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MİRACULOUS SPICE: THE SOLUBILITY OF SAFFRON IN WATER

Mucizevi Baharat: Safranın Suda Çözünürlüğü

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Abstract

The objective of this study is to examine the colour intensity of the saffron plant, an edible flower, in relation to water temperature. An experimental research method was employed to test the hypotheses. The solubility of saffron spice was observed in various water temperatures: icy (0°C), hot (80°C), room temperature (20°C), and warm (40°C), over the course of one month. The data was collected and visually analysed by expert academicians in the field, in accordance with the hypotheses. It was found that water temperature had a significant impact on the saffron plant. These differences were noted to vary based on the duration the saffron plant was immersed in water. Furthermore, it was observed that the most ideal colour in water was achieved from saffron kept at room temperature for one day. The absence of similar studies in the existing literature underscores the originality of this research and its potential to fill the gap regarding the colour intensity of saffron in water. Additionally, these results indicate that much of the prevailing discourse on the solubility of saffron does not accurately reflect reality.

Key words: Edible flowers, Saffron, Safranbolu Saffron, Gastronomy

Öz

Bu çalışmanın amacı, yenilebilir bir çiçek olan safran bitkisinin renk yoğunluğunu su sıcaklığı ile ilişkili olarak incelemektir. Hipotezleri test etmek için deneysel bir araştırma yöntemi kullanılmıştır. Safran baharatının çözünürlüğü, bir ay boyunca buzlu (0°C), sıcak (80°C), oda sıcaklığı (20°C) ve ılık (40°C) olmak üzere çeşitli su sıcaklıklarında gözlemlenmiştir. Veriler toplanmış ve hipotezler doğrultusunda alanında uzman akademisyenler tarafından görsel olarak analiz edilmiştir. Su sıcaklığının safran bitkisi üzerinde önemli bir etkisi olduğu tespit edilmiştir. Bu farklılıkların safran bitkisinin suya daldırıldığı süreye bağlı olarak değiştiği kaydedildi. Ayrıca, suda en ideal rengin bir gün boyunca oda sıcaklığında bekletilen safrandan elde edildiği gözlemlenmiştir. Mevcut literatürde benzer çalışmaların bulunmaması, bu araştırmanın özgünlüğünü ve safranın sudaki renk yoğunluğuna ilişkin boşluğu doldurma potansiyelini vurgulamaktadır. Ayrıca bu sonuçlar, safranın çözünürlüğüne ilişkin yaygın söylemlerin çoğunun gerçeği yansıtmadığını göstermektedir.

Anahtar kelimeler: Yenilebilir Çiçekler, Safran, Safranbolu Safranı, Gastronomi

Introduction

Flowers consist of four parts: sepals, petals, stamens, and pistils. Flowers reproduce through pollination. Reproduction occurs when pollen from the stamen of one flower reaches the stigma of another flower (Özçağıran, 2002). Flowers have always held significant importance in our lives from ancient times to the present day. This significance can be observed in our culture, art, and culinary traditions. Flowers have charmed people with their fragrance and colors. Due to the nomadic lifestyle of the Turks, they have encountered various types of flowers in the mountains and steppes, using them for various purposes. Flowers have been used to make medicine, obtain dye materials, and some have been used as food ingredients (Şimşek, 2022). Edible flowers are increasingly becoming a part of our lives. For a long time, edible flowers, primarily used in the food sector, were consumed both raw and cooked. Flowers consist of four parts: sepals, petals, stamens, and pistils. Flowers reproduce through pollination. Reproduction occurs when pollen from the stamen of one flower reaches the stigma of another flower (Özçağıran, 2002). Flowers have always held significant importance in our lives from ancient times to the present day. This significance can be observed in our culture, art, and culinary traditions. Flowers have charmed people with their fragrance and colors. Due to the nomadic lifestyle of the Turks, they encountered various types of flowers in the mountains and steppes, using them for various purposes. Flowers have been used to make medicine, obtain dye materials, and some have been used as food ingredients (Şimşek, 2022).

Edible flowers are increasingly becoming more prominent in our lives with each passing day. Edible flowers, which have been part of human life for a long time, have been widely used, especially in the food sector. Although there have been periods when they were used both raw and cooked, these flowers, which grow in different seasons, have been subjected to drying processes to be used out of season. For example, to dry roses,

their leaves are spread on a cloth above ground, moistened with rose water, and sprinkled with powdered sugar to obtain the highest aroma from the roses (Şahin & Kılıç, 2009). In a study conducted in America on edible flowers, around 100 different flowers were identified. The flower known as Crocus sativus, or saffron, has been a precious flower throughout history. This study aims to investigate Safranbolu Saffron. It is known that saffron is used in the cosmetic, pharmaceutical, and food industries. However, it has been realized that there is insufficient information to determine which saffron is of higher quality. It has also been understood that there is a lack of definitive information on which type of saffron should be used in the food sector, despite its benefits being identified in the health sector. Currently, saffron is among the most expensive categories of edible flowers.

The purpose of this study is to systematically examine the water solubility of Safranbolu saffron under different temperature conditions (room temperature 20°C, room temperature 40°C, hot water 80°C, icy water, saffron crushed with ice brewed with hot water, saffron crushed in dry form brewed with hot water). Through experiments conducted using an experimental research method, the dissolution rate and solubility properties of saffron were investigated under hot water, icy water, room temperature water, and warm water conditions. The results obtained from these experiments aim to evaluate the sensitivity of Safranbolu saffron to temperature variations, its effects on water solubility, and its temporal changes.

CONCEPTUAL FRAMEWORK

Saffron Plant as an Edible Flower

Flowers, which have been present in every aspect of human life, have gained significance at times through their appearances and at other times through their aromas. Stimulating emotions with their appearances and colors, flowers also enhance the taste and colors in foods through their flavors. Edible flowers, with their high antioxidant content, have positively impacted human health (Güneş & Akcan, 2022). There are various flowers in nature, but not all of them fall into the category of edible flowers. Therefore, it is important to select and consume edible flowers correctly. Edible flowers are gaining importance in the food and beverage sector with each passing day. It is known that there are 180 species of edible flowers on Earth, and their numbers vary according to region. They have been found to be low in calories but rich in vitamins, minerals, carbohydrates, proteins, fiber, amino acids, and essential oils. The purpose of using edible flowers in the kitchen is not only due to their nutritional values but also because of their eye-catching appearances in presentations. For example, they are commonly used in plate decorations, cocktail garnishes, and pastry decorations. The production stage of these flowers, which are in demand in the food sector, is crucial. This is because they may be exposed to certain chemical pesticides and fertilizers during cultivation. Edible flowers with unknown production stages can sometimes cause poisoning and even be fatally harmful (Yıldırım, 2022). Some of the most common edible flowers include: Marigold, Violet, Lilac, Nasturtium, Squash Blossom, Chamomile, Daylily, Velvet Flower, Chinese

Hibiscus, Onion Blossom, Carnation, Snapdragon, Rose, and Saffron (Şahin & Kılıç, 2009).

Academic studies on the saffron plant are generally conducted in the field of health. Saffron, cultivated in the Safranbolu district of Turkey, has taken its name from the district. It is also known as "golden saffron" due to its color and material value. Saffron is a bulbous plant with a brown shell, approximately 2-4 cm in diameter. Its stem is about 20-30 cm long and has a appearance consisting of 5-11 leaves. The flower section consists of 5-7 purple petals, an upwardly extending ovary, and finally the stigma, called the stigma, which are the three parts that make up the flower. Each flower contains 3 yellow pistils and 3 stigmas in the center. The stigmas are orange-red in color, 2.5-3.2 cm long, and are known as the medicinal part of the saffron plant. The flowering time of the plant, planted in August, is known as October (Çınar & Önder, 2019).

For centuries, edible flowers, which were initially used in Chinese cuisine, have now become common in many kitchens. Edible flowers have a delicate structure and can easily spoil. Therefore, they should be preserved with proper techniques shortly after harvesting. It is important to ensure that the flowers have proper air circulation during storage, as flowers stored in environments with poor air circulation can quickly deteriorate (Örnek, 2021). There are some commonly used edible flowers, such as chamomile, rose, marigold, and saffron. Research on edible flowers has revealed that flowers like purple violet, carnation, squash blossom, nasturtium, and onion blossom are industrially produced, supplied to businesses, and procured by various retail institutions. It has also been observed that flowers traded in the food and beverage market are sometimes sold in dried form. Research conducted in Turkey indicates that edible flowers are mostly sold as medicinal herbs or spices in spice shops and marketplaces in dried form. It has been found that five types of fresh flowers are sold after harvesting, such as squash blossom, purple viola, and nasturtium (Şahin & Kılıç, 2009). Saffron, a member of the iris family, is a bulbous plant with purple leaves. Saffron flowers, grown in tropical and subtropical climates in the Northern Hemisphere, are found in Italy, Spain, Greece, Morocco, Egypt, Israel, and Turkey (Eser Ünaldı, 2007). Saffron is widely used in kitchens. It is used for coloring and adding flavor in confectionery such as Turkish delight, cakes, biscuits, cookies, cakes, and rice pudding, as well as in the production of soups, chicken, meat dishes, rice, cheese, and butter. The use of saffron in kitchens is mainly due to its intense yellow color and unique aroma. Therefore, saffron can be obtained as an aromatic coloring agent. Saffron can also be used in medicine as an aphrodisiac, appetite stimulant, stimulant, analgesic, for skin disorders, bronchitis, and gout treatment (Çelik, Cankurt, & Doğan, 2010). Saffron has been recognized and used for centuries. Saffron, known for about 3000 years, was named by the Assyrians in the 7th century BC. The saffron flower, which is also the subject of mythology, is featured in many stories. In one of these stories, a hero named Til is bitten by a snake in winter and dies. When spring comes, the saffron flower blooms and its scent revives the hero, making saffron a symbol of spring. The Lydians created festivals called "golden flower" to celebrate the arrival of spring thanks to this story (Çınar & Önder, 2019). Even today, saffron is known as the golden flower in the Safranbolu district and golden saffron festivals are held (Safranbolu Belediyesi, 2020). Saffron has

been cultivated in Iran and India since ancient times. Its use in Anatolia dates back to the Hittite civilizations. The spread of saffron to the world was facilitated by the Mongols to China and by the Arabs to Europe (Çınar & Önder, 2019).

Saffron of Safranbolu

Throughout history, people have always attached importance to spices. At times, wars and diplomatic difficulties have arisen due to spices. The Spice Route is the best example of its significance. Saffron spice has always been among the most important spices. Anatolian lands are one of the most fertile regions in the world in terms of endemic plants. There are nearly 3,000 endemic plants in Turkey. The existence of these plants accounts for 33% of all plants. However, a large portion of these plants are at risk of extinction. One of the endangered plants is the saffron plant. Today, Safranbolu district, which is valuable for saffron cultivation, was also an important region for saffron cultivation during the Ottoman period. In the past, saffron was also produced in the cities of İzmir, Bolu, Adana, Tokat, and Şanlıurfa. There are records indicating its cultivation in these regions (Arslan, 2019).

According to certain literature analyses, it is stated that the homeland of saffron is Anatolia and the Eastern Mediterranean region, while according to some sources, it is mentioned that saffron was brought to Anatolia by the Turks coming from Central Asia (T.C. Safranbolu Kaymakamlığı, 2014). The places where saffron is grown in our country include primarily Safranbolu, as well as Istanbul, Tokat, Izmir, Adana, and Şanlıurfa. It is recorded that saffron is cultivated in around 40 villages in Safranbolu. Currently, saffron cultivation in our country continues in only three villages, namely Davutoba (four families), Yörük (one family), and Aşağı Güney (one family) villages in Safranbolu, on an area of 4310 m2. Safranbolu, which has lost its significant position in the world saffron trade, imports saffron because it cannot meet domestic production consumption (T.C. Safranbolu Kaymakamlığı, 2014).

Safranbolu is located in the western part of the Black Sea region in Turkey. While Safranbolu was previously affiliated with the provinces of Zonguldak and Kastamonu, it is currently under the administration of the province of Karabük. In order to preserve its unique culture, Safranbolu was added to the UNESCO World Heritage List in 1994 (Özdemir, 2011). Additionally, the saffron plant received its geographical indication as 'Safranbolu Saffron' from the Turkish Patent and Trademark Office of the Ministry of Industry and Technology in the Karabük province's Safranbolu district in 2011 (Türk Patent ve Marka Kuruluşu, 2018). Traditional Safranbolu dishes such as saffron tea, zerde (a sweet pudding), saffron-flavored ashure (a dessert), and saffron rice are still prepared in the region. These local delicacies, which are also found in the bazaar kitchens, are preferred by both tourists and locals (Gümüş, 2021). Currently, saffron production in the Safranbolu region amounts to approximately 25-30 kg on a 50-decare area. Despite Turkey's favorable climate conditions, the limited amount of saffron production allows for the presence of imported saffron in the market. Although saffron production decreased significantly after the 19th century, recent efforts aim to increase production (Çınar & Önder, 2019). Saffron plant is cultivated on 47 decares of land by 47

producers in 14 villages in Karabük Safranbolu district. 0.5 kg of saffron is obtained from 1 decare area under optimum conditions. Safranbolu Saffron was registered with the Turkish Patent Institute in 2010 with the registration number 144 as Geographical Indication of Origin. 'Saffron Harvest Festival' is organised every year in November in the district (Çınar & Önder, 2019).

THE METHOD

In this study, experimental research method was used to analyse the colour intensity of Safranbolu saffron depending on the water temperature. This method includes experiments conducted at different water temperatures in a controlled laboratory environment to determine the colour intensity of saffron. The general steps of the research method consist of determining the question and hypothesis, forming the research hypothesis, testing the experimental design and conducting the experiment.

In line with these steps, the research question and hypothesis were determined. Research question:

How is the colour intensity of Safranbolu saffron affected by water temperature?

Research hypothesis: The colour intensity of Safranbolu saffron given to water depending on the water temperature varies with time.

The independent variable of the study is 'temperature', and the dependent variable is 'colour intensity of saffron in water depending on water temperature'. The female (brown) organ of the saffron plant is used in the food industry. For this reason, in order to test the saffron under different temperature conditions, 6 brown coloured saffron were tested in different glass cups for each temperature level.

Study Objective and Significance

The aim of this study is to investigate the colour intensity of saffron, an edible flower, in water depending on the water temperature. The colour intensities of saffron in hot water, ice water, water at room temperature and warm water conditions were investigated. The results obtained with these experiments aim to evaluate the sensitivity of saffron water to temperature variables and their effects on water solubility.

The importance of this study is to provide scientific and experimental data on the colour intensity of Safranbolu saffron in water and to provide basic information for the effective use of saffron. Saffron is known as a valuable spice widely used in food, pharmaceutical and cosmetic industries. However, there is not enough accurate information about the colour intensity of saffron in water and especially how it changes under different temperature conditions. The data provided by this study will provide an important resource to understand how saffron reacts in different temperature environments. This information may help to utilize saffron more efficiently under appropriate conditions and achieve better results.

In conclusion, this study provides scientific contributions on the use and value of saffron by demonstrating the effects of temperature on the colour intensity added to water by the female organ of saffron with experimental data. It also points to an important commercial and industrial potential.

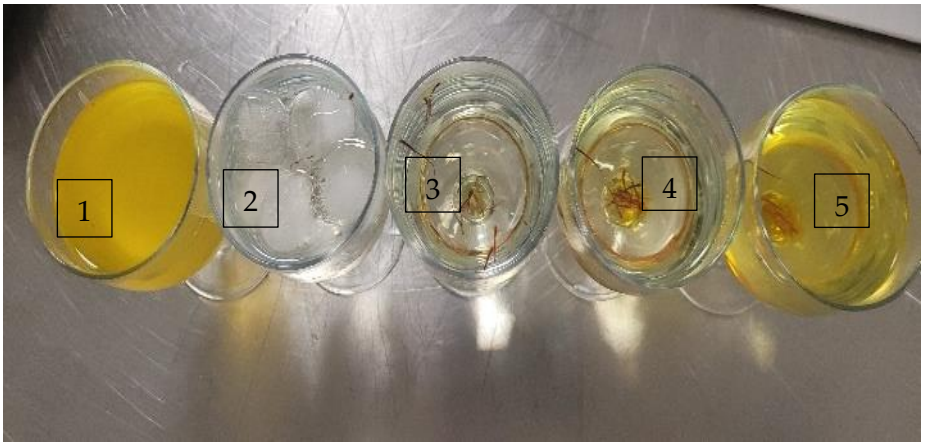
RESEARCH FINDINGS

Experimental Findings

Figure 1, the first 5 minutes of the reaction of saffron are shown in water environments at temperatures of 80 degrees, icy water (0 degrees), room temperature (20 degrees), 40 degrees, and 60 degrees from left to right, respectively.

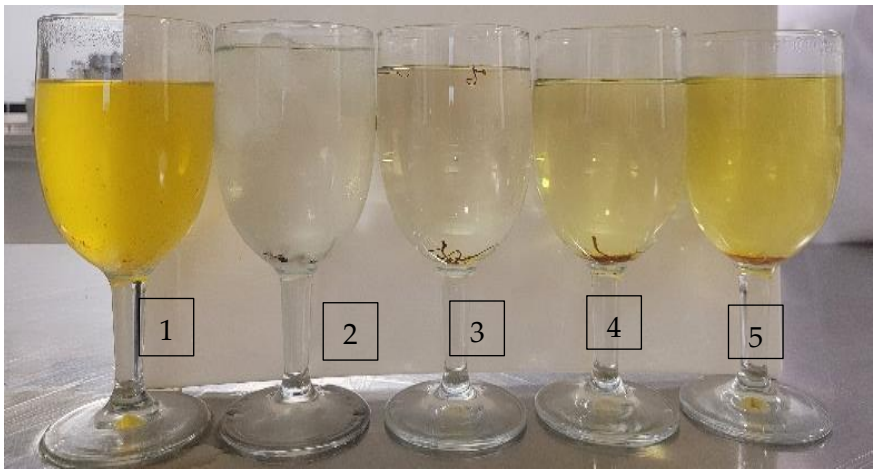
Figure 1. The Reaction of Saffron in Water Within the First 5 Minutes (1=80°C, 2=0°C, 3=20°C, 4=40°C, 5=60°C) is Depicted.

Figure 2, the color changes of saffron samples exposed to different temperature levels were examined after 5 minutes, and it was observed that their colors were consistently maintained during this period. The water at 80 degrees Celsius showed the most intense color change in saffron. However, saffron did not react in the icy water environment. The color changes obtained in water at room temperature (20 degrees Celsius) and at 40 degrees Celsius are quite limited.



However, water at 60 degrees Celsius provided the second most intense color change.

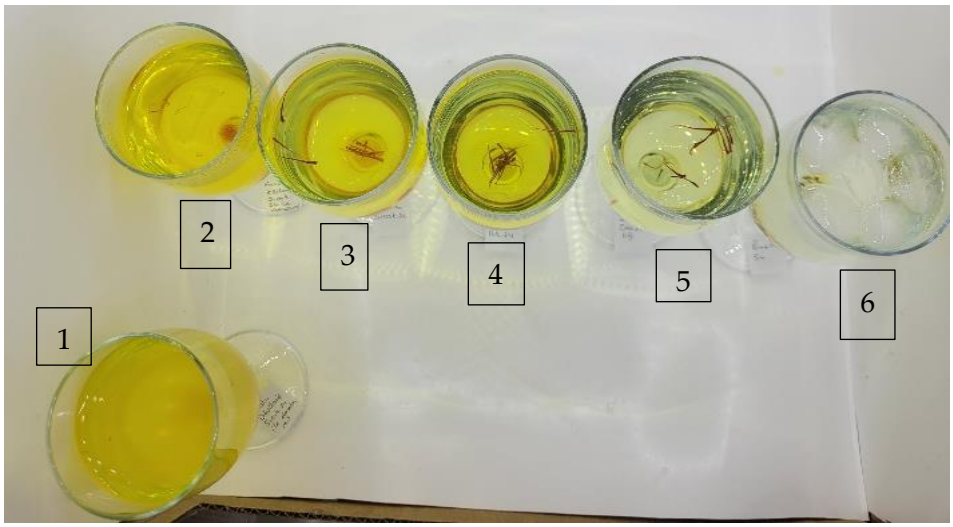
Figure 2. The Changes in Colors After 5 Minutes are as Follows: 1=80 °C, 2= 0 °C, 3=20 °C, 4=40 °C, 5=60 °C



These results indicate that the reaction of saffron is temperature-dependent and particularly more pronounced at higher temperatures. Additionally, it is observed that saffron exhibits its color change most effectively within a certain temperature range (e.g., 60 degrees). These findings suggest that the physical reactivity of saffron may vary depending on temperature and that this variation could be optimized under specific temperature conditions.

Figure 3. Reaction of Water and Saffron Within the First 5 Minutes

Resim 4. Top View of the Reaction of Water and Saffron in the First 5 Minutes



In our second experiment, we crushed the saffron plant with ice and in its dry form, then filled with hot water. In Figure 3, from left to right, we observe: a glass filled with ice-crushed hot water (number 1), a glass filled with hot water (80°C) over crushed saffron (number 2), a glass showing the reaction of saffron plant with hot water (80°C) (number 3), a glass showing the reaction of saffron plant with lukewarm water (40°C) (number 4), a glass showing the reaction of saffron plant with room temperature water (20°C) (number 5), and a glass showing the reaction of saffron plant with ice water (number 6). The glass filled with ice-crushed hot water (number 1) quickly initiated the reaction, but the water became cloudy. However, in the glass filled with hot water over crushed saffron (number 2), the water's color was brighter, and the reaction was faster. Looking at the other glasses, as the temperature decreased, the reaction strength weakened within the first 5 minutes.

Figure 5. The Reaction of Saffron in Water After 24 Hours.

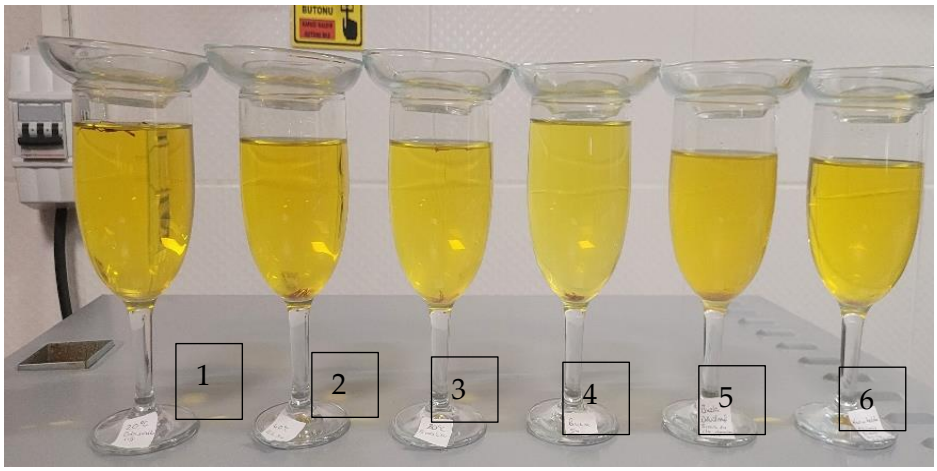
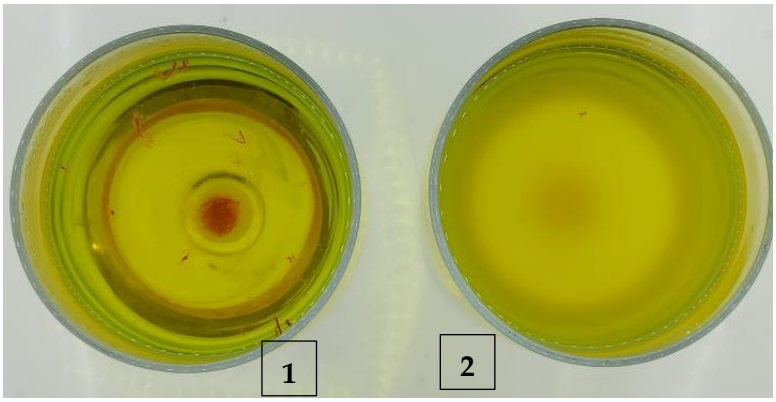


Figure 5 illustrates the reaction of saffron in water after 24 hours. From left to right, we observe glasses numbered 1 to 6, each representing different conditions: 1) water at room temperature (20°C), 2) warm water (40°C), 3) dry saffron crushed and steeped in hot

water (80°C), 4) ice water, 5) saffron crushed with ice and steeped in hot water, and 6) dry saffron crushed and steeped in hot water. These glasses depict the respective reactions of saffron under varying conditions.

In discussions, local saffron producers expressed unanimity regarding the optimal reaction of saffron at room temperature and the necessity for water to be crystal clear. Examination of Figure 5 indicates that under trial conditions with sample 1, the most favorable reaction was achieved at 20°C (room temperature). This suggests that the biochemical processes of saffron, particularly, are most effectively conducted under these temperature conditions. Furthermore, these observations, based on local knowledge and experiences, appear to be supported by scientific studies. Such fieldwork, integrating local wisdom with scientific data, can play a significant role in determining the most suitable cultivation and processing conditions for saffron.

Figure 6. 1: The reaction of crushed saffron plant when mixed with hot water. 2: Reaction of saffron plant crushed with ice when mixed with hot water.



In Figure 6, image 1 shows the reaction that occurs when saffron interacts with hot water after crushing. The 2nd image depicts the reaction that occurs when saffron interacts with hot water after being crushed together with ice. The results obtained reveal that saffron exhibits a cloudy appearance when interacting with ice but gives a rapid and effective reaction when it encounters hot water after crushing. These observations contribute significantly to the understanding of the behavior of saffron under different conditions.

Figure 7. The Reaction of Saffron in Water Over the Course of 1 Month.

Figure 7 presents the findings of an experiment carried out at 20°C (room temperature). This experiment details the changes observed when saffron plants were stored in water for one month. The data obtained was conducted to determine the effects of long-term storage at room temperature on the saffron plant and analyses the changes in the physical properties of saffron.

According to the results of the experiment, it was observed that the colour intensity given to the water by the saffron plant depending on the water temperature disappeared completely after a month. This finding shows that the saffron plant should be in contact with water for a short time and should not be stored for a long time.

Figure 8 The Experimental Videos Conducted Within the Scope of The Study

Figure 9 The Sterile Area Created for the Image Capture Conducted Within the Scope of The Study.

CONCLUSION

This study included a series of experiments to investigate the reaction of the colour added to the water by the saffron plant in a glass of water at different temperatures. The colour intensity given by the female organ of the saffron plant placed in glasses of water at different temperatures was recorded at 5 min, 24 hours and 1 month.

In the experiments in which the reaction of saffron and water was analysed within 5 minutes, it was observed that saffron crushed with ice gave a blurred reaction, while saffron crushed in dry form gave a brighter and faster reaction. It is also observed that saffron reacting with hot water showed the most effective colour change. The results showed that the colour given by saffron to water is related to temperature.

When 24 hours-soaked saffron plant in water was analysed for colour, it was found that it gave the most effective colour to the water at 20 °C (room temperature) and the colour of the water was the most ideal colour to be used in cooking.

When the experiments examined the long-term interaction of the saffron plant with water, it was found that the colour completely disappeared, especially when stored for a long time such as 1 month. This situation shows that saffron plant should be used in meals without keeping it in water for more than 1 day.

In the study, it is emphasized that the observations of local people and the results of the experiment supported each other. The mutual support of local knowledge and scientific

data can be an important source in determining the most appropriate growing and processing conditions for saffron plant.

In conclusion, this study provides a detailed analysis of the reaction of the colour added to water by the saffron plant in a glass of water at different temperatures. The findings have the potential to provide guidance on setting quality standards in saffron trade and production. In future research, it is suggested that studies on the use of saffron plant in food should be carried out.

References

Arslan , R. (2019). Cumhuriyet Dönemi'nde Safranbolu'da safran yetiştiriciliği (1923-1990). *Uluslararası Geçmişten Günümüze Karabük ve Çevresinde Dini, İlmi ve Kültürel Hayat Sempozyumu*, (s. 589-597).

Çelik, Ş., Cankurt, H., & Doğan, C. (2010). Safran ilavesinin sade dondurmanın bazı özelliklerine etkisi . *Gıda Dergisi* , 1-7.

Çınar, A., & Önder , A. (2019). Anadolu'nun kültürel mirası: crocus sativus l. (Safran). *Fabad Farmasötik Bilimler Dergisi*, 44(1), 79-88.

Eser Ünaldı, Ü. (2007). Tehdit ve tehlike altında bir kültür bitkisi: Safran (Crocus sativus L.) . *Fırat Üniversitesi Sosyal Bilimler Dergisi* , 17(2), 53-67.

Gümüş , Y. (2021). Safranbolu yöresinde safran bitkisi ve safran kültürü üzerine halkbilimsel bir inceleme. *Uluslararası Beşeri Bilimler ve Sanat Dergisi* , 2(1),1-23.

Güneş, Ş., & Akcan , T. (2022). Yenilebilir çiçek olarak gülün önemi ve Osmanlı mutfak kültüründeki yeri. *Aydın Gastronomy Dergisi*, 6(2),325 - 334 .

Örnek, A. (2021). Yiyecel içecek sektöründe yenilebilir çiçekler ve mikro filizler. Y. Oğan içinde, *Gastronomi Araştırmaları* (103-109). Çizgi Kitabevi.

Özçağıran, R. (2002). Çiçekli bitkilerde tozlanma ve çiçektozu taşıyıcıları. *Ege Üniversitesi Ziraat Fakültesi Dergisi*, 39(2),151-158.

Özdemir , Ü. (2011). Safranbolu ve safran tarımı. *Doğu Coğrafya Dergisi* , 7(5),297-307.

Şahin, Ö. ve Kılıç, B. (2009). Yiyecek içecek işletmeciliğinde yenilebilir çiçekler. 3.Ulusal Gastronomi Sempozyumu, 17-18 Nisan 2009, Akdeniz Üniversitesi Alanya İşletme Fakültesi, Alanya Meslek Yüksek Okulu, Antalya.

Şimşek , S. (2022). Yûnus Emre Dîvân'ında Çiçek Sembolizmi. *Tasavvuf İlmî ve Akademik Araştırma Dergisi*, 25(49), 29-54.

Yıldırım , O. (2022). Mutfak şeflerinin bakış açısından yenilebilir çiçekler ve konaklama işletmelerinde kullanılma durumu. *Güncel Turizm Araştırmaları Dergisi*, 6(2), 345-368.

Internet References

T.C. Safranbolu Kaymakamlığı (2014). *Safranbolu Safranı* . T.C. Safranbolu Kaymakamlığı : http://www.safranbolu.gov.tr/safranbolu-safrani [Access Date: 15.05.2023].

Türk Patent ve Marka Kuruluşu . (2018). *Türkiye'nin Coğrafi İşaretleri*. Türk Patent ve Marka Kuruluşu : https://ci.turkpatent.gov.tr/ [Access Date: 12.08.2023].

Safranbolu Belediyesi (2020, 10 Eylül). *Safran festivali başladı*. Safranbolu Belediyesi: https://www.safranbolu.bel.tr/haberler/safran-festivali-basladi [Access Date: 25.08.2023].