



## Analysing the Extent of Awareness of Millennial Generation Regarding the Likely Effects of Food Additives

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### Abstract

In the global era, the concerns of people on healthy food consumption is growing. Some people are approaching skeptically about the effects of food additives on the human body. The extent of awareness and knowledge of people on food additives can be an important indicator of their food choices. This study aims to explore to what extent young people are aware of the food additives listed on food labels and to reveal their perceptions of the effects of food additives on the body. The results of this research show that the participants who are the members of the millennial generation can identify what food additives exist in the food labels, but they have no idea regarding what the additive is used for nor do they have adequate information about the effects of the additives on the human body.

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## **INTRODUCTION**

'A customer can have a car painted any color he wants as long as it's black' is a famous quote by Henry Ford in 1909 (Baumeister & Bushman, 2017: 492). This quotation can be recalled for food additives such as 'Any customer can buy any food that he wants as long as it has food additive'. There is an abundant number of food additives that are widely used in many food products today. Therefore, it can be stated that consumers cannot avoid consuming them (Lee, Park, Wi, Ahn, Kim, Moon, Yang, & Kim, 2014).

Food additives have been used for a long time. They are not a new invention in our lives and the use of them dates back to the last several centuries by many cultures to facilitate or complement the production methods and improve its taste. Traditional additives come from natural sources. The oldest tradition in the use of additives was probably for preservation; salt, sugar, and vinegar made food safer, by avoiding the oxidation, the chemical changes and inhibiting the food from bacteria (Emerton & Choi, 2008). Today, scientists can imitate flavors and colors and preserve foods for longer periods.

There has been a wide variety of food additive categories based on the functions they are supposed to carry out: such as the stabilizing, coloring, preserving, flavoring, oxidation avoiding, bulking, gazing and anti-caking agents. The use of these additives changes the nature of the food (Packard, 1976).

Today, items that are made entirely from chemicals or artificial ingredients are commonly used in processed foods. For instance, consumers can drink a strawberry milkshake without a strawberry or milk inside. What is crucial here is that this sort of manipulation to food could have a deep impact on our body and its biochemical balance (Haas, 2018). Conscious customers doubt and worry about the use of food additives for human health. Studies show that food naturalness and clean labels are important factors for many consumers (Aschemann-Witzela, Varelab, & Peschela, 2019; Roman, Sanchez-Siles, & Siegrist, 2017).

According to the national statistics, life span has been extended in Turkey and it is expected to increase (Turkish Statistical Institute, 2018). To have a long and healthy life, it is necessary to consume healthy food. The awareness and knowledge of the effects of food ingredients shape our food choices. Lee (1989) explains that some sources of perceived risks of food additives are originated from a lack of knowledge of food chemistry and messages delivered through commercials. Therefore, this study aims to understand the extent of awareness and knowledge of the members of the millennial generation on a sub-category of food ingredients called food additives. In this study, the millennial generation has been chosen as a target group since they are labeled as most health-conscious generations ever (Hamilton, 2018). Moreover, the size of millennials in the world population is large, and they are likely to have a long life span.

The outline of this study is as follows: In the first part, a literature review is presented. In the second part, the methodology is provided. In the third part, the findings of the study are explained. These parts are followed by the discussion and conclusion.

## **Literature Review**

### **Food Additives**

Food additives are defined as ‘*substances that do not have any nutritional value in itself but added to foods to enhance its taste, appearance and extend shelf life and become an ingredient of the food and change its characteristics*’ (World Health Organization, 2018). While some food additives help to preserve the food against risks such as the growth of harmful microorganisms, others contribute to the appeal of the food. Food additives can be classified as natural and synthetic ones. The use of natural food additives tend to be more reasonable than the synthetic food additives, Carochó, Morales, & Ferreira (2015) emphasize that even natural food additives can carry the toxicity risks based on consumption amounts.

Food additives are among the controversial topics regarding food safety. Supporters underline that there is a strict regulation requirement in the approval of any food additive. Scientific evaluation is carried out and safety evaluations are held periodically as exposure may change over time (Jain & Mathur, 2015). On the other side, opponents claim that FDA (Food and Drug Administration)’s approval process is not as strict as it is mentioned and as further scientific studies are conducted, the link between adverse health implications will be evident (Eaton, 2016). Opponents also claim that the terminology used in food labels is not that type which everyone can understand regardless of their knowledge level.

Food labels are important since they give evidence to customers about the food they purchase, guide them about their choices and assist them to store and safely use. Food labels are subject to governmental and international regulations regarding their sale to final customers. There are mandatory statements to be included in food labels such as the name of the food, list, and quantity of ingredients, instructions for use, storage conditions and durability statements, food allergens, nutritional information and alcohol strength for beverages having alcohol. There are also explicit labeling requirements for some food colors such as *E 102 (Tartrazine)*, *E 214 (Ponceau 4 R)*, *E 110 (Sunset yellow)*, *E 122 (Carmoisine)*, *E 104 (Quinoline yellow)* and *E 129 (Allura Red)*. These additives are required to be labeled with additional information mentioning that they can have an adverse effect on activity and attention in children (Food Standards Agency, 2015; Scotter, 2015).

The review study of Roman, Sanchez-Siles, & Siegrist, (2017) shows that the naturalness of food is an important factor for many consumers. One of the attributes used in scales of previous researches to measure the naturalness of food is being free from artificial ingredients. Verala & Fiszman (2013) reveals that food additives are mostly perceived as artificial substances. Bearth et al. (2014), also claims that the risk perception of people on some artificial food additives influences their acceptance of the food. Devcich, Pedersen, & Petrie (2007) states that people who have modern health worries have a greater acceptance of natural additives than synthetic additives in functional foods. Shim, Seo, Lee, Moon, Kim, & Park (2011) claims that consumers are worried about the preservatives such as colorants and artificial sweeteners in foods. Rimal, Fletcher, McWatters, Misra, & Deodhar (2001) explain that consumers perceive food additives as a kind of food safety threat.

Consumer preferences in purchasing intention regarding food with additives have also cross-cultural differences. In their study conducted through Hungarian, Romanian, and Spanish participants, Szucs, Guerrero, Claret, Tarcea,

Szabo, & Banati (2014) find out that Hungarians and Romanians show higher rejection to artificial preservatives and packaging gases than do Spanish participants.

Risk perceptions of consumers affect their attitudes toward consuming foods that contain additives (Chen, 2017). Being aware of the most questionable additives and their possible health effects can contribute to changing eating habits and avoidance from foods that have health risks. On the other hand, lack of familiarity with food ingredients increases the perceived risks by consumers (Aschemann-Witzela, Varelab, & Peschela, 2019). Kubota, Sawano, & Kono (2017) find that the awareness of consumers on health risks of wine additives and their knowledge on food and wine processing reversely affect their preferences. Consumers who are aware of the dangers of wine additives prefer antioxidant-free wines. On the other hand, consumers who are knowledgeable about processing of wine and food perceive that additives are needed for high-quality products. Findings of Shim et al. (2014) show that most of the respondents of their study have perceived that the information on food additives is insufficient and education on the issue is needed.

### **Food Consumption and Eating Habits of Millennial Generation**

Millennial Generation or the so-called Y generation stands for an essential segment of today's consumers. The global population of this generation has reached about a quarter of the World population which is about 1.8 billion, and by 2025 they will provide 75 percent of the global workforce (Tilford, 2018). There are some studies that examine the health and nature perceptions of millennials (Young, McGrath, & Adams, 2018); food and health consumption patterns (Euromonitor, 2015; Statista, 2018) and their health problems (Barkin, Heerman, Warren, & Rennhoff, 2010).

Millennials matter to marketers since they are the greatest generation alive now, influential on purchase decisions of other generations, and they are the first digital generation. Based on food and health consumptions, they retain a great premium on health and have a different way of health perception; they eat more snacks, do not follow the standard meal periods, but are more willing to taste different flavors; value natural foods that comprise low carbohydrate and sugar with high protein paradigm (Euromonitor, 2015).

According to Statista's study on millennials' grocery shopping behavior in the U.S., among all generation groups, millennials prefer to purchase organic dairy products more, and they are willing to pay higher for added benefits in food beyond basic nutrition. Millennials also adopt a meat-free diet because of health concerns, fewer chemicals, and preservatives with less environmental impacts and treatment of animals. They believe proteins are very important in grocery shopping and non-GM products are healthier. Replacement of meals with snacks is denoted as a reason for being too busy to eat a proper meal and unbothered to cook a meal (Statista, 2018).

According to the study of Nielsen (2014), Global Health and Wellness Survey which has been conducted through 30,000 respondents in 60 countries, four in ten respondents (40%-43%) have claimed that in their purchasing decisions absence of artificial colors, flavors and foods made from vegetables and fruits, foods without GMO (Genetically Modified Organisms) are very important. Besides, 26 % have stated that the most desirable attributes to foods are fresh, natural and minimally processed ones. Another study held by Private Label Manufacturers Association (2016) conducted through 1839 millennial shoppers about how America's eating habits are changing, it

has been stated that millennial generation is strong-minded to acquire what's inside the products they purchase and express consideration about what they do not want in the foods they eat. 40 % have claimed that it is important to keep away from high fructose corn syrup, sodium, artificial colors and flavors, and the ingredients that they can't pronounce and additives. Also, 40 % have supported avoiding GMOs, hormones, and antibiotics in food (Private Label Manufacturers Association, 2016).

## **Methodology**

This study aims to explore the awareness of the members of the millennial generation about the food additives listed on food labels and to understand their perception and knowledge on the effects of food additives on the human body.

This study was carried out in two stages. In the first stage, the awareness of participants was measured through a question form. In the latter stage of the study, a focus group study was conducted with the volunteer participants of the first stage. Two of the study stages were completed on Apr. 20, 2018.

At the beginning of the study, one of the researchers explained the aim and the flow of Study 1 (the first stage) and then the volunteers were asked to stay in the classroom. 16 volunteer students who were taking the "Restaurant Management" course at Dokuz Eylul University Faculty of Business 2017-2018 Fall Term, aged between 22-30 agreed to participate. A questionnaire form consists of demographic information and blank tables for 10 different food labels were distributed to the participants. The labels of each food are presented on PowerPoint slides. Brand names and food categories were not shared with the students due to ethical considerations. After showing them each label, the students were asked to write the names of the food additives, the effects on the human body and the reason for using these additives in the labels. This part of the study which was implemented in the classroom was completed in 40 minutes. The physical conditions of the classroom enabled researchers to measure the awareness of participants on food additives reliably. In this process, researchers aimed to collect data that can be converted into quantitative form. During the first stage of the study, participants recalled the knowledge they have on food additives.

Qualitative studies give more flexibility to researchers than quantitative studies in terms of the sampling, data collection and interpretation of the data (Kozak, 2014). When researchers aim to understand the behavior of people, qualitative studies can be beneficial (Yıldırım ve Şimşek, 2013). Therefore, the second stage of the study has a qualitative design. In contrast to the individual participation of the students in the first stage, the focus group study method was used to benefit from the interaction of participants in the second stage. Interaction of the group is one of the advantages of focus group studies (Morgan, as cited in Punch, 2014).

The sampling decisions of researchers can be affected by factors such as the aim of the study, time constraints and financial limits (Patton, 2002). Aim of the study affected the sampling strategy of the second stage of this research. At the end of Stage 1, one of the researchers explained the details of Stage 2 and asked for the volunteers who would be involved. Implementing the random sampling method is very difficult in focus group studies (Özdemir, 2010). Therefore, in this study convenience sampling as a kind of non-random sampling method was used. The sample of this focus group study represents a homogeneous group in terms of age and educational status. Nine students participated in Stage 2. Then the researcher gave the instructions and explained the process of focus group

study. At the beginning of the focus group study, the students were asked for their permissions to record the discussion. After their approval, the participants were asked to introduce themselves to the group.

The participants of Stage 2 discussed 6 questions which were listed in Table 1. The first question was designed to understand the purchasing intention of students based on food labels which may involve food additives. Second and third questions were included to get an understanding of knowledge of students on food additives. The fourth question was designed to understand the awareness of young people on food additives. Finally, the last two questions were included to understand the perspectives and bias of participants on cultural consumption habits and characteristics of Turkish people. This focus group study lasted for 30 minutes.

**Table 1.** Discussion Questions of Focus Group Study

1	Do you check food labels regarding food additives before purchasing?
2	What are the reasons for food producers to use food additives?
3	What are the effects of food additives on the human body?
4	Which food categories mostly involve food additives?
5	Do you think that the food consumption habits of Turkish people prevent, limit and/or eliminate the negative effects of food additives?
6	Do you think that the specifications of Turkish people prevent, limits and/or eliminate the negative effects of food additives?

The data collected in Stage 1 was analyzed by the basic tools of a computer software program. Data on participants' recognition of food additives which was collected during the class activity was converted to numerical values. These values were enabled researchers to develop a chart that shows the data in a basic and clear way.

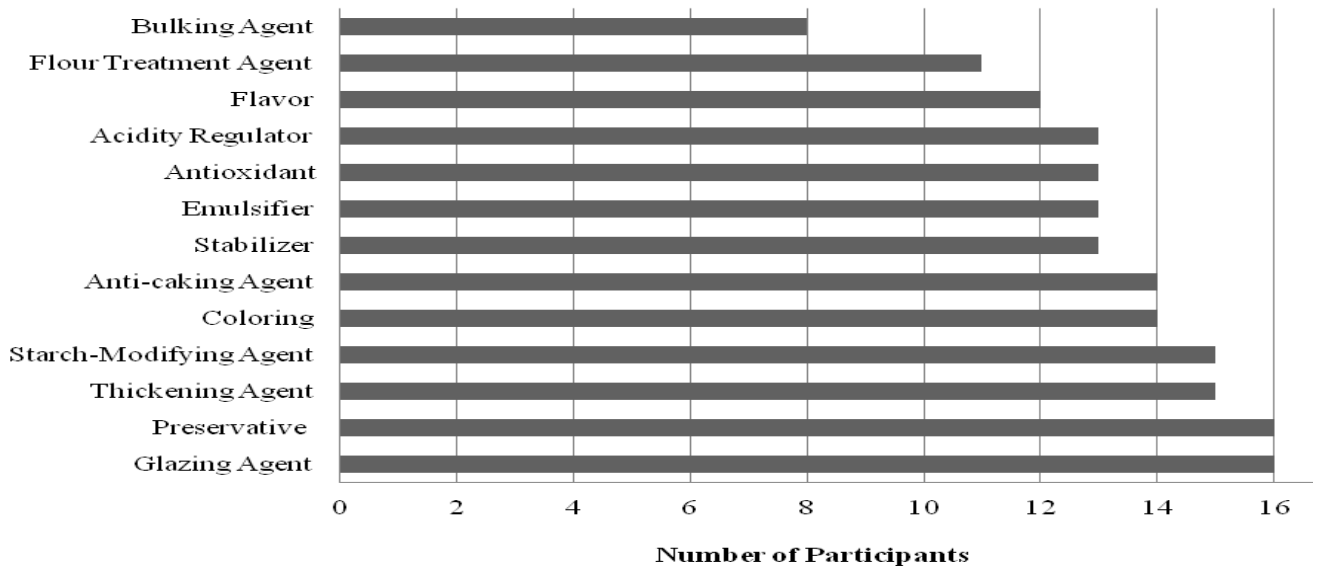
The tape records of Stage 2 were transcribed by the researchers and then the content analysis technique was used. In the findings section of the study, the original statements of the participants were shared. The names of the participants were not given in this study. This way is consistent with the ethical principle of the researchers. While referring to the statements of the participants of Stage 2, a number that represented the person was used (i.e. Participant 1). To correct the grammatical mistakes and to avoid the barriers against the flow, some words were added and shown by square brackets “[ ]”. In the following section, the findings of the study were discussed.

## **Findings**

The responses of the participants on the food additives listed in ten different food labels have been examined. Graph 1 shows the number of students who correctly have determined the different types of additives. As it is shown on the graph, all the participants have determined the preservative and glazing agents in the labels. The bulking agent has been recognized as an additive by fewer of the participants (half of the students) compared to those who have recognized the other agents. More than 69% percent of the participants have determined the flour treatment agent, flavor, acidity regulator, antioxidant, emulsifier, stabilizer, anti-caking agent, coloring, starch-modifying agent, and thickening agent as a kind of additive.

The numbers displayed in the graph shows that the respondents of the study are familiar with the names of the food additives. The reason why the bulking agent listed by relatively few participants as an additive may be that it is an ingredient frequently used in home-made pastry making.

**Graph 1. Additives Determined by Participants**



On the other hand, tables in the question form on the reason for using those additives and the potential effects on the human body have mostly been left empty. The reason for using food additives have been answered by four participants for label 1, eight participants for label 2, thirteen participants for label 3, fifteen participants for label 4, fifteen participants for label 5, fourteen participants for label 6, thirteen participants for label 7 and fifteen participants for label 8. None of the participants have answered this question for the last two labels. The answers of the students given to this question are very superficial and limited with the hints derived from the name of the agent (i.e. *bulking agent is used for bulking*). For the other agents such as emulsifier, stabilizer, starch-modifying, they have written nothing.

Only 5 participants have answered the potential effects of food additives on the human body for the first label; and for label 2, only one of the participants has answered the same question. For the other 8 labels, none of the participants has answered the question.

The findings derived from Stage 1 reveal that the participants can determine the names of the food additives. Their awareness of the names of different types of additives is high. On the other hand, they are not knowledgeable about the reason for using those additives and the potential effects of additives on the human body.

The results of the focus group study indicate that food labels have been perceived as an important tool to recognize the content of the food. However, in line with the responses given, it is clear that the behavior of checking food labels before the purchase is not widespread among the participants and could vary depending on who would consume the food.

The participants have expressed their habits in checking food labels as ‘*I sometimes check*’, ‘*I rarely check*’ and ‘*I don't check*’. At this point, the age (1) and specific dietary preferences and habits of the person who will consume the food (2) appear as two important variables. This has been stated by two participants as follows :

*'I usually don't pay much attention when I'm shopping for myself or my family, but I'm checking labels if I'm going to buy for my little cousins or children who are in their developmental age. I guess there is a mobile application for this similar to barcode readers. I pay attention when I buy for them, but I don't check for myself or my family'.*

Participant 5

*'Since my housemate is vegetarian, I'm checking the contents of the products'.*

Participant 9

Whether the food additive declaration in labels prevents them from purchasing the item has been asked to the participants. The respondents have claimed that they do not prefer foods containing E-coded additives and colorants. These opinions have been expressed by one participant as follows:

*'My Dad claims that foods having E-coded items are carcinogenic. I pay attention to them. And there are also colorants and preservatives. I check E-coded items and the colorants. I don't care about the rest'*

Participant 10

For the question regarding the habit of consuming certain food, and the reasons for using additives some participants have claimed that the additives enhance the visual appeal and distinguish flavor, and thus consumption becomes a habit. Also, they have emphasized that they are also used for facilitating production and improving raw material efficiency. The views of the two participants are as follows:

*'When you taste the X for example, you say that is super. When you taste another item belonging to the same product category, you don't like it. Now that your palate becomes accustomed to X, you want that taste. We love it when there's a food additive. In order to provide satisfaction, companies are using food additives to make their products more appealing.*

Participant 7

*'With food additives, it's cheaper and easier to produce. Nowadays, sugar beet chat is going on. The substitute for sugar beet is easier to obtain, the more sugary taste can be gained with just a few drops. It may also be preferred in terms of mass production'.*

Participant 13

One of the important emphases on the use of food additive is that companies have an engagement with one another and food producers use additives due to such cooperation. One participant has expressed his opinion on this point as follows:

*'Currently, all sectors of the world are connected. For survival by supporting each other'*

Participant 1



Regarding the questions about the possible effects of additives on our bodies and the source of information on additives, the responses are likely that they cause hyperactivity, mental retardation, and the risk of cancer. The source of information mainly consists of opinions of the family members, acquaintances and friends, and the media. Among the food items that participants prefer not to consume due to possible negative effects are chips, fruit juices, prepared canned foods, and packaged products. One participant has expressed her view on this particular point as follows:

*'I do not eat chips, no way in particular. They eat near me but I don't'.*

Participant 10

It is asked the participants whether media, which is proclaimed as a significant information tool about additives is exaggerating the news or not. The participants stated that the enterprises led to manipulation by using media in order to gain a competitive advantage in the market. One participant expressed his view as follows:

*'If the competitor wants the rival product to be withdrawn from the market, he can go to the defamation campaign somehow'.*

Participant 1

Regarding the question about whether traditional Turkish food culture and eating habits eliminate the possible negative effects of additives, all participants have shared one of the student's opinions that traditional consumption habits are decreasing the negative effects. After the participant's opinion on the positive effects of homemade yogurt, another participant has expressed his sadness that such traditional food consumption habits are gradually decreasing. These opinions are as follows:

*'I think our nutritional habits have already changed. We are eating foods with additives. I do not remember when I last ate homemade yogurt'.*

Participant 10

## **Discussion and Conclusion**

The concerns of the consumers on healthy food consumption have been growing. This study aims to explore the millennial's awareness of the food additives listed on food labels and to understand their perceptions and knowledge on the effects of food additives on the nature of foods themselves and human body.

This study has two contributions to the literature. First, the findings revealed that millennial's can recognize food additives in food labels. They are aware of the names of different types of food additive substances. Second, the findings on their perceptions about the use of food additives and the effects of additives on the human body showed that their knowledge in these issues is very limited. The findings also revealed that the recommendations of their families, friends, relatives, and media can evoke their attention toward the risks of consuming specific kinds of food additives.

The relevant literature reveals that food naturalness is an important issue for many consumers (Roman et al., 2017). On the other hand, it seems that many customers are uninterested in the nature, use, and effects of food additives. The studies of Altuğ & Elmacı (1995) and Varela & Fiszman (2013) showed that the knowledge of

customers on food additives is very limited. The results of this study support their findings. In line with the results of Altuğ and Elmacı (1995), participants recognized the food additives, but they were unaware of the functions and effects of them on health.

Seisun (2010) stated that the perceptions of customers on the image of the additives may vary for food additives. While the name carboxymethyl cellulose type may bring chemicals into the minds of some consumers, cellulose gum (the synonym of the same additive) may be perceived as a more label-friendly food additive. This study revealed that the “E” coded food additives and colorants were perceived as risky. The reason behind this perception is not connected with the connotations of the name of the additive but it is attributed to the warnings of other people.

In the study of Unusan (2007) and Kang et al. (2017), many respondents expressed that they perceive the food additives as harmful for health and some consumers avoid buying foods which include additives. On the other hand, Legesse et al. (2016) found that the awareness of consumers on potential health risks of foods does not prevent some of them from consuming that food. In this study, it was revealed that the purchasing intention of the participants negatively affected by the presence of specific food additives.

Increasing the knowledge of millennial generation will help to prevent the bias about food additives. Moreover, this will help them to change their consumption patterns, protect themselves and the loved ones from the real health risks. To increase the knowledge of millennials on food additives, a sort of relevant education should be given to students. The contents of food additives should be added to the food-related courses. Different types of food additives, the reason for using them, prevalent foods prepared with additives, benefits, and risks of using additives should be explained in these courses.

The findings of the study have to be seen in the light of the major limitation of the study. The sample size of the classroom activity, first stage, is limited to the students of the restaurant management course. Therefore, the sample size is small. The results of the study from this sample can not be generalized for the millennial generation. Future studies can be conducted on a larger sample to understand the millennial’s awareness and knowledge of food additives. Another point to be thoroughly investigated in future researches could be the reflection of lifestyles on food-based attitudes and consumption patterns.

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