JOTCS
Journal of the Turkish Chemical Society
Section: C
Chemical Education

TURKISH CHEMICAL SOCIETY

Determination of the 8th Grade School Students' Awareness of Food Dye with the Use of Spectrophotometer*

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MAKALE http://dergipark.gov.tr/jotcsc

Abstract: In the current study aimed to create awareness of color dyes found in foods and beverages on 8th grade students through an experimental activity designed by the researchers. To this end, the experimental activity developed on the basis of 5E learning model including the use of spectrophotometer allowing the practical analysis of food dye was administered to the participants. This study was designed as a case study, one of the qualitative research methods. As the data collection tool, a semi-structured interview form, administered before and after the activity, was used to determine the participants' awareness. By making use of science and technology integration through the developed experimental activity, students were enabled to make scientific observations on a problem encountered in their daily life. In the analysis of the data, content and descriptive analyses were used together. It was found that the activity was effective in raising the participating students' awareness of color dyes in foods and with the inclusion of spectrophotometer into this process, the students' interest was aroused. As a result, it can be suggested that with the inclusion of technological tools such as spectrophotometer into teaching-learning process, activities directed to raising students' awareness of the issues directly related to their health can be enhanced.

Key Words: Spectrophotometer, food dyes, experimental activity, 5E learning model, science education.
*Some part of this study was presented in the International Contemporary Education Research Congress 2016 in Muğla.

Submitted: November 26, 2018. **Accepted:** March 22, 2019.

8. Sınıf Öğrencilerinin Spektrofotometre Kullanımı ile Gıda Boyası Hakkındaki Farkındalıklarının Belirlenmesi*

Öz: Bu çalışmada, 8. sınıf öğrencilerinde, araştırmacılar tarafından tasarlanan deneysel etkinlik ile yiyecek ve içeceklerde bulunan gıda boyalarına yönelik farkındalık oluşturulması amaçlanmıştır. Bu amaçla katılımcılara, gıda boyalarının pratik analizini sağlayan spektrofotometrenin kullanımını içeren 5E öğrenme modeline dayalı olarak geliştirilen deneysel etkinlik uygulanmıştır. Araştırma, nitel araştırma yöntemlerinden durum çalışması olarak desenlenmiştir. Veri toplama aracı olarak etkinlik öncesinde ve sonrasında katılımcıların farkındalıklarını belirlemek amacıyla yarı-yapılandırılmış görüşme

formu uygulanmıştır. Deneysel etkinlik ile fen ve teknoloji entegrasyonunu kullanarak, öğrencilerin günlük hayattaki bir soruna yönelik bilimsel gözlemler yapması sağlanmıştır. Verilerin analizinde içerik ve betimsel analiz birlikte kullanılmıştır. Etkinliğin, öğrencilerde tükettikleri gıdalar içindeki katkı maddelerine karşı farkındalık oluşturmada etkili olduğu ve bu sürece spektrofotometrelerin dâhil edilmesiyle konuya yönelik ilgilerinin arttığı görülmüştür. Eğitim ve öğretime spektrofotometre gibi teknolojik cihazların dâhil edilmesiyle öğrencilerin doğrudan sağlığını etkileyen konularda bilinçlendirilmesini sağlayan etkinliklerin çeşitlendirilmesi önerilmektedir.

Anahtar kelimeler: Spektrofotometre, gıda boyaları, deneysel etkinlik, 5E öğrenme modeli, fen eğitimi.
*Bu çalışmanın bir kısmı, Muğla'da düzenlenen International Contemporary Education Research Congress 2016 isimli kongrede sunulmuştur.

Sunulma: 26 Kasım 2018. **Kabul:** 22 Mart 2019.

INTRODUCTION

Developments in science and technology have led the way in the formation of social issues and the development of the modern education concept of the 21st century. Teaching methods and environments have been renewed and there have been changes in the existing educational practices to prepare students and instructors for the future. In accordance with these changes, curriculums have also been renewed. In the science curriculum (Ministry of National Education [MoNE], 2018), it is strongly emphasized that "All students must be educated as science literate individuals". In science education one of the learning environments that can foster science literacy by making it possible to learn by doing and experiencing are laboratories. Laboratory experiences help students develop their critical thinking and creativity. In addition, this process increases students 'appreciation of the mechanisms used by scientists to gain knowledge and analyze. Moreover, through laboratory education, students are allowed to engage in in-depth learning (Bes, Sancho, Peleato, Medina, Gomez-Moreno & Fillat, 2003). Today, various educational reforms are being implemented to increase the effectiveness of laboratory practices in science education. In these reforms, approaches that can contribute to the improvement of learning and teaching environments in the laboratory have been adopted. One of these approaches is the inquiry-based learning. In the inquiry-based science education, on the one hand students are provided with experiences that can be taken as the basis in the construction of new information or in the testing of thoughts, they are encouraged to question their thoughts created on the basis of evidence on the other (Köseoğlu & Tümay, 2015, p. 83). In the constructivist approach various learning models (3E, 4E, 5E, 7E) are used. The 5E model is a science teaching model built on experimental activities. The model consists of five stages. These stages are; Engage, Explore, Explain, Extend (or Elaborate) and Evaluate (Wilder & Shuttleworth, 2005). 5E model-based instruction has been reported to increase students' conceptual understanding and higher order thinking skills and to positively affect students' learning motivation by relating what has been learned to their daily lives (Çetin-Dindar & Geban, 2017).Moreover, laboratory activities developed on the basis of the 5E model have been reported to positively affect students' academic achievement and scientific process skills (Açışlı & Turgut, 2011). Hırça (2013), conducted a study on pre-service teachers, reported that the use of 5E model-based animation scenarios for electrical safety awareness improved the technical skills related to electric shock and information of first aid.

Science education should be directed to the accomplishment of learning of science subjects in a holistic manner by establishing connection between science and technology. UV-visible spectrophotometers used in some general chemistry laboratories can determine the absorption spectra of colored or colorless solutions (Aycan & Arslan, 2017;

Dooling, Bodenstedt & Page, 2013; Galloway, Bretz & Noval, 2014; Kılıç-Alpat, Özbayrak-Azman & Alpat, 2018; Sharma, Gulati & Mehta, 2012). These tools rely on the interaction of electromagnetic radiation with matter and are built on Beer Lambert's Law, which is based on the principle that radiation is absorbed or diffused by the atom or molecules that make up the matter. This law states that the amount of light passing through a solution is logarithmically inversely proportional to the length of the path followed by the light in the solution and the concentration of the solution, while the amount of light absorbed is directly proportional (Lema, Alijinovic & Lozano, 2002). Quantitative analyses of some food additives (food dyes, sweeteners, preservatives, etc.) can also be performed with spectrophotometers.

Food dyes are divided into two groups as pigments obtained from natural sources and synthetically obtained pigments. While cochineal carmine, indigotine, anthocyanin, riboflavin and beta-carotene are included in the class of natural colorings, tartrazine (E102), sunset yellow (E110) and ponceau 4R are synthetic dyes (Öncül, 2009). There are many food dyes in the food we use in our daily lives. For example; energy drinks, cakes, pastries and sauces were found to contain food dyes (Altıniğde, 1999; Atlı, 2010). Clinical studies have shown that tartrazine (E102) in humans, especially in children, triggers asthma, eczema, urticaria and migraine and causes hyperactivity, restlessness and sleep disturbance (Büyükdere & Ayaz, 2016; Lok, Chung, Benzie & Woo, 2011). In addition, there are studies reporting the negative effects of food additives on human health (Şen, Aksoy & Yılmaz, 2017). Although some food additives have such negative effects on health, their consumption by children and young people is increasing with each day. Lok et al. (2011), conducted a study on 142 elementary school students aged at 8-9 in Hong-Kong and found; by using the Food Frequency Survey data, that the color additives other than sunset yellow (E110) are consumed at acceptable levels for his/her age group but it is highly above the acceptable daily intake level (51%) for the nine-year old. Studying on a different age group, Jain & Mathur (2014) found that students in the age group of 13-15 consume sports drinks, energy drinks, cakes, pastries and sauces including food additives than the students in the age group of 15-19.

Problem Statement

It is necessary to raise students' awareness of the foods whose consumption is continuously increasing and which are made more attractive with the addition of food colorings. It is thought that raising this awareness in students at early ages can help to prevent many negative occurrences. In addition, there are studies (Bosma, 1998; Fialho, Rocha & Mello, 1999; Grenger, 2004; Munmai, Ruenwongsa, Panijpan, Barman, Magee & Somsook, 2011; Sharma, Gulati & Mehta, 2012) in the international literature conducted with the participation of undergraduate students using spectrophotometers in teaching-learning process. Though there are studies conducted at university (Arslan & Aycan, 2014; Kılıç-Alpat, Özbayrak-Azman & Alpat, 2018; Küçük, 2011) and high school levels (Carrher, Curry & Tessonnier, 2015; Sigmann & Wheeler, 2004) in the international literature. The awareness of food consumption should be imparted to students at early ages. Science education can play an important role in the inculcation of food awareness. In order to raise students' awareness through science education, instructional environments should be enriched and should be made more attractive. Its reported that 5E learning model has positive effects on elementary school students' conceptual understanding (Şahin & Çepni, 2012; Turgut & Gürbüz, 2011) and achievements (Aksoy & Gürbüz, 2013; Sertkaya, 2018) in science education. Moreover, it was thought that 5E learning model would provide convenience and benefit to students in engage and explain stages attention and the introduction of spectroscopic methods, in explore and extend stages obtaining information about food dyes by using the spectrophotometer.

In the current study, it was aimed to design a laboratory activity to inform students about food dyes and increase their interest in the use of technology in science education and to investigate the effects of this activity. To this end, answers to the following sub-questions were sought;

1. What is the effect of the experimental activity on the 8th grade students' awareness of food dyes?
2. Does their awareness of food dyes affect their consumption patterns?
3. What are the students' opinions about the determination of the presence of food dyes in foods and drinks?

METHOD

Research Design

The current study was designed as a case study, one of the qualitative research methods. The case study is used to analyze one or several cases within their own limits (setting, time, etc.) in a holistic manner (Karasar, 2013, p. 83). The main purpose of the current study is to qualitatively evaluate the effect of the experimental activity developed to raise the 8th grade students' awareness of food dye and food consumption in a laboratory setting.

Study Group

The study group of the current research is comprised of thirteen 8th graders (4 girls and 9 boys) attending a private school in the city of Muğla in 2014-2015 school year. In the selection of the study group, the convenience sampling method was employed. The convenience sampling method takes prevention of waste of time, money and labor as the main priority (Büyüköztürk, Çakmak-Kılıç, Akgün, Karadeniz & Demirel, 2010, p. 91). The students participated in the study on a volunteer basis. The identities of the students were kept confidential and they are named as "Participant" and the students were coded as P1 (Participant 1), P2, P3.

Data Collection Tools

As the data collection tool, a semi-structured interview form was used in the current study. The interview form method is used to collect similar data from different people to arrive at similar issues (Patton, 1987, p. 111). The interview form was administered twice during the study. It was first administered to elicit the opinions about food dye and spectrophotometer before doing the activity and then after the completion of the activity to determine whether the activity raised the students' awareness. The interview form was developed by the researchers and its final form was given after receiving the review of the field experts. In the form, there are two multiple-choice questions and there are 7 open-ended questions (Appendix 1).

Data Collection

Preparation and implementation of the activity

While developing the activities, studies were examined related to students should have knowledge and awareness related to food dyes and the use of spectrophotometers in education. By seeking the opinions of field expert content validity of the laboratory activity was established. The activity was conducted in compliance with the constructivist approach. The activity stages were designed according to the 5E model generally used while conducting science education through the inquiry-based approach (Wilder & Shuttleworth, 2005). The 5E model places students in the center of experiences by encouraging them to research, to construct scientific concepts and to relate these concepts to other concepts (Köseoğlu & Tümay, 2015, p. 96). In the "Engage" stage of the activity, first the students were shown some foods they consume in their daily lives to draw their interest and their predictions about the presence of food dye in these foods were asked and then the spectrophotometer was introduced to them. In the "Explore" stage, the experimental activity was conducted to enable students to engage in concrete experiences on the issue. The experimental activity was conducted as a demonstration experiment. Demonstration experiments, in accordance with the constructivist approach, in engage stage of the 5E/7E learning model are used to reveal the students' prior knowledge and motivate. In addition, demonstration experiments are preferred in some

situation such as the experiments are not suitable for the students in terms of safety, lack of materials, the inadequacy of students' psychomotor competences, lack of time, economic constraints (Ergin, Şahin-Pekmez & Öngel-Erdal, 2012, p.24-25). In this study, a demonstration experiment was used due to lack of psychomotor skills of students, limited time and the economic value of materials. In the experimental activity, first solutions related to foods consumed as drink and food dyes were prepared. Then, measurements were performed by using spectrophotometer.

In order to determine the presence of brilliant blue (E133) food dye in the food consumed, the standard addition method, one of the spectrophotometric methods, was administered. The brilliant blue chemical used in the study was of analytical purity and the solutions were prepared with distilled water. Solutions of consumed food (energy drink) and food dye (brilliant blue, E133) were prepared at suitable concentrations and through the spectra taken, their absorption was observed. As the color of the food (energy drink) consumed in the experiment was blue, brilliant blue (E133) chemical was used. In the activity, PG Instrument Photographic T80 + UV/ VIS spectrophotometer and precision scales (Sartorius) were used. Energy drink was filtered by using blue-band filter paper. Black solution for this experiment was distilled water. Stock solution of brilliant blue was prepared as 1g/100 mL spectrophometric determination was realized with ten times diluted solution and standard addition process realized with 0,2 mL stock solution (Figure 1).

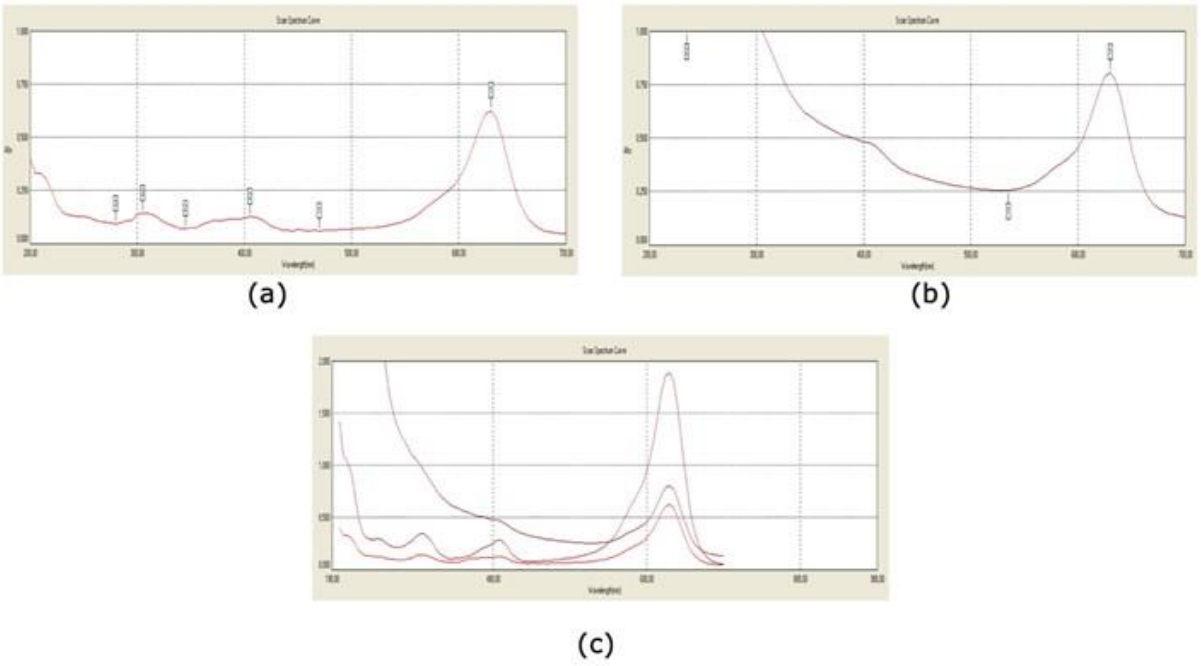

Figure 1. Absorption Values of the Food Consumed and the Brilliant Blue Chemical (a) Brilliant blue 630 nm; (b) The consumed food 630 nm; (c) Brilliant blue, the consumed food and standard addition.

This stage was carried out by the researchers. In the "Explain" stage, the students compared their prior predictions and the data they collected as a result of the experimental activity. Then, they shared their inferences related to the experiment and made scientific explanations on the graphs constructed to demonstrate the experimental data. In the "Extend (Elaborate)" stage, they established links in relation to the presence of food dye in other foods they consume in their daily lives. In the "Evaluate" stage, in line with the scientific information obtained as a result of the experimental activity, a whole class discussion was held about the chemical compounds found in foods (food dyes, etc.) and their potential effects on human health and then the semi-structured interview form was administered. In this activity, the use of the UV/Vis

spectrophotometer device is important in terms of embodying some concepts (relating to lighting-matter interaction) and developing their graphic interpretation skills.

Data Analysis

In the analysis of the collected data, the data obtained through the semi-structured interview form were subjected to the content analysis and then were descriptively interpreted. In the content analysis, the data are first conceptualized and then they are logically classified on the basis of the emerging concepts and then the themes explaining the data are determined (Yıldırım & Şimşek, 2013, p. 259). In the current study, with the themes obtained through the content analysis, a framework was constructed and the responses were descriptively interpreted. In the descriptive analysis, direct quotations are frequently made in order to reflect the opinions of the individuals interviewed or observed more strikingly (Yıldırım & Şimşek, 2013, p. 256). Therefore, direct quotations from the students' responses are given in the current study.

FINDINGS

Findings related to the first sub-problem of the current study "What is the effect of the experimental activity on 8th grade students' awareness of food dyes?"

In order to determine the students' awareness of food colorings, their responses to the third question and fourth question in the semi-structured interview form were analyzed.
When the students' responses given to the third question before and after conducting the activity were examined, it was found that they defined food dye as "the matter adding color to foods before the activity. The themes and sample students' responses related to the third question are given in Table 1.

Table 1. *Responses given to third question and themes before and after activity*

Question 3: What do you understand from food dye?

Before activity			After activity		
Themes	***n***	**Sample Answers**	**Themes**	***n***	**Sample Answers**
Not natural	5	They are matters giving color to foods (P3)	Chemical food dyes	5	Natural and chemical substances causing harms when they are used and found in foods (P3) They are things used to give color to foods and drinks (P5)
Harmful	8	What comes to my mind, when I hear the word "food dye", is dye and harmful agents (P7) Food dye is a kind of dye that is not natural, harmful and posing a threat to human body (P9) They are unnatural, harmful dye agents (P11)	Natural food dyes	4	They are divided into two as harmful and harmless, natural and unnatural (P1)

It is seen in the Table 1 that before the activity, the students' opinions about food colorings as synthetically produced chemicals were that they are harmful substances and after the activity their opinions have changed. According to the Table 1, before the application 5 students thought that the food dye was not natural, 8 students thought that it was harmful yet after the application, 5 students thought that it is chemical and 4 of them thought that it is natural.

The students' responses to the fourth question before and after conducting the activity were examined. The themes and sample students' responses related to the fourth question are given in Table 2.

Table 2. Responses given to fourth question and themes before and after activity

Question 4: Do you think that food dye is useful or harmful? Please explain why.

Before activity			After activity		
Themes	**n**	**Sample Answers**	**Themes**	**n**	**Sample Answers**
Include chemicals	3	Harmful because they include chemicals (P3)	Both useful and harmful	5	Chemical ones are harmful; natural ones are not harmful (P4)
Not natural	5	Harmful because they are not natural (P9)			In my opinion, they are both useful and harmful because the food colorings derived from plants are useful whereas the chemical ones are harmful (P6)
According to media	3	They are harmful because they harm the body. It is said so in news (P7)	Harmful	8	Harmful because they lead to changes in our body (P7)
					In my opinion, food dye is harmful because it can make us sick (P10)

The reason behind this disagreement seems to be that some of them see food dyes as harmless substances. On the other hand, some of the students have learned that all of the food dyes are not harmful. According to the Table 2, before the application 3 students think that the food dye includes chemicals, 5 students think it is not natural, 3 students think that we use food dye because of media. After the application 5 students think it is both useful and harmful, 8 of them think that it is harmful.

Findings related to the second sub-problem of the study "Does their awareness of food dyes affect their consumption patterns?"

First the students' consumption patterns were determined. For this purpose, they were first asked to identify the foods they frequently consume. The foods frequently consumed by the students are given in Figure 2.

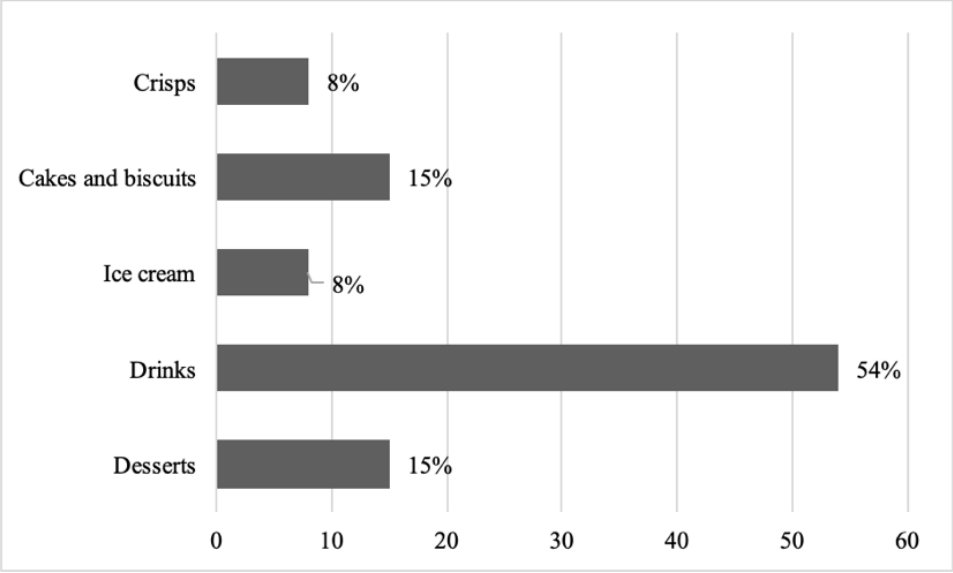

Figure 2. Foods Frequently Consumed by the Students

The most frequently consumed foods by the students are drinks (54%, *n*=7), while the least frequently consumed foods are crisps (8%, *n*=1) and ice-cream (8%, *n*=1). When the students were asked what they consider while buying these products, they responded that they care most about the criterion "enjoying them" (43%, *n*=6), and least about the criterion "date" (7%, *n*=1). Then the students' responses to the 5th question "Do you consume foods including food dye? Why?" and to the 6th question "What do "E" codes

found on the back side of package refer to?" in the semi-structured interview form were evaluated.

When the students' responses given to the 5th question were examined, it was found that they emphasized the themes "I sometimes consume" (*n*=5) and "I usually consume" (*n*=8).Some excerpts showing students' opinions about consuming foods including food dyes are given below;

"Not too much as they include chemicals" (P3)
"I sometimes consume" (P10)
"Even if I consume, I don't know" (P4)
"We consume because there are no natural products in shops" (P9)
"I consume because they are very delicious" (P8)
"Not too much, but a little because if I like its taste I consume; If I don't like, I don't consume" (P11)

When the students' responses given to the 6th question were examined, it was found that majority of them responded as "I have no idea" (*n*=11).
After the completion of the activity, the students emphasized two themes "They consume without knowing" (*n*=6) and "They consume as their taste is good even though they know the fact" (*n*=4).Some students' excerpts are given below;

"Yes, I consume. But I will take more care about it" (P3)
"I consume because I do not know which of the products I buy includes food dye" (K10)
"I sometimes consume because if their taste is good, I cannot control myself" (P11)

After the completion of the activity, it was observed that the students' awareness of E code on the back side of the package increased.

"Europe. It says that there is food dye" (P4)
"It shows whether there is food dye or not" (P7)
"It is the E of Europe. It indicates the color of the food dye in the food" (P13)

Moreover, as families are influential on students' food preferences, the students stated that they would share the information they gained about food colorings with their families.

Findings related to the third sub-problem of the study "What are the students' opinions about the determination of the presence of food dyes in foods and drinks?"

In order to determine the students' opinions about the determination of the presence of food dye, their responses given to the 7th question "How do you determine the presence of food dye in foods?" in the semi-structured interview form were examined.

In response to this question, the students emphasized three themes that are "from its appearance" (*n*=6), "from its taste" (*n*=2) and "from its package" (*n*=4). Some sample statements showing students' opinions on the issue are given below;

"I feel from the taste, and it is also indicated in the ingredients section" (P1)
"From its taste and appearance" (P3)
"If it is colorful, then there is food dye" (P8)
"The presence of food dye is indicated on the packages" (P9)

Thus, it was found that the students mostly prefer observations that are not experimental in the detection of food dye. After the completion of the activity, they used

the phrases "spectrophotometer" (*n*=7) and "by doing experiment" (*n*=6). Some sample student statements are given below;

> *"We can detect with spectrophotometer" (P3)*
> *"With experiments and letter E on the back of packages" (P6)*
> *"We detect with some methods, experiments. For instance, we can determine by using spectrophotometer" (P13)*

DISCUSSION

The findings of the current research have revealed that a positive change has been observed on 8th grade students' awareness of food dye as a result of completing an experimental activity based on the 5E learning model. Similarly, it was reported that the use of 5E learning model in teaching cell divisions, increases the achievement of 8th grade students (Zengin, 2016). In another study conducted with 6th-grade students, it was reported that guide activities prepared in accordance with the 5E learning model increased students' scientific process skills, academic achievements and attitudes towards science (Öztürk, 2013). Prior to the experimental activity, the students defined food dye as a harmful substance used to give color and found them harmful as they are chemical and they sated that they consumed these foods as they are delicious. Lok et al. (2011), stated that consumption of foods including synthetic food dye by students aged at 8-9 is highly over the daily threshold intake level (51%). In another study, it was found that with increasing average age, the consumption of foods including additives (sports drinks, energy drinks, cakes, pastries and sauces) is also increasing (Jain & Mathur, 2014). Our findings are parallel to these findings reported in the literature. The students in the study group of the current research stated that they frequently consume these drinks. As food dyes are used more in drinks when compared to other foods, the students are under risk. The students' awareness of food additives is low. Similarly, Gavaravarapu, Rao, Mendu & Polasa (2009), reported that students are not aware of the food quality standards; thus, their awareness should be raised and that they should be made more familiar with the quality symbols in tags. After the completion of the activity in the current study, the students divided food colorings into two as natural and chemical and they defined the natural ones as harmless and the chemical ones as harmful and they stated that even if they do not want, they have to consume them as they are in any food. Moreover, it was seen that the awareness of E code was created in the students. Sharma, Gulati & Mehta (2012) conducted a study with the participation of undergraduate students and teaching students green chemical concepts and techniques was found to be useful and was found to be allowing students to conduct safe and economical experiments. Munmai, et al. (2011), stated that an application made up of three main activities based on the 5E models (comparison of colors and loading onto the plate, use of the mixture in a computer program and determination of wave lengths with spectrophotometer) created positive effects on the learning of some basic concepts such as nature of colors, light absorption etc. In another study, within the context of a project conducted by a university in cooperation with district schools, experiments including scenarios with real world-based themes and inquiry-based (constructivist) learning and teaching approaches and aiming to use spectrophotometer were carried out with 6-12 grade students. Through this project, the elementary school students were introduced to spectrophotometer and the teachers gained experiences that would be conducive to their professional career (Granger, 2004).

While, before the activity, the students stated that they could detect the presence of food dye mostly through observations that are not experimental, they, after the completion of the activity, stated that they could detect it with spectrophotometer and experiments. Küçük (2011) found that pre-service science teachers think that the use of spectrophotometer in science education can be useful. Studying on a similar sampling, Arslan & Aycan (2014) reported that the pre-service teachers' attitudes positively changed as a result of the experimental activity in which the amount of carmine (E120)

in different drinks was determined with spectrophotometer. Rosa, Antello & Rosa (2018) stated that the laboratory activities in which UV-Vis spectrophotometer was used raised students' awareness of the areas of usage of food colorings in industry. In another study using the spectrophotometer method, it was reported that the experiments designed on the basis of project-based learning approach increased the academic achievement and retention of the pre-service chemistry teachers (Kılınç-Alpat, Özbayrak-Azman & Alpat, 2018).

CONCLUSION AND SUGGESTIONS

The experimental activity conducted in the current study was found to have raised the students' awareness of additives found in foods and with the inclusion of spectrophotometer into the process, the students' interest in the subject was also aroused. Therefore, development and use of activities in which technology is integrated with science education and 5E learning model is used can be suggested. When the relevant literature is reviewed, it is seen that students general engage in such activities at tertiary level; yet, as for elementary and secondary education, such activities are quite limited. Inculcation of awareness of food dye and their consumption at early ages would yield better results. In addition, this study is limited to the developed laboratory activity for use of spectrophotometers to determine food dyes and the study group. With the inclusion of technological tools such as spectrophotometer into education and instruction, activities for secondary level should be developed and enriched so that students' awareness of the issues directly affecting their health can be raised.

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Appendix 1. Semi-structured interview form

1. How often do you consume the following foods? (put them into order of frequency as 3:the most, 2: moderately, 1: the least.)

__Crisps	__Desserts	_Cakes and Biscuits
__Sweets	__Jams	
__Drinks	__Ice-cream	

2. What do you care about while buying foods? (put them into order of frequency as 3: the most, 2: moderately, 1: the least.)

__Its being well-known trademark	__Ingredients
__Adverts	
__Its being high quality	__Enjoying it
__Date	__Appearance of its package

3. What do you understand "food dye" is called? Please explain.

4.Do you think that food dye is harmful? Useful? Explain why.

5. Do you consume foods including food dye? Why?

6. What do you think "E" codes on the back of the package refer to?

7. How do we determine the presence of food dye in foods?

8. Do you share this information with your family and friends?

9. Has your family got any influence on your selecting packaged foods? Please explain.