slight difference between the mean values of interests of both cultures reveals that French panelists are more interested in obtaining information about their health than the Turkish participants (Table 4.2).

According to a study conducted in 2006, most Americans associate food the most with health and the least with pleasure, while the French are the most food-pleasure-oriented and the least food-health-related (Labrecque *et al.*, 2006). However, the results of the current study indicate that French panelists are particularly sensitive for the sugar content of foodstuff and they are also interested in healthy information as well.

One of the major findings from survey conducted by Lappalainen *et al.* (1998) showed that more than 70% of Europeans believe there is no need to change their diets as they are already healthy enough. Overall, only a minority of the EU sample reported that they did not want to change their diets, perhaps suggesting that many Europeans are still open to the idea of eating more healthy diets. In addition, a minority reported that a lack of knowledge and conflicting opinions of experts were barriers to healthy eating. An interesting finding from the survey is that there was no relationship between the educational level of subjects and the selection of the barrier category "lack of knowledge/expert consensus" (Lappalainen *et al.*, 1998).

4.2.2 Healthy diet information sources

The rankings of health information sources where the participants obtain are represented in Table 4.3.

Table 4.3: Rank percentage of the sources used to get the information on healthy eating (%)

	Turkish			**French**		
	1st	**2nd**	**3rd**	**1st**	**2nd**	**3rd**
TV/radio	34	10	8	11	14	11
School / University	20	9	13	28	6	8
Internet	13	18	24	4	10	12
Magazine	10	9	5	17	14	15
Newspaper	7	24	13	5	5	7
Health professional	7	8	9	13	8	6
Books	5	8	5	9	7	8
Advertising	1	6	6	1	4	8

Turkish participants ranked TV and radio the first (34%) and newspaper and Internet (24%) as the second source for obtaining information about healthy diet (Table 4.3). On the other hand, French participants ranked school and university (28%) as top source for reaching to the information about healthy eating, while food package and magazines were ranked equally as second rank (15%). It is apparent that the sources of information for healthy eating style in both cultures are different. French participants mostly prefer to obtain information through reliable sources than Turkish participants who rely on non-critically evaluated information sources. However, it is interesting that these findings are contrary to the choices of Turkish participants who slightly pay more attention to reading of the food packages (Table 4.2). This might be due to the differences in consumer communication on food packages in both countries. Because, food packages in France are more informative that these available in Turkey. As indicated in Appendix G, fruit juice used in sensory panel in France has been used for consumer communication about health via package. "Breakfast is essential for starting a good day. It needs to be composed to drink water for hydration, cereal for energy, dairy products for obtaining calcium and fruit for obtaining vitamins and fibers" is recommended under "Nutritional Recommendation" part on the pack. On the other hand, consumers are informed via "Info Nutrition" part: "200 ml of glass gives you amount of natural antioxidant as same as 48 g of fresh red grape". Another health communication on the pack is: "This beverage contains the natural antioxidants of grape under polyphenol forms". Additionally, energy requirement for each gender and age groups has been given on the pack. Besides, energy, simple sugar and fat quantity in 200 ml of juice was also given via package.

In a study conducted by Lappalainen *et al.* (1998) indicated that France has a high proportion of people reporting that they are not exposed to information on healthy eating. French people use health professionals as the first source of information on health eating while slimming societies, vegetarian societies and women's organizations are the least important as information sources. French people trust health professionals (94%) and government agencies (82%) mostly; food packages are the third most trusted source. In France, 75% of respondents mentioned either fruit or vegetables, less fat or balance and variety as part of a healthy diet (Lappalainen *et al.*, 1998). In this study, information obtained from health professionals and package is on 4th rank; but government agency is on 9th rank among 14 sources. It is obvious that food labels have been reliable sources for important healthy diet information tools through years. However, the current study showed that food package is not preferred by Turkish panelists as an information

source. Hence, the results obtained from the questionnaire are in parallel with Lappalainen's study in terms of French panelists' side (Lappalainen *et al.*, 1998).

4.2.3 Factors effecting on food choice

According to their importance factors affecting the food choices during the shopping were ranked by Turkish and French participants. Ranking percentages of these factors are represented in Table 4.3.

Table 4.4: Rank percentage of the factors effecting on food choice (%)

	Turkish			French		
	1st	**2nd**	**3rd**	**1st**	**2nd**	**3rd**
Taste	58	19	10	38	9	15
Price	2	21	22	21	31	20
Quality / Freshness	21	17	21	9	18	16
Habit	4	9	14	11	9	17
Nutrition value	4	5	9	11	14	5
Convenience of use	0	3	3	1	3	10
Brand	2	0	10	1	1	3
Presentation/Packaging	1	2	4	1	5	3
Content of additives	6	6	1	1	1	2

58% of Turkish participants ranked taste as a key factor during their food shopping. Price and quality and freshness were ranked equally as second and third factors (21%). Although taste is the primary factor determining the food choices for both cultures, the number of French participants (38%) was lesser than Turkish panelists. French participants ranked price as the second important factor while habit was ranked as the third one (31% and 17%, respectively).

It is obvious that Turkish participants are more interested in food quality than their French counterparts but they pay less attention to the price of the food product as only 2% participants ranked it as a factor at the first place (Table 4.4).

It is interesting that, habit and nutrition value are among the important choice factors for both French and Turkish participants whereas salt, sugar and fat level are ignorable factors. However, Turkish and French participants claimed that they have salt, sugar and fat level awareness when they choose their food (Table 4.4).

In a study conducted by Lappalainen *et al.* (1998), while quality and freshness (77%) is on first rank, price and taste are on second and third rank, respectively, for French panelists. On the other hand, presentation and package is ignorable factor influencing on food choice during food shopping. It is apparent that the findings of the current study is slightly different almost a decade ago. Although the importance of the first

three factors (quality and freshness, price and taste) is similar, ranking was different for French participants compared to Lappalainen *et al.* (1998). In addition to these, the results of both studies revealed that presentation and package was considered to be as an ignorable factor.

Rozin *et al.* (1999) studied how panelists' beliefs about different food-related aspects vary between countries. They found that Americans associate food the most with health and the least with pleasure and the French are the most food-pleasure-oriented and the least food-related group. The findings of current study about ranking of factors influencing on choice during food shopping are different than findings of Pettinger (2004) who claimed that quality of food product is more important than price for French panelists. In Pettinger's the study (2004); it may be obviously said that, price (24% of French panelists) is more important than quality (14% of French panelists). Thus these two studies are not aligning in terms of price or quality preference during the shopping.

As represented in Table 4.4, there are common three factors influencing on food choice for both French and Turkish panelists. These determining factors are taste, price and quality & freshness. In general, French panelists are more price oriented than Turkish panelists and Turkish panelists are more taste sensitive than French. On the other hand, Turkish panelists pay attention to brand when choosing food product and they ignore the nutritional value of food product contrary of French panelists.

4.2.4 Neophobia

Neophobia is a fear of novelty and new things (Lappalainen *et al.*, 1998). Functional foods are considered as novel foods. In the questionnaire, some questions related to neophobia took part in order to understand if the participants have such an behavior towards to novel foods which causes them to be unmotivated for buying functional foods. Participants were asked to rate the statements in a 7 point scale (1: strongly disagree, 7: strongly agree) if they are agree or not. Table 4.5 represents the responses to questions about neophobia.

The mean values of answers to the first question indicated that Turkish and French panelists did not have any resistance to consume new foods.

Table 4.5: Statistically t-test of the responses on neophobia[1]

	Mean value[2]		
	Turkish	**French**	**p value**
1. I am afraid to eat things that I have never heard before.	3.58	3.08	0.06 > 0.05
2. I don't trust new food.	**2.96**	2.51	**0.03 < 0.05**
3. In general, I am among the last in my circle of friends to purchase a new food product.	2.84	2.48	0.09 > 0.05
4. If I heard that a new food product was available through a local store, I would be interested enough to buy it	4.75	4.84	0.77 > 0.05
5. I would consider buying a new food product, even if I hadn't heard of it yet.	4.50	4.80	0.67 > 0.05
6. I know more about new foods than other people do.	**4.28**	3.85	**0.03 < 0.05**
7. I am constantly trying new and different foods.	4.13	3.98	0.52 > 0.05

[1]Figures in bold indicate the significant difference in 95% confidence interval

[2]Questions were evaluated in 7-point scale

In the second question, participants were asked if they trust on the new food or not. The findings do not represent a heavy concern about safety of new food products for both cultures (2.96 and 2.51, respectively); however, Turkish participants showed statistically more trust for new foods than French participants (Table 4.5).

In order to understand if the participants are generally aware of new food, they were asked to position their interest with their community in the third question. The findings showed that Turkish and French participants pay attention to purchase new food products among their circle of friends (Table 4.5).

The fourth question involved the measurement of the interest of participants for new food products when first became aware. Turkish and French participants equally rated their answers indicating that they would be interested enough to buy a new food product when they heard of it (Table 4.5). Although question no.5 is similar to previous question, it intended to measure the interest of participant when they are not aware of the new food product.

Turkish and French participants rated this question 4.50 and 4.80 points, respectively, indicating that they were still open for new food product (Table 4.5).

In the sixth question, participants' knowledge about the new food products than other people was investigated. According to the results of t-test ($P<0.05$), Turkish and French participants do not claim that they have more knowledge about new foods

than the other people do (4.28 and 3.85, respectively). However, Turkish participants rated this question statistically higher than French participants showing that they have more knowledge than others (Table 4.5).

In the last question of this section, the desire for continuity of trying new and different foods was investigated. Both Turkish and French participants responded very similarly about 4 point on the scale showing that they have neutral to new products (Table 4.5).

According to these results, it is apparent that Turkish and French panelists do not have neophobia, however, they do not have a great trust towards to new food products neither. Although both cultures showed a certain level of trust on new products, French panelists seemed to have a slightly more novelty to new foods. Turkish and French panelists did not show a tendency of continuous interest to try new food products.

The first three statements were evaluated together as an indicator of fear of new things while the rest of four statements were classified as another group. Overall evaluation of neophobia was analyzed statistically using t-test as given in Table 4.6.

Table 4.6: Overall evaluation for neophobia[1]

	Mean value[2]		
	Turkish	**French**	**p value**
Question 1-2-3 (*neophobia*)	**3.13**	2.69	**0.001 < 0.05**
Question 4-5-6-7 (*opening the novelty*)	4.41	4.37	0.668 > 0.05

[1]Figures in bold indicate the significant difference in 95% confidence interval

[2]Questions were evaluated in 7-point scale

According to results of t-test, there is a statistical significant difference between Turkish and French panelists to the total evaluation of the first three questions. It is proposed that Turkish panelists are less open to the novelty than French panelists are. On the other hand, both Turkish and French panelists are almost neutral towards to new food products, and there is no statistically difference between Turkish and French panelists in terms of tendency to try new food products.

4.2.5 Awareness and perception of functional foods

The responses on functional foods awareness of the panelists are represented in Figure 4.1. Participants were asked if they heard the term of "functional food" or not. More than half of the Turkish participants and nearly half of French participants have heard "functional food", whereas 18% of Turkish and 25% of French panelists never

heard (Figure 4.1). On the other hand, Labrecque *et al.* (2006) showed that 64% of French students have never heard the term of functional food. This difference in current study may be associated to the location of the testing and survey as the food engineering students were mostly participated. Besides, mean values of Turkish and French participants' responds were not significantly different (3.04 and 2.76, respectively).

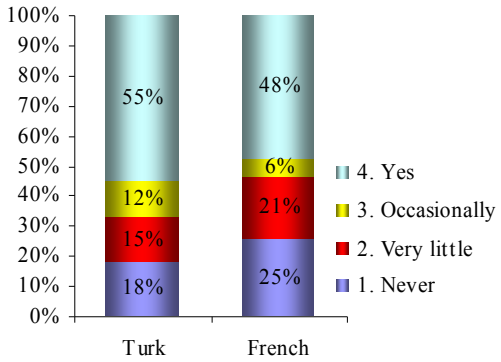

Figure 4.1: Percentage of responses if participants heard the term of "Functional Food"

In the second question on functional food, participants were asked to rate if they agree or not on the following statement: "I have eaten the functional food products before". The responses obtained from the participants are represented in Table 4.7. According to the results, 15% of Turkish panelists experienced have eaten the functional food while only 5% of French panelists did daily (Table 4.7). In general, most of the Turkish and French participants consumed functional foods 1-3 times in a week (35% and 45%, respectively).

Table 4.7: Responses for the question that "I have eaten the functional food products before"

	Percentage	
	Turkish	**French**
5. Very often (*more than 1 time a day*)	15%	5%
4. Often (*4-7 times a week*)	21%	19%
3. Sometimes (*1-3 times a week*)	35%	45%
2. Occasionally (*1-3 times a month*)	22%	27%
1. Never	7%	4%

When processed the crosstab between the functional food knowledge and the consumption frequency, it was observed that 14.6% of Turkish and 23.3% of French participants consume functional foods, although they do not know what functional food is. On the other hand, %4 of Turkish and %2 French participants who know what functional is never ate a functional food.

Overall attitude towards to functional foods was investigated in the third question. Participants were asked to rate their negative or positive attitude in a 7-point scale. The responses of Turkish and French panelists are represented in Figure 4.2.

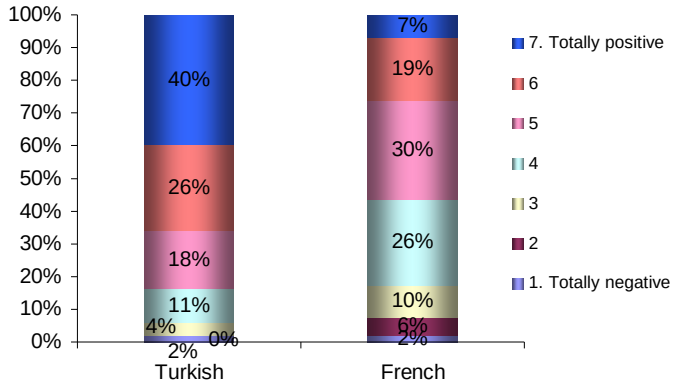

Figure 4.2: Attitude towards functional food

66% of Turkish panelists rated totally positive while 26% of French panelists claimed that they are agree that they think totally positive about functional foods. Additionally, majority of French panelists have attitude neutral.

The mean value of Turkish respondents for their attitude against functional foods is 5.80 while 4.62 for French participants indicating a significant difference ($p<0.05$). When evaluated the results in terms of gender, women are more positive towards to functional foods than men.

Relationships between overall attitude and knowledge about functional foods were also evaluated based on crosstab function. About 15% of Turkish and 14% of French panelists are more positive towards to functional foods whereas they do not consume it. However, 3% of Turkish and French participants consume functional foods although they have a negative attitude towards to functional foods.

In order to understand a detail attitude of panelists toward to functional foods, additional 9 questions were asked. The mean values the responses of both Turkish and French panelists are given in Table 4.8.

Table 4.8: Turkish and French panelists' attitude towards to functional foods[1]

	Mean value[2]		
	Turkish	**French**	**p value**
1. The new properties of functional foods carry unforeseen risks	3.51	**3.92**	**0.023 < 0.05**
2. Functional foods are completely unnecessary	2.02	**2.91**	**0.000 < 0.05**
3. I think functional foods are not natural so they can have negative effects to human health.	2.69	**3.32**	**0.004 < 0.05**
4. I only want to eat foods that do not have any medicine-like effects	**4.52**	2.93	**0.000 < 0.05**
5. Functional foods are acceptable to me if their taste good	5.18	5.48	0.149 > 0.05

[1]Figures in bold indicate the significant difference in 95% confidence interval

[2]Questions were evaluated in 7-point scale

The first question aimed to clarify if the participants have concerns on the risks of functional foods. Participants were asked to rate their statements in a 7-point scale where 1 points corresponds to "strongly disagree" and 7 to "strongly agree". The mean value of the responds of Turkish participants was 3.50 while 3.92 of French panelists (Table 4.8). Although there is a statistically significant difference between both cultures ($p<0.05$), participants do have sufficient knowledge about the risks of functional foods.

The second question involved the perception of functional foods' necessity. Turkish and French panelists rated this question in average of 2.02 and 2.91 points, respectively (Table 4.8). In other words, participants of both countries do not think that functional foods are unnecessary. However, the average values of French participants were statistically higher than these of Turkish panelists ($p<0.05$).

Third question was about the perception of the functional foods as natural. Turkish panelists rated this question in average of 2.69 which is statistically lower than French panelists' rating (3.32). In other words, both French and Turkish panelists evaluated that functional foods are not harmful to human health because of its unnaturalness, but French panelists are more negative ($p<0.05$).

In order to understand if the reason of rejection of functional foods is associated to a medicine like perception, the following statement was asked to be rated:" I only want to eat foods that do not have any medicine-like effects". The perception of Turkish panelists was relatively neutral (an average of 4.52) but the perceptions of French participants were very likely to be on no concern level (an average of 2.93) for eating foods with a medicine-like effect (Table 4.8).

Fifth question aimed to clarify the importance of taste of the functional foods. The responses of Turkish and French participants are given in Table 4.8. The average of replies of Turkish participants was 5.18 while 5.48 of French participants. There was no difference between both cultures for the importance of taste ($p<0.05$). In general both French and Turkish panelists accept functional foods if their taste if good. This is expected considering the previous evaluation of the participants in which they considered the taste as a key factor during shopping of food.

The objective of the sixth question was to clarify the preference of Turkish and French participants for either taste or health. Participants were asked to rate the following statement in a 7-point scale where 1 is "strongly disagree" and 7 is "strongly agree": "Functional foods are acceptable to me, even if their taste is worse than other foods". French participants rated this question with a mean of 2.76 while the responses of Turkish participants averaged 3.37. This difference indicated that French panelists are more conscious for taste than Turkish participants. However, it is apparent that both cultures are taste-oriented as known from previous questions (Tables 4.4 and Table 4.8). Indeed, taste is more important than all of the other factors for all types of panelists.

The aim of seventh question was to understand the perception of participants if they the functional foods as a medicine. French participants rated statistically differently higher than Turkish participants (4.95 and 4.34, respectively). Turkish participants are considered to be more neutral while French participants tend to perceive the functional foods as foods having medical effects.

According to overall results of these questions, taste is the key factor for both French and Turkish participants. However, their knowledge is limited for the risks and its naturalness. Although Turkish and French participants are neutral towards to the functional foods, it is obvious that Turkish panelists have a more positive tendency towards to this food category.

Table 4.9: Turkish and French panelists' attitude towards to functional foods (Continued)[1]

	Mean value[2]		
	Turkish	**French**	**P value**
6. Functional foods are acceptable to me, even if their taste worse than other foods	**3.37**	2.76	**0.00 < 0.05**
7. Functional foods are needed by people who have specific health problems	4.34	**4.95**	**0.02 < 0.05**
8. Functional food products have more nutritional level than other food products.	**4.11**	3.38	**0.00 < 0.05**
9. Functional food products are healthier than other food products.	**4.51**	3.08	**0.00 < 0.05**

[1]Figures in bold indicate the significant difference in 95% confidence interval

[2]Questions were evaluated in 7-point scale

In order to evaluate the perception of participants about the nutrition value of the functional foods, they were asked to rate the following statement in a 7-point scale: "Functional food products have more nutritional level than other food products" (Table 4.9). The mean values of the responses of both vultures reflected a difference in such a way that Turkish panelists believe that a functional food has a more nutritional value (an average of 4.11 vs. 3.38) than a normal food. These results indicated that French panelists seemed to be more skeptical about nutrition level of the functional foods than Turkish panelists.

In the last question, wholesomeness of the functional foods was asked to the participants. Turkish panelists responded to this question with an average of 4.51 and French panelists with a mean value of 3.08 (Table 4.9). Such difference revealed that French panelists have a more negative attitude about wholesomeness of functional foods while Turkish panelists are more neutral.

In general, the results of overall perception of French and Turkish participants towards to functional foods pointed out that taste is the major criteria for the decision of consuming functional foods. On the other hand, participants have very limited information for the wholesomeness and nutrition of the functional foods.

In the following question, participants were asked to rate their perception for the suitability of the price of functional foods using a 7-point scale. Figure 4.3 shows that half of Turkish and 65% of French participants perceived the functional foods to be more expensive than their normal counterparts. Likewise, none of Turkish and French participants thinks that functional foods are less expensive than other foods (Figure 4.3).

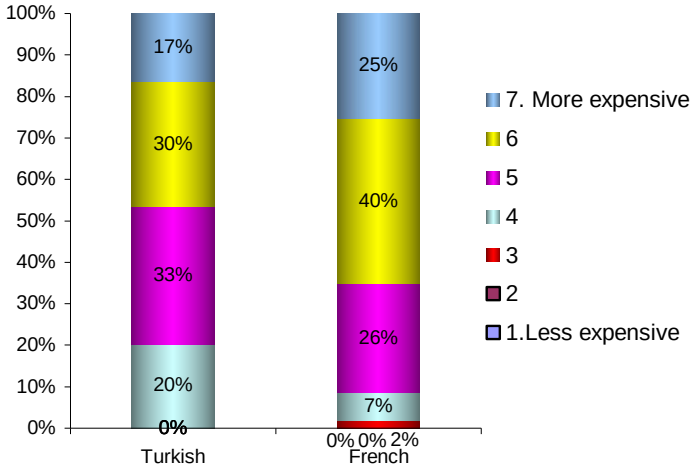

Figure 4.3: Price perception of functional foods for Turkish and French panelists

As explained in section "Factors Effecting on Food Choice", price was listed as a very significant factor by French panelists influencing on their food choice. Thus, higher price perception difference for functional food is expected for particularly French participants. On the other hand, mean value for price perception of functional foods for Turkish and French participants was 5.43 and 5.80, respectively. It is proposed that price perception of functional food is statistically different between Turkish and French panelists ($p < 0.05$).

In following question, participants were asked if the functional foods were appealing to them. The replies obtained from both cultures are given in Figure 4.4. Half of the French participants were neutral (with an average of 4.00) while none of them found functional foods totally less appealing. Mean value of Turkish and French respondents for appeal of functional food was 5.00 and 4.43, respectively, indicating a statistically significance ($p < 0.05$).

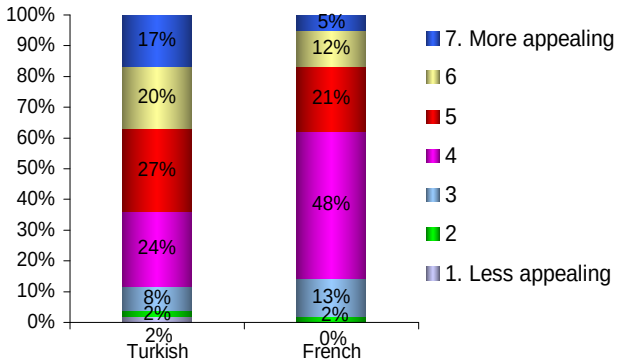

Figure 4.4: Appeal of functional foods for Turkish and French panelists

Based on the results pertaining this question, French panelists are neutral about the attractiveness of functional foods. In contrary to their perception, Turkish panelists are slightly more positive towards to functional foods.

Confidence to functional foods was also investigated in the following question. The results of the responses of cultures are represented in Figure 4.5. About 23% of Turkish and 14% of French panelists do trust on functional foods, while almost one fourth of Turkish and French participants seemed to be neutral (Figure 4.5).

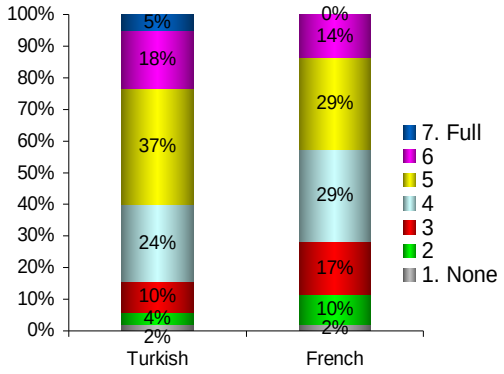

Figure 4.5: Confidence of functional foods for Turkish and French panelists

The mean values of the evaluation of Turkish and French participants for the trust on functional foods were 4.65 and 4.15, respectively, showing no significant difference ($p>0.05$). It is proposed that Turkish and French panelists are hesitant when it comes to a decision if they totally trust on the functional foods.

4.2.6 Functional foods consumption

In order to understand the level of beverage consumption of the participants, respondents were asked to rate their consumption frequency using a 5-point scale. As represented in the Figure 4.6, tea is the most abundantly consumed beverage in Turkey (54% of Turkish participants who rated “very often”). A total of 83% of Turkish panelists drink tea oftenly (Figure 4.6). Whereas tea was listed on the third rank by French participants (22% rated “very often”). The juice consumption was dominant for the French respondents (35% rated “very often”). A total of 90% of French participants preferred fruit juice at the first place. Both Turkish and French participants ranked dairy products at the second place (82% and 81%, respectively). Besides, coffee was an important beverage as it was placed on the third rank by Turkish and French participants.

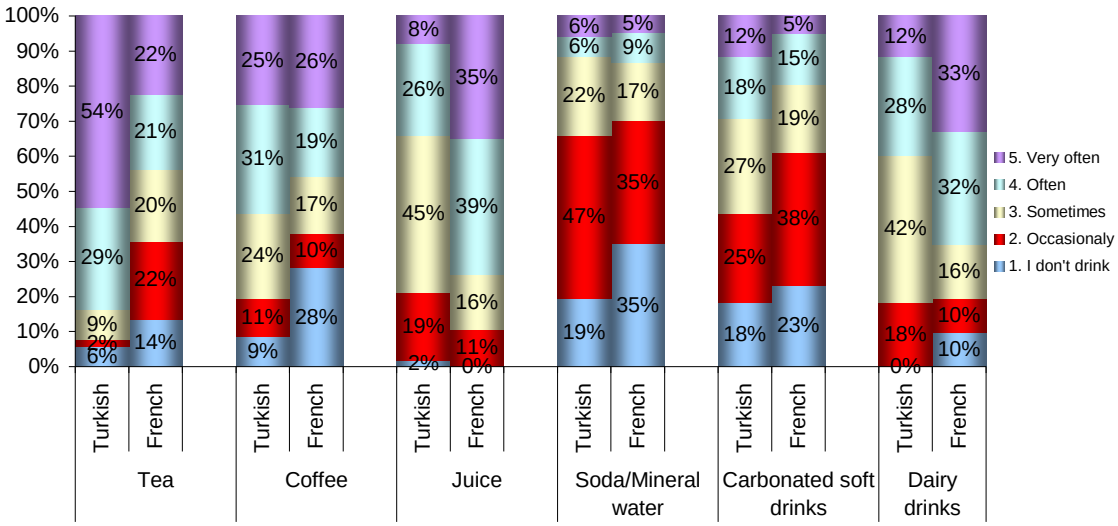

Figure 4.6: Consumption frequency of beverage

In addition to consumption of different beverages, purchase intent of participants for selected functional foods was also investigated using a 5-point scale in which 1 means "not at all willing"; 5 means "extremely willing" (Table 4.10).

Table 4.10: Functional food purchase intent of Turkish and French panelists[1]

	Turkish	French	Overall
	Mean value[2]	Mean value[2]	p value
Juice with added calcium and vitamins	**4.02**	3.14	**0.00 < 0.05**
Milk with added *omega-3*	**3.94**	2.68	**0.00 < 0.05**
Yogurt with *bifidus*	**3.84**	3.39	**0.02 < 0.05**
Cholesterol-lowering spread	**3.63**	3.11	**0.00 < 0.05**
Oatmeal with added *beta-glucan*	**3.58**	2.40	**0.00 < 0.05**
Snack bar with added fiber	**3.91**	2.51	**0.00 < 0.05**

[1]Figures in bold indicate the significant difference in 95% confidence interval

[2]Questions were evaluated in 5-point scale

In general, the mean values of consumption intents of functional foods by Turkish participants were observed to be higher than these of French participants (Table 4.10). Previous evaluations (Figure 4.2 and Table 4.8) also confirmed these results as French panelists were observed to be either negative or neutral, while Turkish participants to be positive towards to functional foods.

Juice with added calcium and vitamins was the most preferable functional food within this category, while cholesterol-lowering spread was the least preferred one. On the other hand, French panelists preferred yogurt with *bifidus* the most and oatmeal with added *beta-glucan* was the least (Table 4.10). Labrecque *et al.*(2006)

claimed that functional foods are not part of French students' regular diet. In addition, only 7% French students consume milk with *Omega-3* or eggs with *Omega-3* every two weeks (2006).

4.2.7 Fruit and vegetable juice perception

Participants were asked specifically to specify the type of juices that they mostly prefer. Figure 4.7 presents that 92% of Turkish participants preferred fruit juice whereas rest of them preferred fruit and vegetable juice mix. Similarly, French participants also preferred mostly fruit juice (93%) while 5% of them preferred vegetable juice.

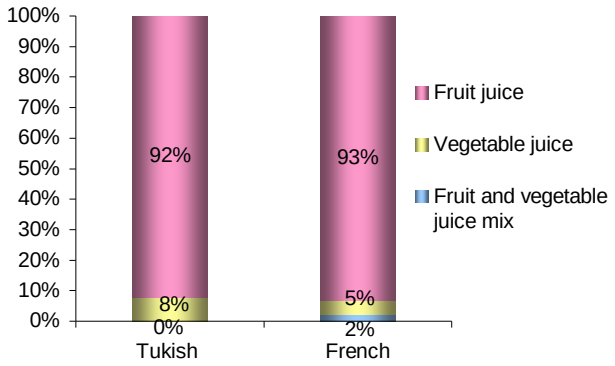

Figure 4.7: Type of juices preferred mostly by Turkish and French panelists

In the second question related to juice consumption, the participants were forced to select the possible reasons for their preferences. Fruit juice consumption reasons of Turkish and French participants are summarized in Table 4.11. According to these results, 77% of Turkish and 64% of French participants purchase fruit juice basically for its taste. Nutrition value was observed to be ranked as the second (36% of Turkish and 27% of French participants) and habit was as the third (20% of Turkish and 28% of French participants).

Table 4.11: Percentage of the reasons of Turkish and French panelists for fruit juice consumption

	Turkish			French		
	1st	**2nd**	**3rd**	**1st**	**2nd**	**3rd**
Taste	77	15	5	64	20	8
Nutrition value	15	36	7	19	27	16
Habit	4	32	20	9	23	28
Convenience of use	3	3	13	1	13	16
Availability	0	9	18	1	0	8
Price	0	2	16	3	9	6
Presentation/Packaging	0	1	12	0	0	4

Based on the findings listed in Table 4.4, taste was always on the first rank for both cultures. On the other hand, while price was on the second rank as a factor influencing choices during food shopping, nutrition value was on the second rank for buying fruit juice for Turkish and French panelists (Table 4.11). In other words, it may be proposed that French panelists relatively ignore the price during fruit juice shopping. Habit is still on the third rank for French panelists for both food and fruit juice choice, while quality/freshness is on the third rank for Turkish panelists during food shopping (Table 4.11). Convenience of use and product availability can also be considered as important reasons for buying fruit juice. While 12% of Turkish participants listed presentation/packaging as the third factor for buying fruit juice, culinary usefulness and fashion are considered by very few people (Table 4.11).

Reasons for consumption of vegetable juice were also asked to participants as the third question. As given in Table 4.12, panelists do not rank price (not among the top three reasons for both Turkish and French participants) as a significant factor but they absolutely consider the nutritional value of product. In other words, price which was listed as an important factor influencing on food choice was now replaced with nutritional value by both Turkish and French panelists (Table 4.12). Taste was still on the first rank as a factor affecting choices by Turkish panelists, while French participants replaced it with nutritional value as the first factor. Only 17% of Turkish panelists ranked presentation/packaging factor as the third but French participants ranked convenience of use as a factor at the third.

Table 4.12: Percentage of the reasons of Turkish and French panelists for vegetable juice consumption

	Turkish			**French**		
	1st	**2nd**	**3rd**	**1st**	**2nd**	**3rd**
Nutrition value	38	38	5	46	23	13
Taste	41	12	12	35	25	15
Convenience of use	4	10	12	1	13	19
Presentation/Packaging	2	4	17	1	4	8
Culinary usefulness	3	10	9	7	8	13
Habit	1	7	14	2	4	9
Family preferences	8	9	5	3	8	2
Price	1	3	8	1	6	7
Fashion	0	1	11	1	5	6
Availability	3	4	8	2	3	7

The overall evaluation of reasons for vegetable juice consumption, nutrition value was highlighted by both cultures. However, taste is still an important factor when participants make their choice for vegetable juices.

It is also interesting to note that availability becomes a significant factor for choices of purchase for fruit juice, while presentation and packaging for vegetable juices.

4.3 Sensory Panel Analysis

Fruit juices and vegetable juices purchased from Turkey and France differ in their ingredients, food additives, and fruit/vegetable proportions. Apple (69.9%), raspberry (15%), red grape (10%), black currant (5%), natural aroma and grape extract are the ingredients of the fruit juice purchased from France (Brand M) while raspberry, strawberry, blueberry, blackcurrant, pomegranate, sour cherry, apple and grape are the ingredients of the fruit juice purchased from Turkey (Brand D).

4.3.1. Fruit juices

4.3.1.1. Appearance

The liking of participants for the appearance property of fruit juice samples is given in Figure 4.8.

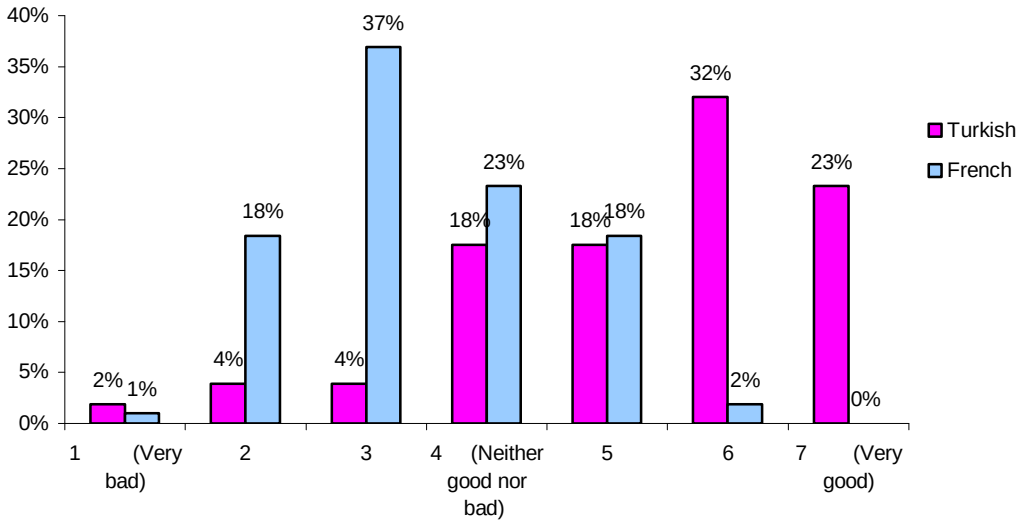

Figure 4.8: Evaluation of general appearance fruit juice by Turkish and French panelists

Turkish panelists liked the general appearance of fruit juice (with a 5.3 mean value). On the other hand, French panelists seemed to be more neutral for this property (3.5 mean value). It might be obviously said that Turkish panelists liked the general appearance of the fruit juice while French panelists do not.

Panelists evaluated the turbidity of the fruit juice in a 7-point hedonic scale in the second question (Figure 4.9). Turbidity, which is a well-known appearance property,

was perceived differently by both groups of panelists. For instance, according to the French panelists the fruit juice was more turbid.

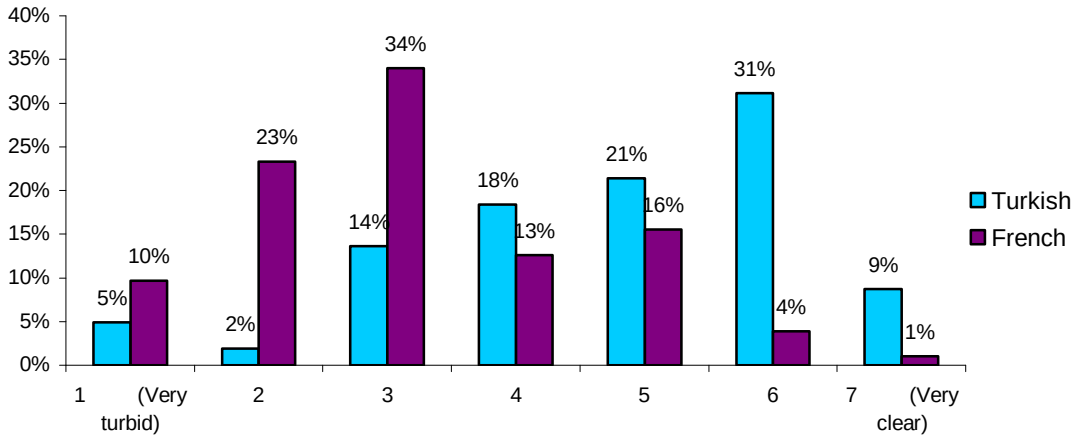

Figure 4.9: Evaluation of turbidity of fruit juice by Turkish and French panelists

Interestingly, when correlated between turbidity and general liking, there was a negative correlation between turbidity and overall general appearance likings of Turkish respondents ($P<0.05$). In general, Turkish panelists preferred a more clear fruit juice rather than a turbid one. On the other hand, there was no correlation between turbidity and general overall appearance perceptions of French respondents

Following question was related to perception of color source of the juice Figure 4.10. According to the Turkish panelists the color source of the fruit juice appeared to be less natural (4.6 mean value) than evaluations of French panelists (5.1 mean value).

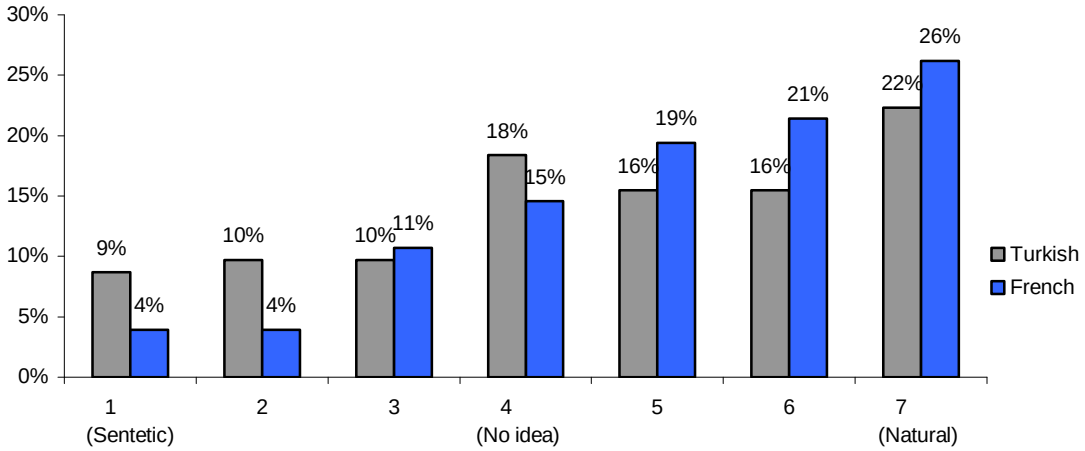

Figure 4.10: Perception of color source of fruit juice by Turkish and Fruit panelists

In general, Turkish panelists evaluated the fruit juice sample to have properties of good quality of appearance (non-turbid), a natural odor without a natural color. However, French panelists evaluated their fruit juices to present a natural color and odor. In addition, they found the fruit juice product to be turbid presenting a low quality of general appearance.

4.3.1.2 Flavor

Perception of naturalness of odor was asked to evaluate by panelists in 7-point hedonic scale as given in Figure 4.11. Both side of panelists rated this question as 5.17 and 5.08 Turkish and French panelists respectively. In other words, both French and Turkish panelists evaluated the odors of the products to be natural.

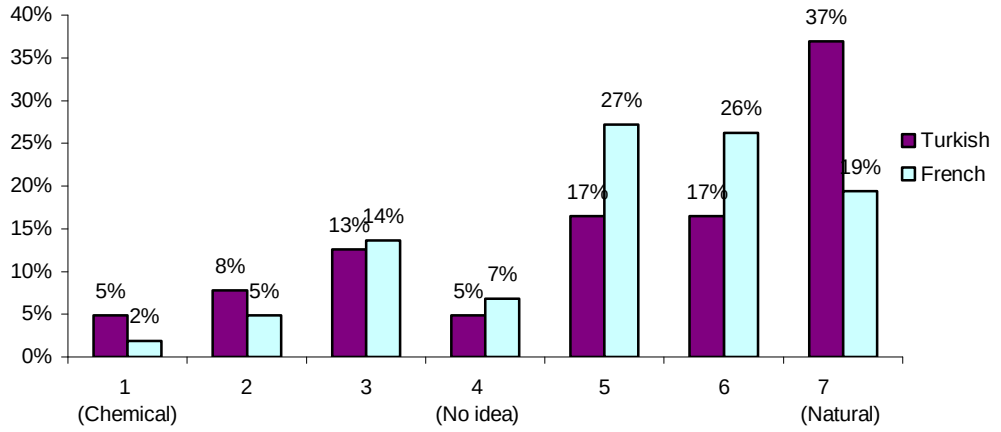

Figure 4.11: Perception of naturalness of fruit juice odor by Turkish and French panelists

Grape and sour cherry (21% and 23%, respectively) are the fruit odors that were perceived to be dominant by Turkish panelists while grape (74%) was the main odor detected by French panelists (Figure 4.12). Following these odors, Turkish panelists listed blackcurrant (13.8%), pomegranate (13.4%) and raspberry (12.1%) odors to be important. French panelists perceived the blackcurrant (11%) odor after grape.

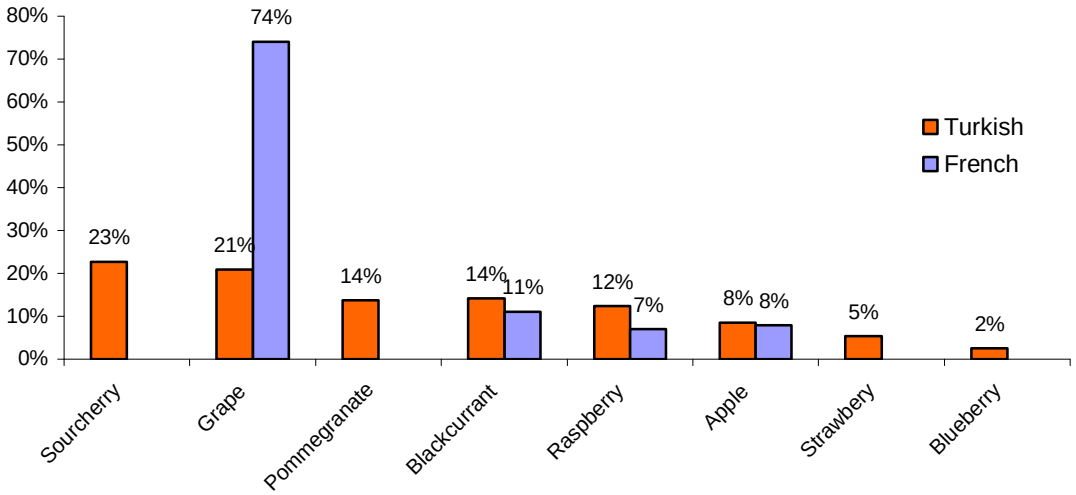

Figure 4.12: Fruit odors perceived by Turkish and French panelists

In the following question within the sensory panel section, panelists were asked to try to capture the fruit flavors that they perceive. The perception of flavors of fruit

juice sample by Turkish panelists is represented in Figure 4.13. As given on the Figure 4.13, sweetness and astringency of fruit juice were found to be dominant taste qualities expressed by Turkish panelists. Only 13% of Turkish panelists perceived sour flavor.

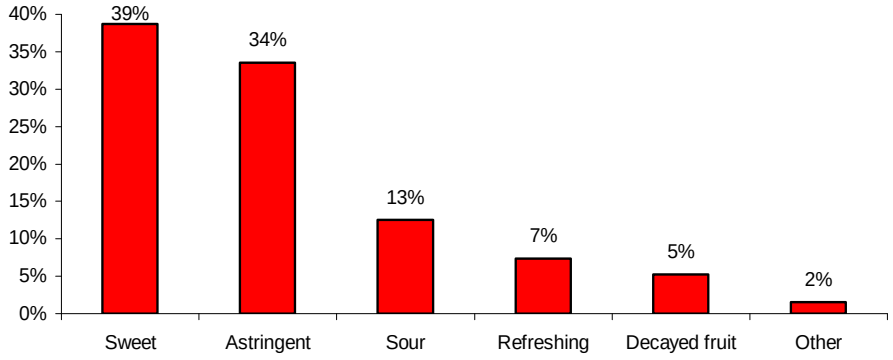

Figure 4.13: Flavors perceived by Turkish panelists in fruit juice

The perception of flavors of fruit juice sample by French panelists is represented in Figure 4.14. About 1/3 of French participants expressed sweet and sour flavor to be distinctly perceived in fruit juice. Other taste qualities defined as refreshing and astringent by French panelists were also noteworthy.

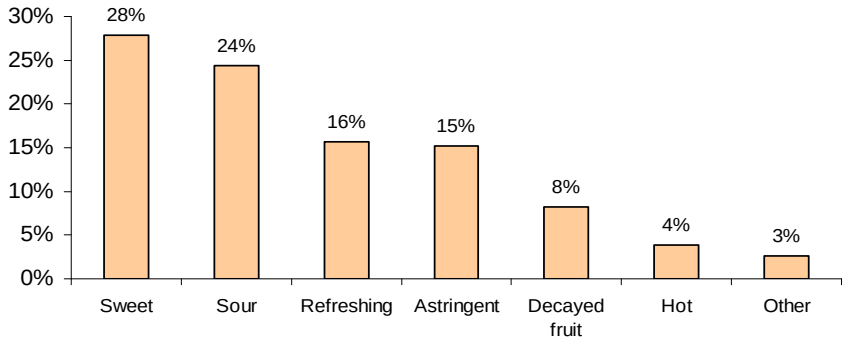

Figure 4.14: Flavors perceived by French panelists in fruit juice

Naturalness perception of juice flavor was asked to be evaluated by panelists in the following question. As given in Figure 4.15, both Turkish and French panelists evaluated the flavor of juices to be natural (5.17 and 5.08 mean values, respectively). Majority of panelists rated their perception on naturalness perception of fruit juice flavor above 4 point. In other words, both French and Turkish consumers perceived the fruit juice flavor as natural.

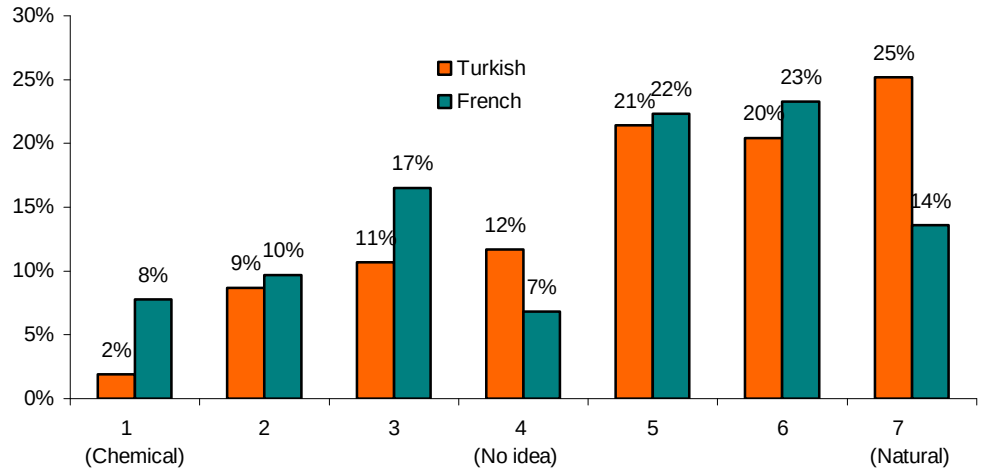

Figure 4.15: Perception of naturalness of fruit juice flavor by Turkish and French panelists

The flavors contributing to the taste of product as determined by Turkish panelists are presented in Figure 4.16. Sour cherry and grape juice flavors were predominantly preferred and perceived by Turkish panelists (Figure 4.16). To a lesser extent, the flavors of pomegranate, blackcurrant and raspberry were the other important flavors contributing to the overall taste of the product (by about 10-15%). In addition, some of these flavors were actually fulfilled or even exceeded the expectations of the panelists; examples are the flavors of sour cherry, pomegranate, raspberry, apple, and strawberry (Figure 4.16). Interestingly, blackcurrant flavor was listed as the fourth fruit flavor perceived by Turkish panelists, although its presence was least expected among the other flavors. On the contrary, although blueberry and lemon flavors were expected by panelists, these flavors were undetected in juice sample. Moreover, raspberry and blueberry flavors were not detected by panelists, although these flavors are present in fruit juice.

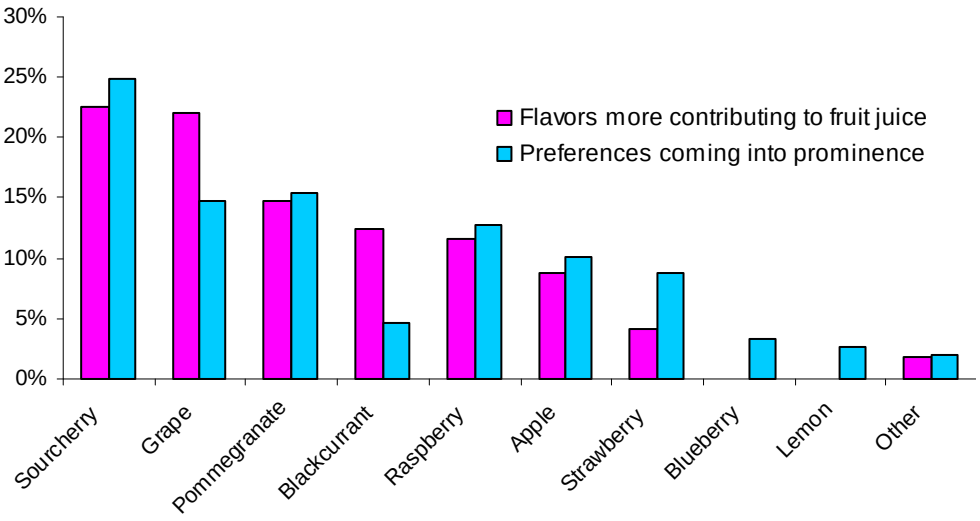

Figure 4.16: Flavors perceived in fruit juice and flavor preferences of Turkish panelists

In general, as the expectations of Turkish panelists are being met in juice sample, it is proposed that Turkish panelists prefer a fruit juice comprising of mostly sour cherry, pomegranate, raspberry, grape, apple and strawberry fruits.

The flavors contributing to the taste of juice product as determined by French panelists are presented in Figure 4.17. Grape juice was the predominant flavor perceived by French panelists. To a lesser extent but in a decreasing order, blackcurrant, apple, and raspberry fruits were also perceived to be contributing to the flavor of the product. However, it is interesting to note that the expectations of panelists for the presence of raspberry flavor were not being met, although it was one of the major flavors that the panelists expected (Figure 4.17).

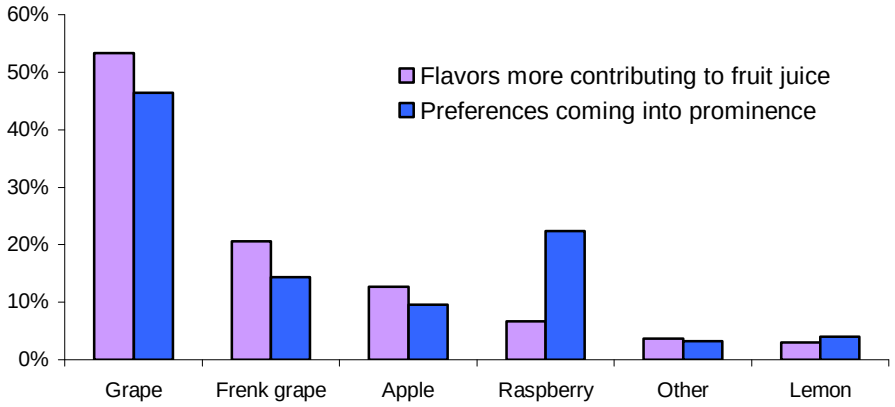

Figure 4.17: Flavors perceived in fruit juice and flavor preferences of French panelists

In general, expectations of French panelists were met in terms of fruit juice varieties except for the raspberry flavor. It may be concluded that grape, raspberry,

blackcurrant and apple are the most preferred flavors in a fruit juice by French panelists.

4.3.1.3 Likings and purchase intent

The likings and purchase intent of Turkish panelists are represented in Figure 4.18. Liking level of taste and overall likings of Turkish panelists (with a mean value 5.1) was found to be higher than that of French panelists (mean value is 4.56) as indicated in Table 4.12.

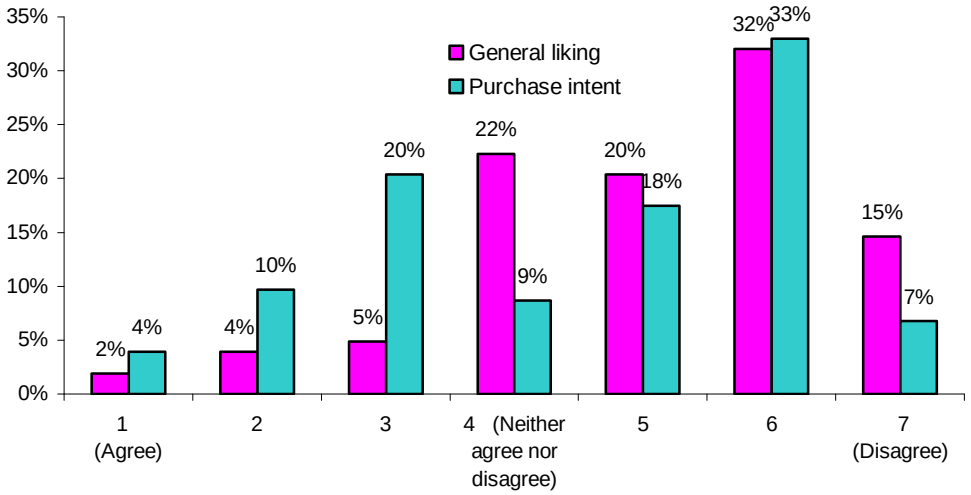

Figure 4.18: General liking and purchase intent of Turkish panelists for fruit juice

However, the purchase intents for both of these products were almost the same indicating an uncertainty by both French and Turkish panelists as represented in Table 4.13.

Table 4.13: Mean value of Turkish and French panelists' respondents for overall liking and purchase intention

	Mean Value	
	Turkish	**French**
Overall liking	5.13	4.56
Purchase intention	4.52	4.27

General liking and purchase intent of fruit juice by French panelists was represented in Figure 4.19. Mean value of overall liking and purchase intention was also given in Table 4.13. French panelists like the vegetable juice samle on average (4.56 mean value). On the other hand, purchase intention of this sample has been rated lower than overal likining's score.

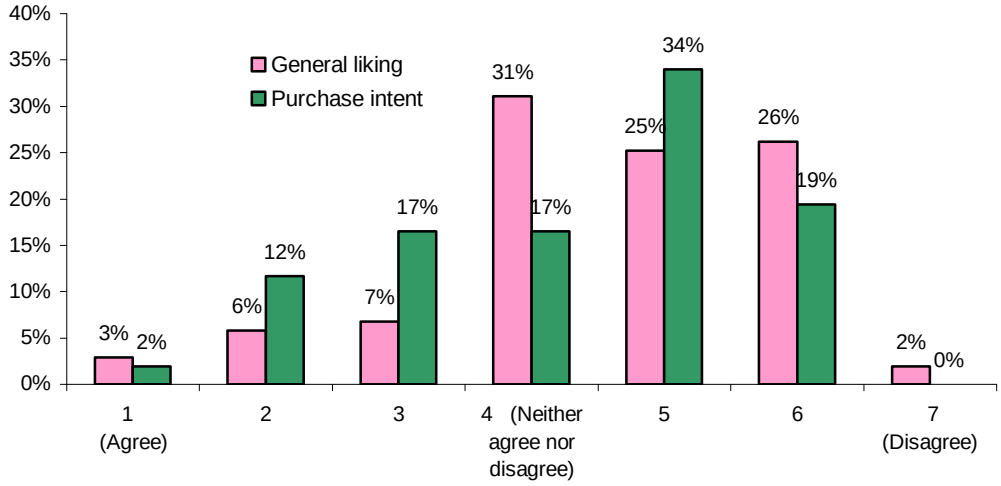

Figure 4.19: General liking and purchase intent of French panelists for fruit juice

When correlated the overall liking and purchase intention of vegetable juice, it is obviously seen there is a positive correlation in Turkish and French panelists' responses (P=0.68> 0.05). In other words, purchase intention increases by increasing in overall liking.

4.3.2 Vegetable juice

Vegetable juice presented to Turkish panelists (Brand T) consisted of water, vegetable puree, vegetable juice concentrate (tomato, carrot, pepper, beetroot, cucumber, celery, black carrot, lemon, cabbage, onion, lettuce), salt, vine, spice mix, natural aromas, vegetable oil, and basil extract. While vegetable juice purchased in France (Brand U) comprised of tomato, celery, carrot, parsley, onion, red beetroot, basil, spinach, lettuce, salt, and lemon.

4.3.2.1 Appearance

The liking of participants for the appearance property of vegetable juice samples is given in Figure 4.20. Figure 4.20 represents Turkish and French panelist's responses about the basic attributes of the fruit juice.

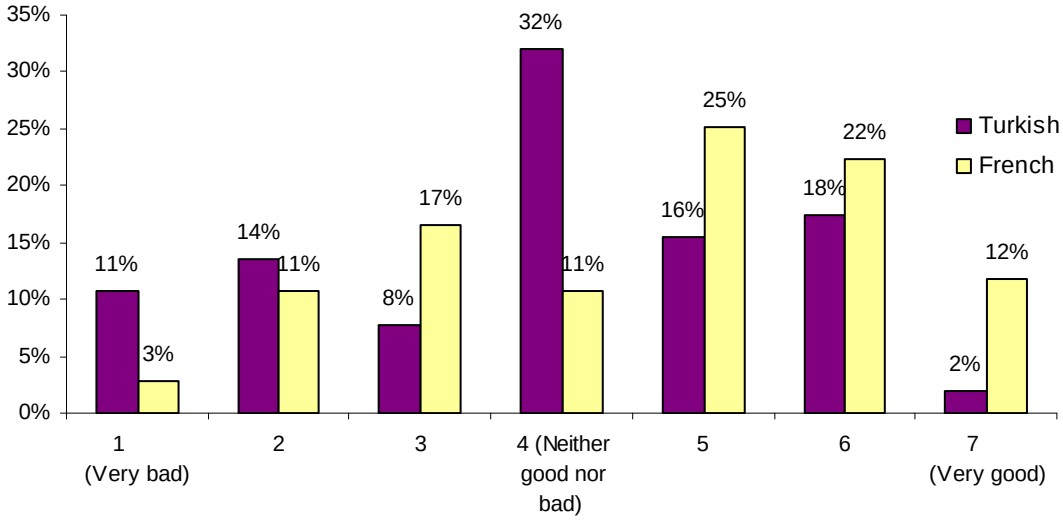

Figure 4.20: Evaluation of general appearance vegetable juice by Turkish and French panelists

Turkish panelists do not liked the general appearance of fruit juice (with a 3.89 mean value) while French panelists liked this property (4.58 mean value). It might be obviously said that French panelists liked the general appearance of the fruit juice while Turkish panelists do not.

Panelists evaluated the turbidity of the fruit juice in a 7-point hedonic scale in the second question (Figure 4.21).

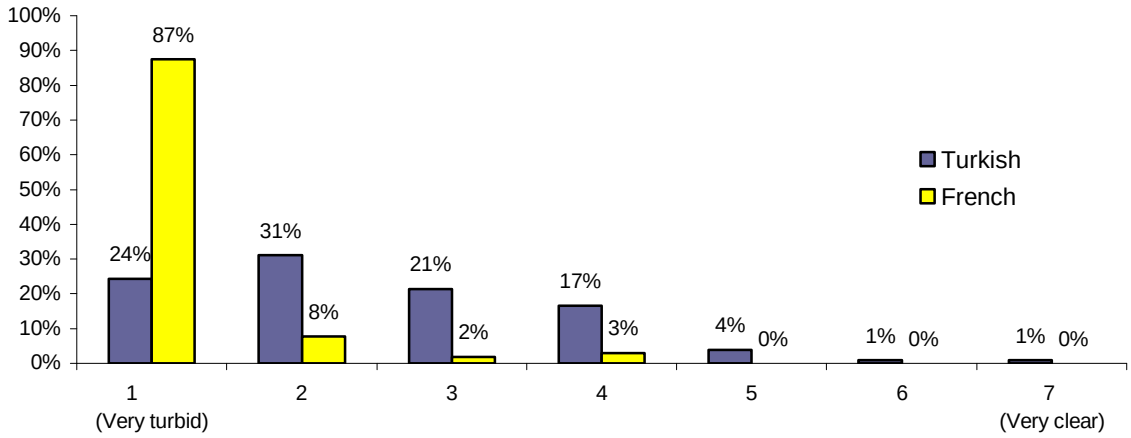

Figure 4.21: Evaluation of turbidity of vegetable juice by Turkish and French panelists

French and Turkish panelists found the vegetable juice very turbid (rated 1.2 and 2.5 respectively) as given in Figure 4.21. Especially French panelists evaluated their samples very turbid.

Perception of naturalness of color source of the vegetable juice was questioned in the third question as given in Figure 4.22. French respondents think that the source of vegetable juice color is natural (mean value 5.73). Furthermore, Turkish respondents showed a uniform split about this property (4.52 mean value).

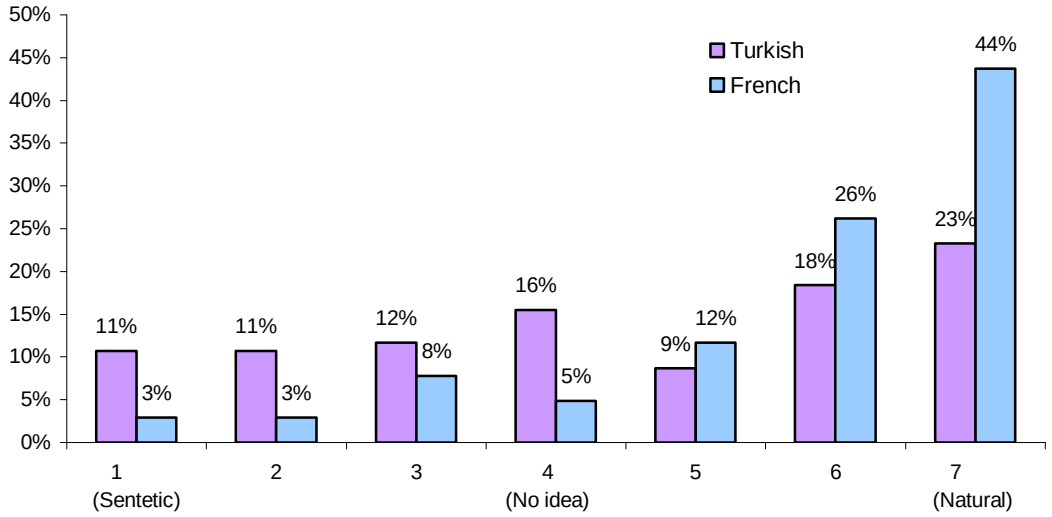

Figure 4.22: Perception of color source of the vegetable juice by Turkish and Fruit panelists

When compared the Turkish and French panelists in terms of color source of vegetable juice, it may be concluded that Turkish panelists have no idea and French panelists tend to think its color is natural.

4.3.2.2 Flavor

Perception of naturalness of odor was asked to evaluate by panelists in 7-point hedonic scale as given in Figure 4.23. Both side of panelists rated this question as 4.99 and 5.16 Turkish and French panelists respectively. In other words, both French and Turkish panelists evaluated the odors of the products to be natural.

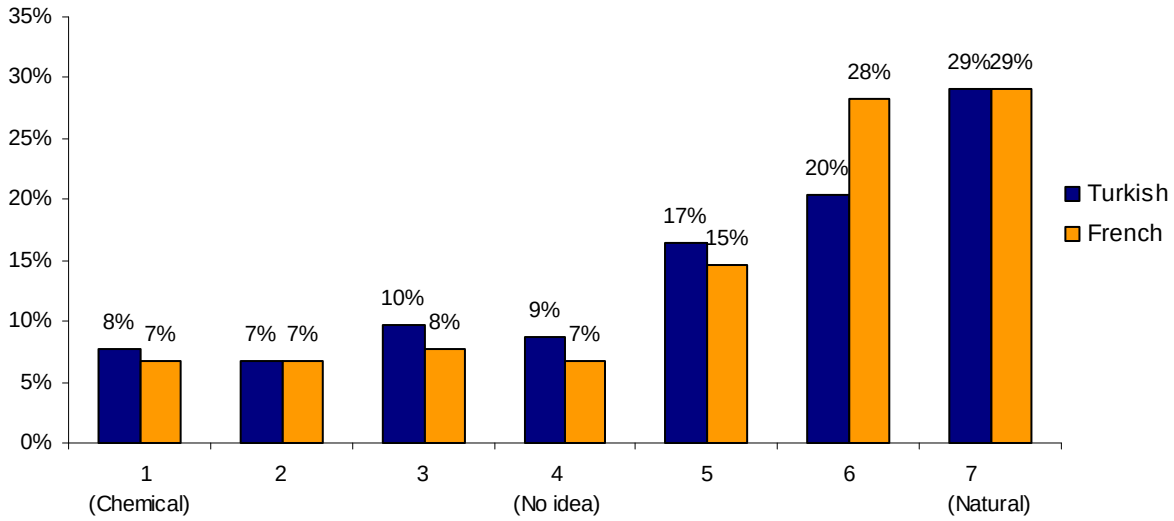

Figure 4.23: Perception of naturalness of vegetable juice odor by Turkish and French panelists

Generally, although Turkish panelists perceived that vegetable juice is not more turbid than which of French panelists, the level of general appearance is lower than that of French panelists. On the other hand, there is positive relationship between turbidity and overall liking on general appearance for Turkish panelists ($P>0.05$). In other words, Turkish panelists like turbid vegetable juices rather than the clearer one. On the other side, the more turbid the vegetable juice, the less French panelists like. Additionally, there is a negative relationship between turbidity and overall liking on general appearance of vegetable juice ($p<0.05$). In other words, turbidity in vegetable juice may not be acceptable by French panelists.

Tomato and pepper (32% and 25%, respectively) are the vegetable odors which were dominantly perceived by Turkish panelists while carrot (39%) and tomato (37%) were the main odor detected by French panelists as given Figure 4.24. Following these odors, Turkish panelists listed spice (19%) and onion (6%) odors to be important.

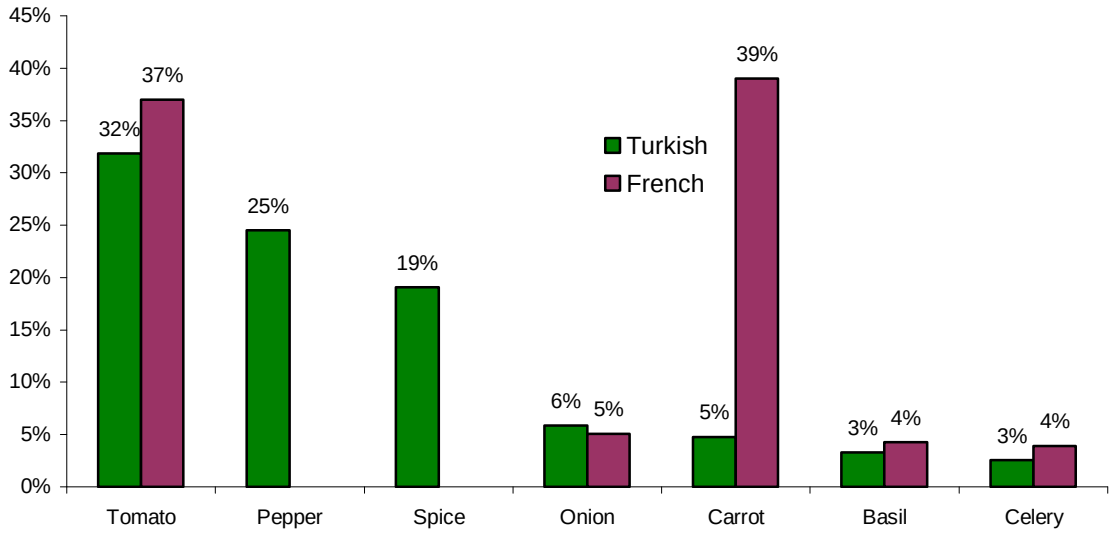

Figure 4.24: Vegetable odors perceived by Turkish and French panelists

In the following question within the sensory panel section, panelists were asked to try to capture the ve fetable flavors that they perceive. The perception of flavors of vegetable juice sample by Turkish panelists is represented in Figure 4.25. As given on the Figure 4.25, spicy and salty of vegetable juice were found to be dominant taste qualities expressed by Turkish panelists. Besides, 14% of Turkish panelists perceived sour flavor.

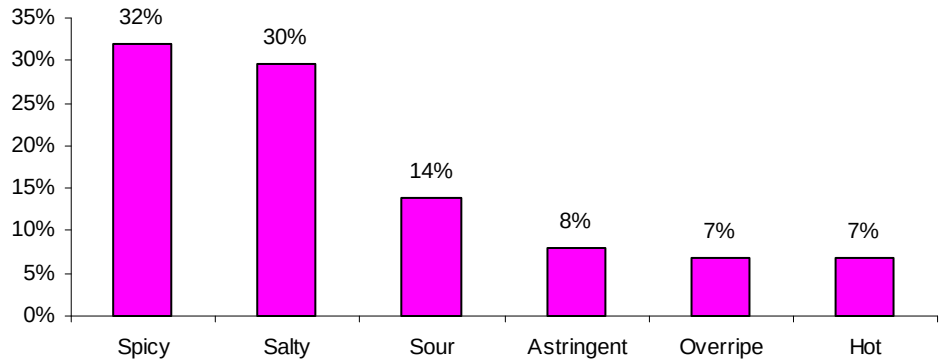

Figure 4.25: Flavors perceived by Turkish panelists in vegetable juice

The perception of flavors of vegetable juice sample by French panelists is represented in Figure 4.26. About 1/3 of French participants expressed spicy and salty flavor to be distinctly perceived in vegetable juice. Other taste qualities defined as sour and astringent by French panelists were also noteworthy.

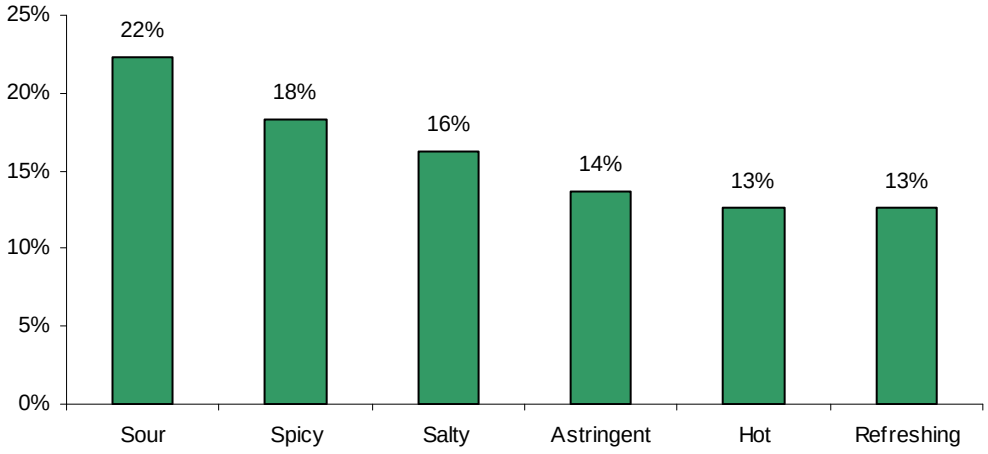

Figure 4.26: Flavors perceived by French panelists in vegetable juice

In the following question, panelists evaluated the vegetable juice in terms of their naturalness perception (as given Table 4.27). Turkish panelists think that vegetable juice tastes naturally (4.92 mean value) while French are close to skeptical its source is natural or not (4.47 mean value).

Naturalness perception of vegetable flavor was asked to be evaluated by panelists in the following question. As given in Figure 4.27, both Turkish and French panelists evaluated the flavor of juices neither natural nor sentetic (4.92 and 4.49 mean values, respectively). They are not sure about the vegetable juice naturalness.

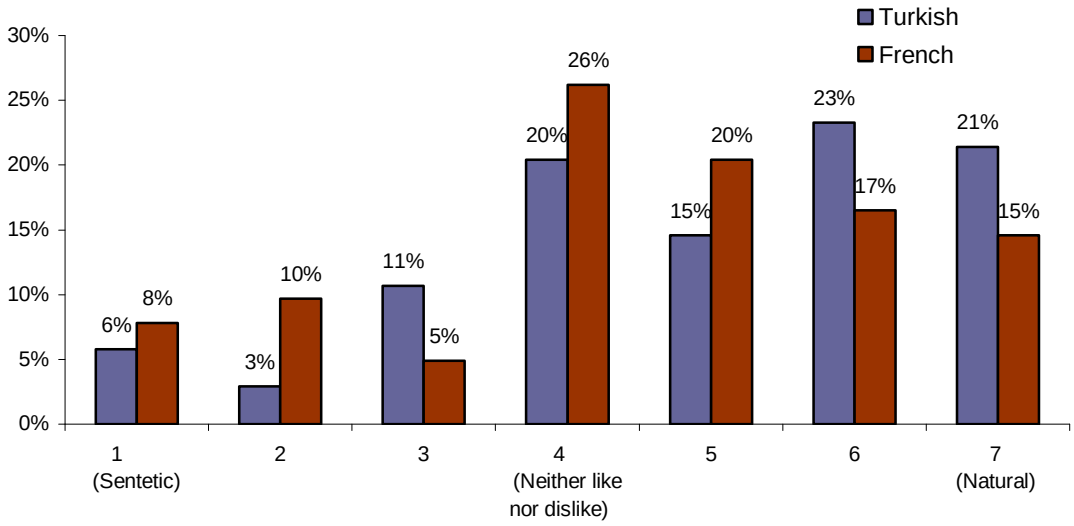

Figure 4.27: Perception of naturalness of vegetable juice flavor by Turkish and French panelists

The flavors contributing to the taste of product as determined by Turkish panelists are presented in Figure 4.28. Tomato and pepper flavors were predominantly preferred and perceived by Turkish panelists (Figure 4.28). To a lesser extent, the flavors of spice, onion and carrot were the other important flavors contributing to the

overall taste of the product (by about 15-10%). In addition, some of these flavors were actually fulfilled or even exceeded the expectations of the panelists; examples are the flavors of tomato and spice. Interestingly, carrot flavor was listed as the fifth vegetable flavor perceived by Turkish panelists, although its presence was the second expected among the other flavors. On the other hand, although cucumber and lemon flavors were expected by panelists, these flavors were undetected in juice sample.

In general, as the expectations of Turkish panelists are not exactly being met in juice sample, it is proposed that Turkish panelists prefer a fruit juice comprising of mostly tomato, pepper, spice,onion and carrot.

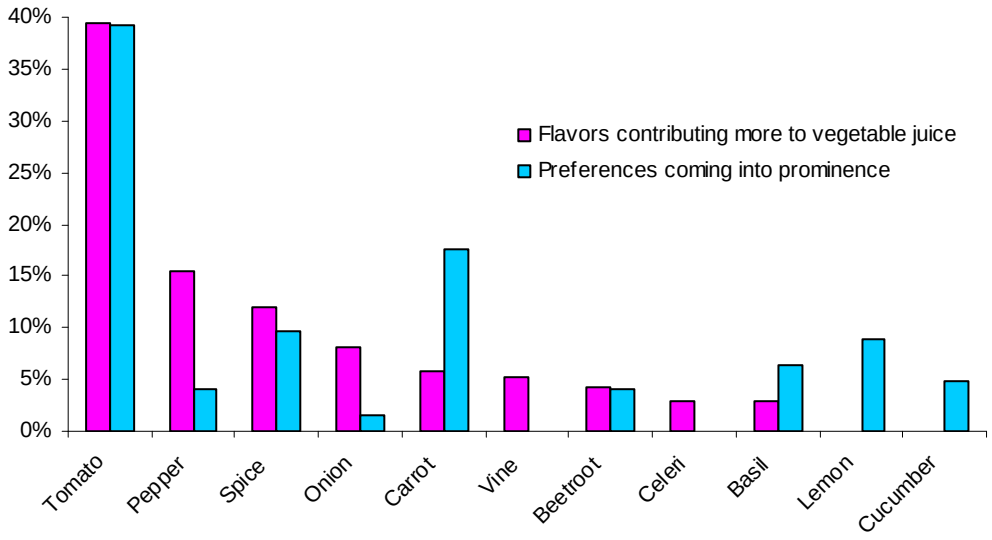

Figure 4.28: Flavors perceived in vegetable juice and flavor preferences of Turkish panelists

The flavors contributing to the taste of juice product as determined by French panelists are presented in Figure 4.29. Basil was the predominant flavor perceived by French panelists. To a lesser extent but in a decreasing order, tomato, celeri, and parsley were also perceived to be contributing to the flavor of the product. However, it is interesting to note that the expectations of panelists for the presence of tomato flavor were not being met, although it was one of the major flavors that the panelists expected (Figure 4.29).

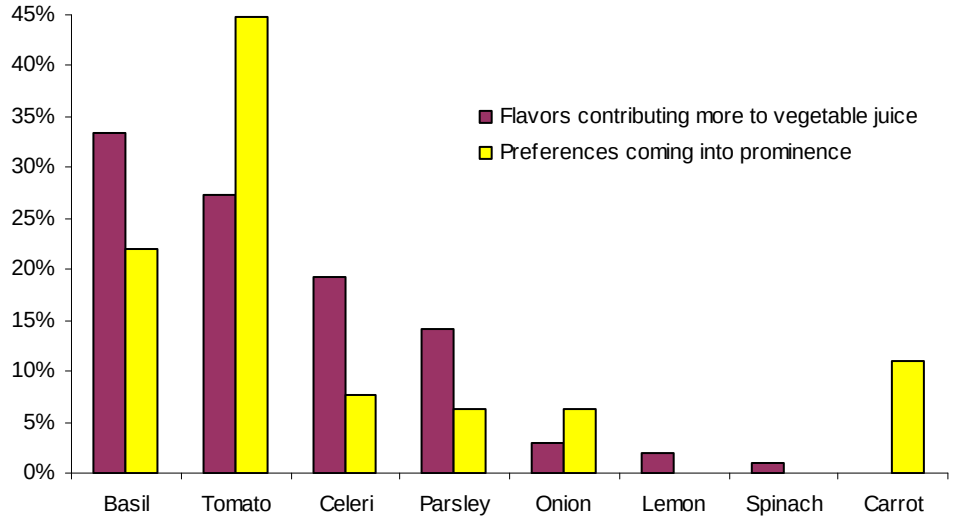

Figure 4.29: Flavors perceived in vegetable juice and flavor preferences of French panelists

In general, expectations of French panelists were met in terms of fruit juice varieties except for the raspberry flavor in terms of portion in the juice. It may be concluded that tomato and basil are the most preferred flavors in a vegetable juice by French panelists.

4.3.2.3 Likings and purchase intent

In the following question in sensory session, samples were evaluated in terms of overall liking (Figure 4.30). Turkish panelists rated the vegetable juice as 3.25 which is below the average as given Table 4.14. On the other hand, purchase intention of Turkish panelists is 3.10 in 7-point hedonic scale.

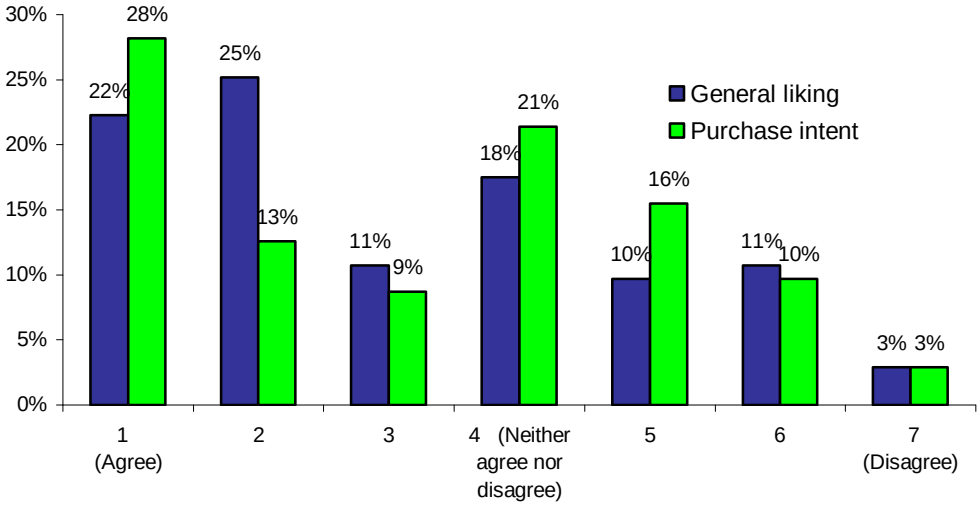

Figure 4.30: General liking and purchase intent of Turkish panelists for fruit juice

Table 4.14: Mean value of Turkish and French panelists' respondents for overall liking and purchase intention

	Mean Value	
	Turkish	**French**
Overall liking	3.25	4.05
Purchase intention	3.10	4.93

When assessed the overall liking and purchase intention together, Turkish panelists rated these attributes below the average. Additionally, there is positive correlation between overall liking and purchase intention (P=0.07>0.05).

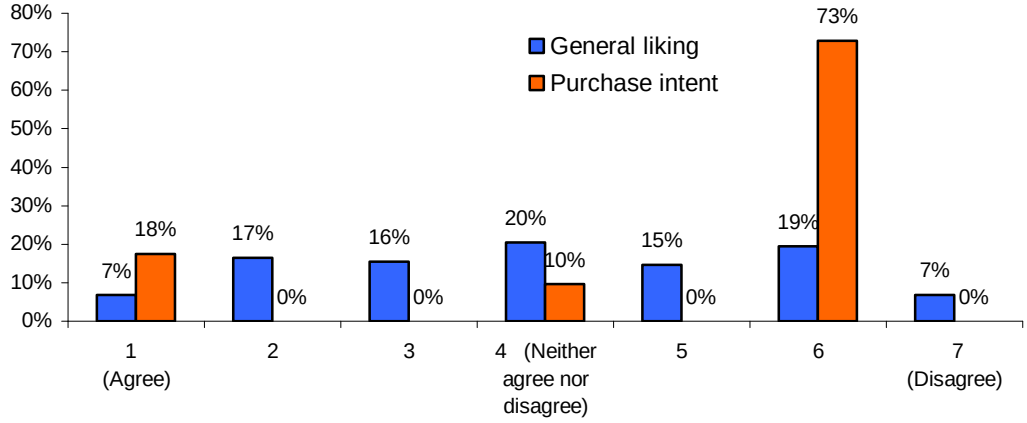

Figure 4.31: General liking and purchase intent of French panelists for fruit juice

On the other hand, French panelists rated the vegetable juice's overall liking on average (4.05 mean value) as given in Figure 4.31. Overall product liking has a uniform split in terms of rating. However, purchase intention is being agglomerated on 6-point in the scale. Thus, there is not correlation between general liking and purchase intention.

5. CONCLUSION

Health is a vital and growing concern for panelists across all ages, demographic groups and countries. In turn, this has led to increased consumer interest in the link between diet and health, and spurred demand for health-related food and drink products.

Functional foods are foods or food components which help human beings to be protected against illnesses and to reach a healthier life status and, thus, provide additional health benefits to physiological and metabolic functions apart from their properties for meeting basic nutrition requirements of body. In the past few decades, therefore, the demand of the fruit juices which have natural functional properties has been increased consistently with an increasing demand of functional foods.

Panelists have moved beyond consuming food simply to maintain everyday health. They are now seeking to optimize their performance and reduce the risk, or delay the onset of diseases with functional food and drink products. Globally, there is an ever increasing amount of scientific evidence on the positive contribution that a balanced diet, rich in nutrients, particularly micronutrients and bioactive compounds, can have on a consumer's overall well-being. Widespread interest in select foods that promote health has resulted in the use of the term 'functional foods'.

The opportunities presented in the functional food and drinks market is evident by the fact that in Europe, all categories are achieving strong sales growth.

Although the scope of current research is limited to only about 100 participants, it provides the first evidence of cultural differences in sensorial perception of functional fruit juices. Although Turkish and French panelists have similar sensitivities for a healthy diet, they differ in specific expectations such that Turkish participants pay attention for the presence of saturated fat and French participants for sugar level of foods. On the other hand, Turkish participants are willing to pay more for a tastier and high quality of food whereas it seems that French panelists are more price-oriented.

Sources of information for healthy eating style in both cultures are also different. French participants mostly prefer to obtain information through reliable sources than Turkish participants who rely on non-critically evaluated information sources.

There are common three factors influencing on food choice for both French and Turkish panelists. These determining factors are taste, price and quality & freshness. In general, French panelists are more price oriented than Turkish panelists and Turkish panelists are more taste sensitive than French. On the other hand, Turkish panelists pay attention to brand when choosing food product and they ignore the nutritional value of food product contrary of French panelists.

The general perceptions of participants for functional foods differ greatly. Turkish panelists are more positive than French panelists towards to functional foods. French panelists believe that functional foods are only necessary for people who have specific health problems. As opposite to Turkish participants, French panelists do not agree that functional foods are healthier and more nutritious than the regular foods. In addition, Turkish panelists feel that the functional foods are more attractive than the regular ones while French panelists do not. Both French and Turkish participants believe that functional foods are more expensive, and they still pay attention to the good taste of product rather than its healthy attributes.

In general, purchase decision of Turkish and French panelists is based on taste and nutritional value of fruit juice and their consumption habits. However, their purchase intents for vegetable juice highly depend on nutrition value, taste and convenience of product.

It is also apparent that there are differences in fruit flavor choices of both cultures. As Turkish participants prefer mostly sour cherry, pomegranate, grape and raspberry in a fruit juice, French panelists prefer flavors of grape, raspberry, blackcurrant, and apple. Similar differences were also observed in flavor choices of both cultures for a vegetable juice. Turkish panelists prefer tomato and carrot as major vegetables in juice in addition to basil, lemon and cucumber. On the other hand, tomato, basil and carrot are the vegetables most preferred by French panelists as well as celery, parsley and onion.

In conclusion, the research including a very limited number of participants showed that there are significant differences in the knowledge and behaviors of both cultures towards functional fruit and vegetable juices.

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APPENDIX

APPENDIX A

Location: _____ Date: _____ Time: _____

As part of the master thesis, we are surveying French consumers on their eating habits. We would appreciate your participation in this research project. Specifically, we are asking you to take about 15 minutes to complete this questionnaire. Your answers will help us to increase the knowledge about the basis of attitudes towards functional food products.

Please answer the questions corresponding to your choice.

A. Please mark the questions below

Do you do your own food shopping? □ Yes □ No

B. Please rate and mark the questions below

Please rate the following set of statements on the scale:

	Strongly disagree	Disagree	Little disagree	Neutral	Little agree	Agree	Strongly agree
1. I usually read the ingredients on food labels.	1	2	3	4	5	6	7
2. I always care not to eat the food products including high saturated fat level.	1	2	3	4	5	6	7
4. High sugar level is very acceptable reason for me not to buy the food product.	1	2	3	4	5	6	7
3. I always buy food products having lesser salt level.	1	2	3	4	5	6	7
4. I am interested in information about my health.	1	2	3	4	5	6	7

3. Please order the ***sources you use to get the information on healthy eating***? (Please order **3** choices)

□ TV/radio (health program) □ Advertisements □ Food packages

□ Magazine (articles related health) □ Health professionals □ School collage

□ Newspaper (articles related health) □ Consumer organizations □ Relative/Friends

□ Internet (health website) □ Government agency

□ Promotions in shopping □ Books (health books)

□ Other (please indicate)……

4. Please order the most important 3 ***factors for you influencing on your food choice***? (Please order **3** choices)

□ Taste □Price □ Habit

□Fashion □Availability □Nutrition value

□ Convenience of use □ Quality/ Freshness □ Fat level

□ Salt level □ Sugar level □ Brand

□ Content of additives □ Family preferences

□ Presentation/ Packaging □Culinary usefulness

C. Please rate the following set of statements on the scale

5. Please rate the following set of statements on the scale:

	Strongly disagree	**Disagree**	**Little disagree**	**Neutral**	**Little agree**	**Agree**	**Strongly agree**
1. I am afraid to eat things that I have never heard before.	1	2	3	4	5	6	7
2. I don't trust new food.	1	2	3	4	5	6	7
3. In general, I am among the last in my circle of friends to purchase a new food product.	1	2	3	4	5	6	7
4. If I heard that a new food product was available through a local store, I would be interested enough to buy it	1	2	3	4	5	6	7
5. I would consider buying a new food product, even if I hadn't heard of it yet.	1	2	3	4	5	6	7
6. I know more about new foods than other people do.	1	2	3	4	5	6	7
7. I am constantly trying new and different foods.	1	2	3	4	5	6	7

D. This section covers questions related to functional foods (novel foods)

6. Please rate the statement below on the scale

	Never	Very little	Occasionally	Yes
I have heard the term functional foods before	1	2	3	4

Functional food products:

Functional food is any fresh or processed food having a health-promoting and/or disease-preventing property beyond the basic nutritional function of supplying nutrients. *For example;* milk with added omega-3, cholesterol-lowering spread, orange juice with added mineral or vitamins, yogurt with added *bifidus*, breakfast cereal with whole grain.

7. Please rate the statement below on the scale

	Never	Occasionally (1-3 times a month)	Sometimes (1-3 times a week)	Often (4-7 times a week)	Very often (more than a day)
I have eaten the functional food products before.	1	2	3	4	5

8. Based on what you have heard of functional food and on the definition given, what is your ***overall attitude*** toward this category of product?

Negative	1	2	3	4	5	6	7	Positive

9. Please rate these statements on the scale:

	Strongly disagree	Disagree	Little disagree	Neutral	Little agree	Agree	Strongly agree
1. The new properties of functional foods carry unforeseen risks	1	2	3	4	5	6	7
2. Functional foods are completely unnecessary	1	2	3	4	5	6	7
3. I think functional foods are not natural so they can have negative effects to human health.	1	2	3	4	5	6	7
4. I only want to eat foods that do not have any medicine-like effects	1	2	3	4	5	6	7
5. Functional foods are	1	2	3	4	5	6	7

acceptable to me if their taste good							
6. Functional foods are acceptable to me, even if their taste worse than other foods	1	2	3	4	5	6	7
7. Functional foods are needed by people who have specific health problems	1	2	3	4	5	6	7
8. Functional food products have more nutritional level than other food products.	1	2	3	4	5	6	7
9. Functional food products are healthier than other food products.	1	2	3	4	5	6	7

10. We want to know your opinions concerning functional foods, compared with traditional foods. For each pair of statements, please indicate on a scale of 1 to 7, how close each statement matches your point of view. Would you say that ***functional foods are*** :

Less expensive	1	2	3	4	5	6	7	More expensive
Less appealing	1	2	3	4	5	6	7	More appealing

11. In general, what degree do you have confidence about functional food?

1. None	1	2	3	4	5	6	7	Full

D. This section covers questions related to functional fruit juices

12. Please rate the ***consumption frequency*** of drinks written below:

	I do not drink	**Occasionally**	**Sometimes**	**Often**	**I drink very often**
1. Tea	1	2	3	4	5
2. Coffee	1	2	3	4	5
3. Juices	1	2	3	4	5
4. Soda	1	2	3	4	5
5. Sparkling sweetened drinks (Cola, Fanta, Sprite…)	1	2	3	4	5
6. Milk drinks (milk, ayran, kephir)	1	2	3	4	5

13. Which type of juice below do you ***prefer mostly***?

□Fruit juices □Vegetable juices □Fruit and vegetable mix

14. Please order your 3 ***reasons for fruit juices consumption*** (Please order 3 choices)

□ Taste □Low price □ Habit

□Fashion □Availability □Nutrition value

□ Convenience of use □ Family preferences

□ Presentation/ Packaging □Culinary usefulness

15. Please order your 3 ***reasons for vegetable juices consumption***? (Please order 3 choices)

□ Taste □Low price □ Habit

□Fashion □Availability □Nutrition value

□ Convenience of use □ Family preferences

□ Presentation/ Packaging □Culinary usefulness

Functional fruit juices:

The fruit juices are having health-promoting and/or disease-preventing some beneficial substances such as vitamins, minerals and fiber. *For example;* banana juice with added magnesium, orange juice with added vitamin A, C, E or apple juice with added fiber.

16. Please rate the ***intention to consume*** of functional foods written below:

	Not at all willing	**Not willing**	**Neutral**	**Willing**	**Extremely willing**
Juice with added calcium and vitamins	1	2	3	4	5
Milk with added *omega-3*	1	2	3	4	5
Yougurt with *bifidus*	1	2	3	4	5
Cholesterol-lowering spread	1	2	3	4	5
Whole grain breakfast cereal	1	2	3	4	5
Energy drinks	1	2	3	4	5
Oatmeal with added *beta-glucan*	1	2	3	4	5
Snack bar with added fibre	1	2	3	4	5

E. The following questions will help us classify your answers. Please mark the choice

17. Gender: □ Female □ Male

18. How old are you?

□ 18-27 □ 28- 49 □+ 50

19. Your marital status:

□ Married or living with someone (common law)

□ Single

□ Widowed, divorced or separated

20. Do you have children?

□ No

□ 1

□ 2

□ 3 or more

21. Working status?

□Working □Still in education □Retired

□Housewife □Unemployed

22. What is the maximum level of education that you have completed?

□ Primary school (1 to 8 years)

□ High school (9 to 12 years)

□ College or CEGEP

□ University

THANK YOU FOR YOUR COOPERATION!

APPENDIX B

CONSUMER PANEL QUESTIONNAIRE

Please evaluate the fruit drink you just sampled by indicating your level of agreement or disagreement with each of the following statements.

Please mark the juice that you evaluate: □ 381 □ 295

A. Product's Apperance

1. Overall product's apperance — Very bad ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ ☐ Very good

2. Turbidity — Very turbid ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very clear

3. I think the source of fruit juice's color is — Artifical ☐ ☐ ☐ ☐ No idea ☐ ☐ ☐ ☐ Natural

B. Product's Odour

4. I think it smells — Chemically ☐ ☐ ☐ ☐ No idea ☐ ☐ ☐ ☐ Naturally

5. Please select ***characteristic odour*** of the fruit juices

□ Apple	□ Basil	□ Tomate
□ Beetroot	□ Oignon	□ Raspberry
□ Celery	□ Parsley	□ Red grape
□ Carrot	□ Lemon	□ Black current
□ Spinach	□ Lettuce	□ Other ……

C. Product's Flavor /Aroma

Rinse your mouth with water before starting! Please now taste the fruit drink sample that you have been given.

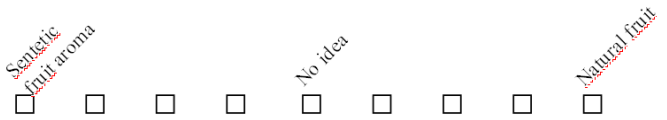
6 Please select ***your prominence feels for fruit juice's taste***, or please write your own definition (can be selected more than one)

□ Bitter	□ Overripe	□ Spicy
□ Refresher	□ Sour	□ Sweet
□ Cooler	□ Burn	□ Acidulous (between sweet and sour)

□ Astringent (drying sensation like in black tea extract or in red wine)

□ Other (Your own definition).....

7. I think the fruit juice tastes



8. Overall satisfaction

9. Please rate the following set of statements on the scale

	Strongly disagree	**Disagree**	**Little disagree**	**Neutral**	**Little agree**	**Agree**	**Strongly agree**
I would certainly buy this product, if I see it in a store?	1	2	3	4	5	6	7

10. Which ***flavor*** does ***more contribute to fruit juice*** ? (can be selected more than one)

- ☐ Apple
- ☐ Basil
- ☐ Tomate
- ☐ Beetroot
- ☐ Oignon
- ☐ Raspberry
- ☐ Celery
- ☐ Parsley
- ☐ Red grape
- ☐ Carrot
- ☐ Lemon
- ☐ Black current
- ☐ Spinach
- ☐ Lettuce
- ☐ Other (Please indicate)…….

11. Which flavor do ***you prefer to come into prominence***? (can be selected more than one)

- ☐ Apple
- ☐ Basil
- ☐ Tomate
- ☐ Beetroot
- ☐ Oignon
- ☐ Raspberry
- ☐ Celery
- ☐ Parsley
- ☐ Red grape
- ☐ Carrot
- ☐ Lemon
- ☐ Black current
- ☐ Spinach
- ☐ Lettuce
- ☐ Other (Please indicate)…….

APPENDIX C

QUESTIONNAIRE SUR LES ALIMENT FONCTIONNELS

Pour valider mon master, je mène une étude relative aux consommateurs français et à leur acceptation des nourritures fonctionnelles. Nous apprécierions votre participation à ce projet de recherche. Nous vous demandons de prendre environ 15 minutes pour remplir ce questionnaire.

Vos réponses nous aideront à améliorer notre connaissance au sujet des attitudes envers les produits alimentaires fonctionnels.

Lieu : _____ Date: _____

Heure : _____

Merci de répondre aux questions suivantes en entourant votre choix.

A. Veuillez répondre aux questions ci-dessous

Faites-vous vous-même vos achats personnels ou familiaux de nourriture?

□ Oui □ Non

S'il vous plait veuillez cocher tableau ci-dessous le réponse qui vous correspond

	Pas du tout d'accord	Pas d'accord	Pas vraiment d'accord	Neutre	Un peu d'accord	D'accord	Fortement d'accord
1. Je lis habituellement les ingrédients sur les paquets des produits alimentaires.	1	2	3	4	5	6	7
2. Je fais attention à ne pas manger des produits alimentaires qui comprennent un taux élevé de graisses saturées.	1	2	3	4	5	6	7
4. Un taux de sucreélevé est une raison acceptable pour ne pas acheter un produit alimentaire.	1	2	3	4	5	6	7
3. J'achète toujours des produits alimentaires ayant un taux de sel faible.	1	2	3	4	5	6	7
4. Je suis intéressé par des informations portant sur ma santé future	1	2	3	4	5	6	7

3. Veuillez indiquer par ordre de priorité les sources ***que vous utilisez pour obtenir des informations sur les bonnes habitudes alimantaires*** ? (3 choix s'il vous plait, 1= source la plus importante)

□ Télé /radio (programme de la santé) □ Publicité

□ Emballage aliments □ Magazine (articles relevant de la santé)

□ Professionnel de santé □ Ecole

□ Journal (articles relevant de la santé) □ Organisation de consommateurs

□ Parent/Ami □ Internet (site web relevant de la santé)

□ Agence Gouvernementale(AFSSA…) □Promotion au (super) marché

□ Les livres (livre santé) □Autre (indiquez svp)……

□ Aucune (cela ne m'intéresse pas)

4. Veuillez indiquer par ordre de priorité ***3 facteurs les plus importants vous influençant dans votre choix de nourriture*** ?
(3 choix s'il vous plait, 1= facteur le plus important)

□ Saveur □Prix □ Habitude

□Mode □Disponibilité □Valeur nutritionelle

□ Praticité d'utilisation □ Qualité / Fraîcheur □ Teneur en graisse

□ Teneur en sel Teneur en sucre □ Marque

□ Teneur en additifs □ Préférences familliales □ Présentation/ Paquet
□ Utilité culinaire

E. S'il vous plait veuillez cocher dans le tableau ci-dessous la réponse qui vous correspond

	Pas du tout d'accord	Pas d'accord	Pas vraiment d'accord	Neutre	Un peu d'accord	D'accord	Fortement d'accord
1. J'ai peur de manger les choses dont je n'ai jamais entendu parler.	1	2	3	4	5	6	7
2. Je ne fais pas confiance aux nouveaux aliments.	1	2	3	4	5	6	7
3. En général, je suis le dernier de mon cercle d'amis à acheter un nouveau produit alimentaire.	1	2	3	4	5	6	7
4. Si j'entendais qu'un nouveau produit alimentaire est disponible dans un magasin, je serais assez intéressé pour l'acheter	1	2	3	4	5	6	7
5. J'achete un nouveau produit alimentaire, même si je n'en ai pas entendu parler.	1	2	3	4	5	6	7
6. J'en sais plus que les autres concernant les nouvaux produit alimentaires.	1	2	3	4	5	6	7
7. J'essaie constamment des aliments nouveaux	1	2	3	4	5	6	7

et variés.							

D. Cette section couvre des questions liées aux nourritures fonctionnelles

6. S'il vous plait veuillez cocher dans le tableau ci-dessous la réponse qui vous correspond

	Jamais	Un peu	Occasionnellement	Oui
J'ai déjà entendu parler des aliments fonctionnels	1	2	3	4

<u>Les Produits Fonctionnels :</u>

La nourriture fonctionnelle est n'importe quelle nourriture fraîche ou traitée ayant une propriété benefique pour la santé et/ou empêchant l'apparition de maladies, au delà de la fonction alimentaire de base des aliments "supplémentés".

Par exemple ; lait supplémenté en omega-3, matières grasses allégees au cholestérol (tartinable), jus d'orange supplémenté en mineraux ou vitamines, yaourt avec bifidus, céréales de petit déjeuner intégrales.

7. S'il vous plait veuillez cocher dans le tableau ci-dessous la réponse qui vous correspond

	Jamais	Occasionnellement	Parfois	Souvent	Très souvent
J'ai déjà mangé des produits alimentaires fonctionnels.	1	2	3	4	5

8. Basé sur ce que vous avez entendu de la nourriture fonctionnelle et sur la définition donnée, quelle est votre attitude générale vis-à-vis de cette catégorie de produit

Totalement negatif 1	2	3	4	5	6	7	***Totalement positif***

9. S'il vous plait veuillez cocher dans le tableau ci-dessous la réponse qui vous correspond:

	Pas du tout d'accord	Pas d'accord	Pas vraiment d'accord	Neutre	Un peu d'accord	D'accord	Fortement d'accord
1. Les nouvelles propriétés des aliments fonctionnels comportent des risques imprévus.	1	2	3	4	5	6	7
2. Les aliments fonctionnels sont totalement inutiles.	1	2	3	4	5	6	7
3. Comme les aliments fonctionnels ne	1	2	3	4	5	6	7

sont pas naturels, ils peuvent avoir des effets négatifs sur la santé humaine.							
4. Je veux uniquement manger des aliments qui n'ont pas d'effets médicinaux.	1	2	3	4	5	6	7
5. J'accepte les aliments fonctionels si leur goût est bon.	1	2	3	4	5	6	7
6. J'accepte les aliments fonctionels même si leur goût est moins bon que celui d'autres aliments.	1	2	3	4	5	6	7
7. Les aliments fonctionnels sont nécessaires pour les personnes qui ont des problèmes de santé spécifiques.	1	2	3	4	5	6	7
8. Les produits alimentaires fonctionnels sont plus nutritifs que les autres produits alimentaires.	1	2	3	4	5	6	7
9. Les produits alimentaires fonctionnels sont plus sains que les autres produits alimentaires.	1	2	3	4	5	6	7

10. Nous souhaiterions avoir votre avis au sujet des aliments fonctionnels. Pour chaque paire, indiquez svp sur une échelle de 1 à 7, votre point de vue. Vous diriez que les aliments fonctionnels sont

Moins chères	1	2	3	4	5	6	7 ***Plus chères***
Moins attirantes	1	2	3	4	5	6	7 ***Plus attirantes***

que les aliments traditionnels.

11. En général, quel degré de confiance avez-vous au sujet des aliments fonctionnels?

Aucun	1	2	3	4	5	6	7 ***Complet***

F. Cette section couvre des questions liées aux jus de fruit

12. Veuillez évaluer la ***fréquence de consommation*** des boissons écrites ci-dessous:

	Je n'en bois pas	**Occasionellement**	**Parfois**	**Souvent**	**Très souvent**
1. Thé	1	2	3	4	5
2. Café	1	2	3	4	5
3. Jus	1	2	3	4	5
4. Eau minérale gazeuse	1	2	3	4	5
5. Les produits gazeux (Cola, Fanta, Sprite…)	1	2	3	4	5
6. Les boissons lactées (lait, yaourt à	1	2	3	4	5

boire)					

13. Quel type de jus ci-dessous ***préfèrez vous la plupart du temps***?

□Les jus de fruit □Les jus de légume □Les jus de fruit et legume mélangés

14. Veuillez indiquer par ordre d'importance ***3 raisons pour la consommation de jus de fruit***

□ Saveur □Pas cher □ Habitude □ Mode

□ Disponibilité □Valeur nutritionnelle □ Praticité utilisation

□ Préférences familliale □ Présentation/ Paquet □ Utilité culinaire

15. Veuillez indiquer par ordre d'importance ***3 raisons pour la consommation de jus de légume***

□ Saveur □Pas cher □ Habitude

□ Mode □ Disponibilité □Valeur nutritionnelle

□ Praticité utilisation □ Préférences familliale □ Présentation/ Paquet □ Utilité culinaire

<u>Les jus de fruit fonctionnels :</u>

Les jus de fruit fonctionnels sont des jus ayant une propriété benefique pour la santé et/ou empêchant l'apparition de maladies, par le teneur en certaines substances bénéfiques telles que des vitamines, des minéraux et des fibres.

Par exemple ; jus de banane supplémenté en magnésium, jus d'orange supplémenté en vitamine A, C, E ou jus de pomme supplémenté en fibre.

16. Veuillez évaluer votre ***intention de consommer*** les aliments fonctionnels écrits ci-dessous:

	Pas du tout envie	**Ne pas très envie**	**Neutre**	**Plutôt envie**	**Très envie**
Jus supplémenté en calcium et vitamines	1	2	3	4	5
Lait supplémenté en *omega-3*	1	2	3	4	5
Yougurt avec *bifidus*	1	2	3	4	5
Matières grasses allégees au cholestérol	1	2	3	4	5

Céréale de petit déjeuner intégrale	1	2	3	4	5
Boissons énergétique	1	2	3	4	5
Snack supplémenté en fibre	1	2	3	4	5
Produits enrichis en DHA (omega 3) pour les enfants	1	2	3	4	5

E. Les questions suivantes nous aideront à classifier vos réponses. Merci d'indiquer :

17. Sexe: □ Féminin □ Masculin

18. Quel âge avez vous ?

□ 18-27 □ 28- 49 □ 50 et plus

19. Votre état civil :

□ Marié ou vivant en couple

□ Célibataire

□ Veuf, divorcé, separé

20. Avez vous des enfant ?

□ Non

□ 1

□ 2

□ 3 ou plus

21. Votre statut ?

□ Employé / salarié □ Etudiant(e) □Retraité

□ Au foyer □ Sans emploi

22. Quel est votre niveau d'étude?

□ Collège

□ Lycée

□ Université

MERCI DE VOTRE PARTICIPATION!

APPENDIX D

Veuillez évaluer le jus de fruits qui vous est présenté selon le questionnaire suivant :

Veuillez marquer le code du jus que vous évaluez:

D. L'Apparence de Produit

1. Apparence globale du produit

Très agréable ☐ ☐ ☐ Neutre ☐ ☐ ☐ Désagréable

2. Turbidité (flou)

Très flou ☐ ☐ ☐ ☐ ☐ ☐ ☐ Très clair

3. Je pense que la source de couleur du jus de fruit est

Artificielle ☐ ☐ ☐ Pas d'idée ☐ ☐ ☐ Naturelle

E. L'Odeur du Produit

4. Je pense que l'odeur est

Chimique ☐ ☐ ☐ Pas d'idée ☐ ☐ ☐ Naturelle

5. Veuillez choisir ***l'odeur caractéristique*** de ce jus de fruit / légume

☐ Pomme	☐ Basilic	☐ Tomate
☐ Betterave	☐ Oignon	☐ Framboise
☐ Celeri	☐ Persil	☐ Raisin rouge
☐ Carrotte	☐ Citron	☐ Cassis
☐ Epinard	☐ Laitue	☐ Autre

…….

F. Saveur/Goût du Produit

Rincez votre bouche avec de l'eau avant de commencez. Maintenant vous allez gouter le jus de fruits.

6. Veuillez choisir le goût majoritaire du jus de fruit. (plusieurs réponses possible)

☐ Sucré	☐ Rafraichissant
☐ Acide	☐ Fruit/ légume trop mûr
☐ Amer	☐ Epicé

□ Salé □ Astringeant (sensation d'assèeshment de la bouche)

□Autres (précisez) :.....

7. Je pense que le goût de ce jus est

Synthétique □ □ □ Pas d'idée □ □ □ Naturel

8. Aimez vous ce jus

Pas du tout □ □ □ Moyennement □ □ □ Beaucoup

9. S'il vous plait veuillez cocher dans le tableau ci-dessous la réponse qui vous correspond

	Pas du tout d'accord	Pas d'accord	Pas vraiment d'accord	Neutre	Un peu d'accord	D'accord	Fortement d'accord
J'achèterais certainement ce produit, si je le voyais dans un magasin ?	1	2	3	4	5	6	7

10. Quelle saveur ***contribue le plus à ce*** jus de fruit / légume ? (plusieurs réponses possible)

□ Pomme □ Basilic □ Tomate
□ Betterave □ Oignon □ Framboise
□ Celeri □ Persil □ Raisin rouge
□ Carrotte □ Citron □ Cassis
□ Epinard □ Laitue □ Autre

…….

11. Quelle saveur aimeriez-vous percevoir majoritairement ? (plusieurs réponses possible)

□ Pomme □ Basilic □ Tomate
□ Betterave □ Oignon □ Framboise
□ Celeri □ Persil □ Raisin rouge
□ Carrotte □ Citron □ Cassis
□ Epinard □ Laitue □ Autre

…….

MERCI DE VOTRE PARTICIPATION!

APPENDIX E

FONKSİYONEL GIDALAR TÜKETİCİ SORU FORMU

Tezimin bir parçası olarak, Türk tüketicilerin beslenme alışkanlıkları üzerine bir araştırma yürütmekteyim. Bu araştırma projesine
katkıda bulunmanız bizi onurlandıracaktır. Anket sadece 15 dakikanızı alacaktır. Cevaplarınız, Türk halkının fonksiyonel
gıdalara karşı genel tutumu ve algısı konusunda bizleri bilgilendirmeye yardım edecektir.

Yer: _____ Tarih: _____ Saat: _____

Lütfen aşağıdaki soruları cevaplayınız.

A. Lütfen aşağıdaki soruları cevaplayınız.

Kendiniz ya da ailenizin gıda alışverişinizi kendiniz mi yaparsınız? □ Evet □ Hayır

---

B. Lütfen aşağıdaki soruları cevaplayınız.

Lütfen aşağıdaki cümleleri değerlendiriniz:

	Kesinlikle katılıyorum	Katılmıyorum	Tam olarak katılmıyorum	Ne katılıyorum ne katılmıyorum	Az katılıyorum	Katılıyorum	Kesinlikle katılıyorum
1. Gıda etiketleri üzerinde yazan içindekiler kısmını genellikle okurum.	1	2	3	4	5	6	7
2. Yüksek miktarda doymuş yağ içeren gıda ürünlerini yememeye daima dikkat ederim.	1	2	3	4	5	6	7
4. Yüksek şeker içeriği, bir gıdayı satın almamam için oldukça geçerli bir sebeptir.	1	2	3	4	5	6	7
3. Daima daha düşük tuz seviyeli gıda ürünleri satın alırım.	1	2	3	4	5	6	7
4. Sağlığımla alakalı bilgilerle ilgiliyimdir.	1	2	3	4	5	6	7

3. Lütfen **sağlıklı beslenme ile ilgili bilgileri hangi kaynaklardan** edindiğinizi sıralayınız (Lütfen 3 seçenek sıralayınız. 1: en önemli kaynak…)

□ TV/radyo (sağlık programı) □ Reklamlar □Gıda ambalajları

□ Dergi (sağlıkla ilgili makaleler) □ Sağlık profesyonelleri □ Okul/üniversite
□ Gazete (sağlıkla ilgili makaleler) □ Tüketici organizasyonları
□ Akrabalar/Arkadaşlar □ Internet (sağlık website)
□ Hükümet ajansları □ Promosyonlar
□ Kitaplar (sağlık kitapları) □ Diğer (lütfen belirtiniz)…….

4. Lütfen **gıda seçiminizi belirleyen en önemli 3 faktörü** sıralayınız. (Lütfen 3 seçenek sıralayınız. 1: en önemli faktör…)

□ Lezzet □Fiyat □ Alışkanlıklar
□Moda □Kolay bulunabilirlik □Besin değeri □
Kullanım kolaylığı □ Kalitesi/Tazeliği □ Yağ oranı
□ Tuz oranı □ Şeker oranı □ Marka
□ Katkı maddesi içeriği □ Ailemin tercihi □ Sunum/Ambalaj
□Yemeklik kullanılırlığı

C. Lütfen aşağıdaki soruları cevaplayınız.

5. Lütfen aşağıdaki cümleleri değerlendiriniz:

	Kesinlikle katılıyorum	Katılmıyorum	Tam olarak katılmıyorum	Ne katılıyorum ne katılmıyorum	Az katılıyorum	Katılıyorum	Kesinlikle katılıyorum
1. Daha önce hiç duymadığım şeyleri yemekten korkarım.	1	2	3	4	5	6	7
2. Yeni çıkan gıdalara güvenmiyorum.	1	2	3	4	5	6	7
3. Genel olarak, arkadaş çevremde yeni bir gıdayı satın alan en son kişiyimdir.	1	2	3	4	5	6	7
4. Markette yeni bir gıda olduğunu duyduğumda, satın almak konusunda yeterince ilgiliyimdir.	1	2	3	4	5	6	7
5. Henüz duymamış bile olsam yeni bir gıda ürününü satın almayı her zaman düşünürüm.	1	2	3	4	5	6	7
6. Yeni gıdalar konusunda diğer insanların bildiğinden daha fazla şey bilirim.	1	2	3	4	5	6	7
7. Sürekli olarak yeni ve farklı gıdalar denerim.	1	2	3	4	5	6	7

D. Bu bölüm, fonksiyonel gıdalarla ilgili kısmı kapsamaktadır.

6. Lütfen aşağıdaki cümleyi değerlendiriniz:

	Hiç	Çok az	Ara sıra	Evet
Fonksiyonel gıda terimini daha önce duymuştum.	1	2	3	4

Fonksiyonel gıda ürünleri:

Fonksiyonel gıdalar, temel besin ihtiyaçlarını karşılamanın ötesinde, sağlık geliştirici ve/veya hastalık önleyici özelliği olan

taze veya işlenmiş gıdalardır. Örneğin; *omega-3* eklenmiş süt, kolesterol düşürücü içecekler, mineral veya vitamin eklenmiş portakal suyu, *bifidus* eklenmiş yoğurt, tam tahıllı kahvaltılık tahıl.

7. Lütfen aşağıdaki cümleyi değerlendiriniz:

	Hiç	Nadiren	Bazen	Sık sık	Çok sık
Daha önce fonksiyonel gıda tükettim.	1	2	3	4	5

8. Yukarıda verilen tanımlamaya ve şimdiye kadar duyduklarınıza dayanarak, fonksiyonel gıdalarla ilgili genel tutumunuz nedir?

Tamamen negatif 1	2	3	4	5	6	7	***Tamamen pozitif***

9. Lütfen aşağıdaki cümleleri değerlendiriniz:

	Kesinlikle katılıyorum	Katılmıyorum	Tam olarak katılmıyorum	Ne katılıyorum ne katılmıyorum	Az katılıyorum	Katılıyorum	Kesinlikle katılıyorum
1. Fonksiyonel gıdaların yeni özellikleri öngörülemeyen riskler taşımaktadır.	1	2	3	4	5	6	7
2. Fonksiyonel gıdalar tamamen gereksizdir.	1	2	3	4	5	6	7
3. Fonksiyonel gıdaların doğal olmadığını; dolayısıyla insan sağlığına kötü etkileri olabileceğini düşünüyorum.	1	2	3	4	5	6	7
4. İstediğim tek şey, ilaç benzeri herhangi bir etkisi olmayan gıdalar yemektir.	1	2	3	4	5	6	7

5. Fonksiyonel gıdaları, eğer tatları iyiyse tüketirim.	1	2	3	4	5	6	7
6. Tatları diğer gıdalara göre kötü olsa bile fonksiyonel gıdaları tüketirim.	1	2	3	4	5	6	7
7. Fonksiyonel gıdalar, belirli bir sağlık problemi yaşayan insanlar için gereklidir.	1	2	3	4	5	6	7
8. Fonksiyonel gıdaların besin değerleri diğer gıdalardan daha fazladır.	1	2	3	4	5	6	7
9. Fonksiyonel gıdalar, diğer gıdalardan daha sağlıklıdır.	1	2	3	4	5	6	7

10. Geleneksel gıdalara kıyasla, fonksiyonel gıdalar konusundaki fikirlerinizi öğrenmek istiyoruz. Lütfen her bir ifadeyi 1'den 7'ye kadar değerlendiriniz. **Fonksiyonel gıdalar, diğerlerine göre:**

Daha ucuz	1	2	3	4	5	6	7	***Daha pahalı***
Daha az çekici	1	2	3	4	5	6	7	***Daha çekici***

11. Genel olarak, fonksiyonel gıdalar konusundaki güveniniz ne ölçüdedir?

Hiç	1	2	3	4	5	6	7	***Tamamen***

G. Bu bölüm fonksiyonel meyve suları ile ilgili soruları kapsamaktadır.

12. Lütfen aşağıda yazan içecekleri ***tüketim sıklığınıza*** göre değerlendiriniz.

	İçmem	**Nadiren**	**Bazen**	**Sık sık**	**Çok sık içerim**
1. Çay	1	2	3	4	5
2. Kahve	1	2	3	4	5
3. Meyve/sebze suyu	1	2	3	4	5
4. Soda	1	2	3	4	5
5. Gazlı alkolsüz içecekler (Cola, Fanta, Sprite…)	1	2	3	4	5
6. Süt ve süt ürünü	1	2	3	4	5

içecekleri (süt, ayran, kefir)					

13. Aşağıdakilerden hangisini ***daha çok tercih edersiniz***? (Tek cevap)

□ Meyve suyu □ Sebze suyu □ Sebze ve meyve suyu karışımı

14. Lütfen ***meyve suyu tüketiminizdeki en önemli 3 sebebi*** sıralayınız. (1: en önemli sebep…)

□ Lezzet □Düşük fiyat □ Alışkanlık

□ Moda □Kolay bulunabilirlik □ Besin değeri

□ Kullanım kolaylığı □ Ailemin tercihleri □ Sunum/ Ambalaj □Yemeklik kullanılırlığı

15. Lütfen ***sebze suyu tüketiminizdeki en önemli 3 sebebi*** sıralayınız. (1: en önemli sebep…)

□ Lezzet □Düşük fiyat □ Alışkanlık

□ Moda □Kolay bulunabilirlik □ Besin değeri

□ Kullanım kolaylığı □ Ailemin tercihleri □ Sunum/ Ambalaj □Yemeklik kullanılırlığı

<u>Fonksiyonel meyve/sebze suyu:</u>

Vitamin, mineral, lif gibi sağlığı iyileştirici ve/veya hastalıklardan koruyucu bazı yararlı bileşenleri içeren meyve/sebze sularıdır. *Örneğin*; magnezyum eklenmiş muz suyu, A. C, E vitaminleri eklenmiş portakal suyu veya lif eklenmiş elma suyu.

16. Lütfen aşağıda yazan ***fonksiyonel gıdaları tüketme isteğinizi*** değerlendiriniz.

	Kesinlikle istemem	**İstemem**	**Ne isterim ne istemem**	**İsterim**	**Kesinlikle isterim**
Kalsiyum ve vitamin eklenmiş meyve suyu	1	2	3	4	5
Omega-3 eklenmiş süt	1	2	3	4	5
Bifidus eklenmiş yoğurt	1	2	3	4	5
Kolesterol düşürücü margarin	1	2	3	4	5
Tam tahıllı kahvaltılık gevrek	1	2	3	4	5
Enerji içecekleri	1	2	3	4	5

Beta-glucan eklenmiş yulaf unu	1	2	3	4	5
Lif eklenmiş atıştırmalık barlar	1	2	3	4	5

E. Aşağıdaki sorular, cevaplarınızın sınıflandırılması için bize yardımcı olacaktır. Lütfen işaretleyiniz.

17. Cinsiyet: □ Bayan □ Erkek

18. Kaç yaşındasınız?

□ 18–27 □ 28–49 □50+

19. Medeni durumunuz:

□ Evli

□ Bekar

□ Dul veya boşanmış

20. Çocuğunuz var mı?

□ Yok

□ 1

□ 2

□ 3 veya daha fazla

21. Çalışma durumunuz?

□Çalışıyor □Öğrenci □Emekli

□Ev hanımı □İşsiz

22. Şimdiye kadar tamamladığınız en yüksek eğitim derecesi?

□ İlköğretim okulu

□ Lise

□ Yüksek okul

□ Üniversite

KATILIMINIZ İÇİN TEŞEKKÜRLER

APPENDIX F

TÜKETİCİ PANELİ SORU FORMU

Aşağıdaki formu size sunulan meyve ve sebze sularına göre değerlendiriniz:

Lütfen size sunulan meyve veya sebze suyu bardağının üzerinde yazan kodu işaretleyiniz.

341 ☐ **573** ☐

G. Ürünün görünüşü

	Çok kötü			Ne iyi ne kötü			Çok iyi
1. Ürünün genel görünüşü	☐	☐	☐	☐	☐	☐	☐

	Çok bulanık						Çok berrak
2. Bulanıklık	☐	☐	☐	☐	☐	☐	☐

	Yapay			Fikrim yok			Doğal
3. Bence ürün renginin kaynağı…	☐	☐	☐	☐	☐	☐	☐

H. Ürünün kokusu

	Kimyasal			Fikrim yok			Doğal
4. Bence ürünün kokusu	☐	☐	☐	☐	☐	☐	☐

5. Lütfen ***ürünün karakteristik kokusunu ağırlıklı olarak belirleyen sebze/meyveleri*** işaretleyiniz.
(Birden fazla cevap işaretlenebilir)

☐ Elma	☐ Domates	☐ Çilek
☐ Havuç	☐ Biber	☐ Frambuaz
☐ Salatalık	☐ Üzüm	☐ Pancar
☐ Vişne	☐ Kereviz	☐ Marul
☐ Frenk üzümü	☐ Yaban mersini	☐ Fesleğen
☐ Siyah havuç	☐ Limon	☐ Lahana
☐ Soğan	☐ Nar	☐ Baharat
☐ Sirke	☐ Diğer…….	

İ. Ürünün tadı/lezzeti

Teste başlamadan önce lütfen boğazınızı suyla temizleyiniz. Şimdi meyve/sebze suyunu tadabilirsiniz.

6. Lütfen ***ürünün karakteristik tadını ağırlıklı olarak belirleyen sebze/meyveleri*** işaretleyiniz. (Birden fazla cevap işaretlenebilir)

□ Tatlı	□ Ferahlatıcı	□ Ekşi
□ Çürük meyve/sebze	□ Acı	□ Baharatlı
□ Tuzlu	□ Buruk (kırmızı şarap ya da siyah çayda olduğu gibi dilde kuruluk hissi bırakan bir tat)	

□Diğer (belirtiniz) :.....

7. Bence bu meyve/sebze suyunun tadı

Sentetik			Fikrim yok			Doğal
□	□	□	□	□	□	□

8. Ürün hakkındaki genel beğeniniz

Kesinlikle beğenmedim			Orta			Çok beğendim
□	□	□	□	□	□	□

9. Lütfen aşağıdaki cümleyi değerlendiriniz.

	Kesinlikle katılıyorum	Katılmıyorum	Tam olarak katılmıyorum	Ne katılıyorum ne katılmıyorum	Az katılıyorum	Katılıyorum	Kesinlikle katılıyorum
Bu ürünü markette görsem kesinlikle satın alırdım.	1	2	3	4	5	6	7

10. Hangi ***tat, meyve/sebze suyuna en fazla katkıda bulunmaktadır***? (Birden fazla cevap işaretlenebilir)

□ Elma	□ Domates	□ Çilek
□ Havuç	□ Biber	□ Frambuaz
□ Salatalık	□ Üzüm	□ Pancar
□ Vişne	□ Kereviz	□ Marul
□ Frenk üzümü	□ Yaban mersini	□ Fesleğen
□ Siyah havuç	□ Limon	□ Lahana
□ Soğan	□ Nar	□ Baharat
□ Sirke	□ Diğer…….	

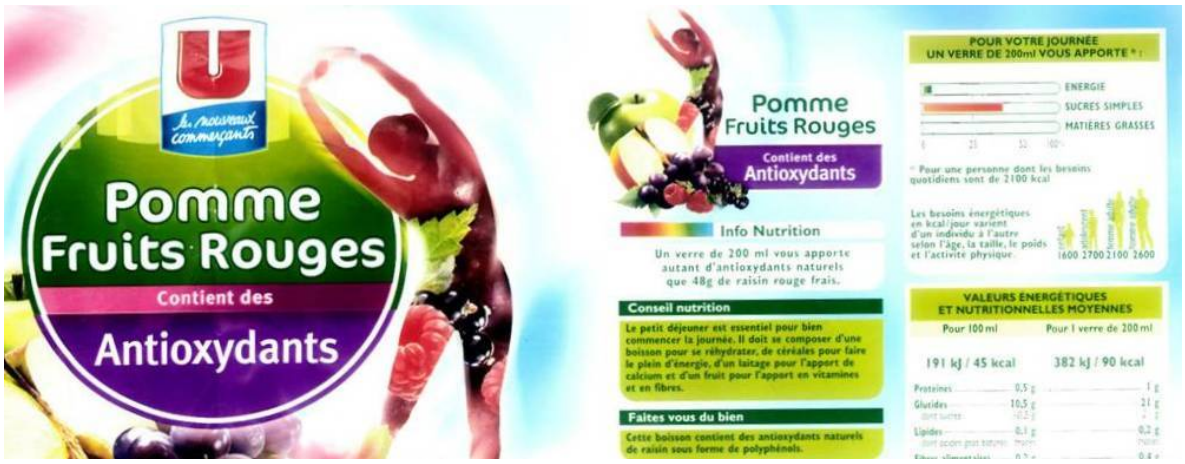
11. Hangi ***tadın daha fazla öne çıkmasını*** isterdiniz? (Birden fazla cevap işaretlenebilir)

□ Elma	□ Domates	□ Çilek
□ Havuç	□ Biber	□ Frambuaz
□ Salatalık	□ Üzüm	□ Pancar
□ Vişne	□ Kereviz	□ Marul

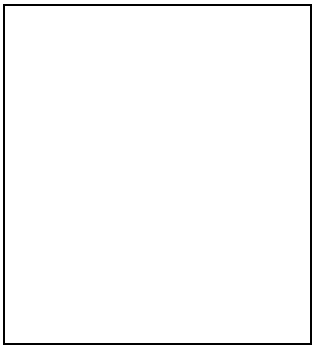
□ Frenk üzümü	□ Yaban mersini	□ Fesleğen
□ Siyah havuç	□ Limon	□ Lahana
□ Soğan	□ Nar	□ Baharat
□ Sirke	□ Diğer…….	

KATILIMINIZ İÇİN TEŞEKKÜRLER!

APPENDIX G


Les nouveaux commerçants
Pomme
Fruits Rouges
Contient des
Antioxydants
Pomme
Fruits Rouges
Contient des
Antioxydants
Info Nutrition
Un verre de 200 ml vous apporte autant d'antioxydants naturels que 48g de raisin rouge frais.
Conseil nutrition
Le petit déjeuner est essentiel pour bien commencer la journée. Il doit se composer d'une boisson pour se réhydrater, de céréales pour faire le plein d'énergie, d'un laitage pour l'apport de calcium et d'un fruit pour l'apport en vitamines et en fibres.
Faites vous du bien
Cette boisson contient des antioxydants naturels de raisin sous forme de polyphénols.
POUR VOTRE JOURNÉE UN VERRE DE 200ml VOUS APPORTE *
ENERGIE
SUCRES SIMPLES
MATIÈRES GRASSES
* Pour une personne dont les besoins quotidiens sont de 2100 kcal
Les besoins énergétiques en kcal/jour varient d'un individu à l'autre selon l'âge, la taille, le poids et l'activité physique.
femme adulte
homme adulte
1600 2700 2100 2600
VALEURS ÉNERGÉTIQUES ET NUTRITIONNELLES MOYENNES
Pour 100 ml
Pour 1 verre de 200 ml
191 kJ / 45 kcal
382 kJ / 90 kcal
Protéines 0,5 g 1 g
Glucides 10,5 g 21 g
Lipides 0,1 g 0,2 g

CURRICULUM VITA



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