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DERLEME MAKALE

A Functional Food: Grape Fruits
Fonksiyonel Bir Gıda: Üzüm Meyveleri

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Abstract

While diseases renew themselves by gaining resistance, the importance of healthy nutrition is understood more. The most important food group indicated in a healthy diet is fruit. One of the most important antioxidant-rich food groups is the berry group with purple, blue and red colors and anthocyanins. This fruit group stands out with its unique taste, texture, smell and structure. In the hospitality industry, visuality and taste are attractive factors for customers. Thanks to its health benefits and attractive color, small fruits are produced and exported more and more around the world. This situation encourages the increase of studies to diversify the researches on berry fruits. For this reason, in this study, the health relations and consumption areas of berry fruits were discussed by using the compilation technique, which is one of the qualitative analysis methods. As a result of the literature review, it was seen that current information about mulberry fruits was insufficient. Within the scope of the study, it is recommended to conduct current studies on fruits.

Key Words: *A functional food, berry fruits, chronic diseases, healthy diet.*

Öz

Hastalıklar direnç kazanarak kendini yenilerken, sağlıklı beslenmenin önemi daha çok anlaşılıyor. Sağlıklı beslenmede belirtilen en önemli besin grubu meyvelerdir. Antioksidan zengini en önemli besin gruplarından biri de mor, mavi ve kırmızı renkleri ve antosiyaninleri ile berry grubudur. Bu meyve grubu kendine özgü tadı, dokusu, kokusu ve yapısı ile öne çıkmaktadır. Konaklama sektöründe görsellik ve lezzet müşteriler için çekici faktörlerdir. Sağlığa faydaları ve çekici rengi sayesinde küçük meyveler dünya çapında giderek daha fazla üretilmekte ve ihraç edilmektedir. Bu durum üzümsü meyveler üzerine yapılan araştırmaların çeşitlendirilmesi için çalışmaların artmasını teşvik etmektedir. Bu nedenle bu çalışmada, nitel analiz yöntemlerinden biri olan derleme tekniği kullanılarak üzümsü meyvelerin sağlık ilişkileri ve tüketim alanları ele alınmıştır. Yapılan literatür taraması sonucunda dut meyveleri ile ilgili mevcut bilgilerin yetersiz olduğu görülmüştür. Çalışma kapsamında meyveler ile ilgili güncel çalışmaların yapılması önerilmektedir.

Anahtar Kelimeler: *Fonksiyonel bir gıda, dut meyveleri, kronik hastalıklar, sağlıklı beslenme.*

Introduction

Radiation, heavy metals, herbicides, pesticides and many medications taken for treatment purposes create active oxygen in the body. In this case, active oxygen must be balanced with an antioxidant. In cases where it is not possible to balance, it causes oxidative stress. This situation disrupts the metabolic balance of the body and causes the emergence of chronic diseases known today (Tosun & Yücel, 2003; Phillips & Currow, 2010).

In the treatment of chronic diseases, diets rich in fruits and vegetables known for their high antioxidant properties are recommended (Yang & Xiao, 2013). Fruits have been proven to provide relief from obesity, diabetes, retinal damage, heart, liver, stomach and kidney inflammation, tumors, microbial infection and bone loss (Phillips & Currow, 2010; Helkar, Sahoo & Patil, 2016; Golovinskaia & Wang 2021). In particular, it is known that fruit consumption delays the aging process and is used in various diseases such as cardiovascular occlusion and in the treatment of cancer, rheumatoid arthritis, lung diseases, cataracts, Parkinson's or Alzheimer's disease (Szajdek & Borowska 2008, Radovanović et al. 2013, Yang & Kortesniemi 2015, Golovinskaia & Wang 2021).

Berries are small fruit varieties known for their distinctive taste, structure, smell and texture. Berry fruit varieties (grapes, goji berries, strawberries, raspberries, blackberries, blackcurrants, cranberries, hawthorn, blueberries and rose hips) have become increasingly important over the last decade. Production of the fruit is widely distributed in the Northern Hemisphere. It is also found in the higher parts of the Western Hemisphere. Turkey is the natural range of grape berries and different forms of many species can be found almost throughout the country (Çağlar and Demirci, 2017).

The trend of small fruit cultivation is increasing worldwide, including grapes, strawberries, blackcurrants, currants, cranberries, rose hips, goji berries, blackberries, blueberries and raspberries (Radovanović et al. 2013, Yang and Kortesniemi 2015). In fact, strawberries have been one of the extraordinarily successful crops produced in Egypt. Accordingly, strawberry exports from Egypt increased from 1,200 tons in 1996 to about 5,600 tons in 2001-2002, valued at $22.7 million. Strawberries are a demanded food crop in the US, Canada, Japan and European markets (Maas, 2004; Bayram, Özeker and Elmacı, 2013).

According to TurkStat, strawberry production increased by 18.2% in 2020 and reached 546 thousand tons. In 2021, it was 646 thousand tons. Turkey's strawberry exports by country were 47,912 tons in 2020. In 2021, it was 27,914 tons in January, February, March and April (Ministry of Agriculture and Forestry, 2021). Manisa, Mersin and Denizli provinces rank first in grape production. In the 2020 production period, 4.1 million tons of grapes were produced on 4.2 million decares of land. In the 2019-2020 season, 1.2 million tons of grapes were exported (Ataseven, 2021). New cutting-edge technologies have been introduced in production and exports, leading to rapid advances (Abdel-Mawgoud, 2010).

This study was compiled to evaluate the consumption areas of grape fruits and their health relations. Review technique, one of the qualitative research methods, was used in the research (Baltacı, 2019).

Health Benefits and Consumption Areas of Berry Fruits

Grapes: Grapes (Vitis sp.) are members of the Vitaceae family (Kanellis & Roubelakis-Angelakis, 1993). Vitis includes two subgenera [Euvit (38 chromosomes) and Muscadinia (40 chromosomes)] with a total of about 60 species. The primary centers of species diversity are North America and East Asia. Grapes have spread east into Asia and west into the Mediterranean region (Reisch, Owens, & Cousins, 2012; Williams, Dokoozlian, & Wample, 2018). Histologically, the grape berry is divided into three main parts: the flesh (mesocarp and endocarp), the skin (exocarp) and the seeds. (Figure 1)

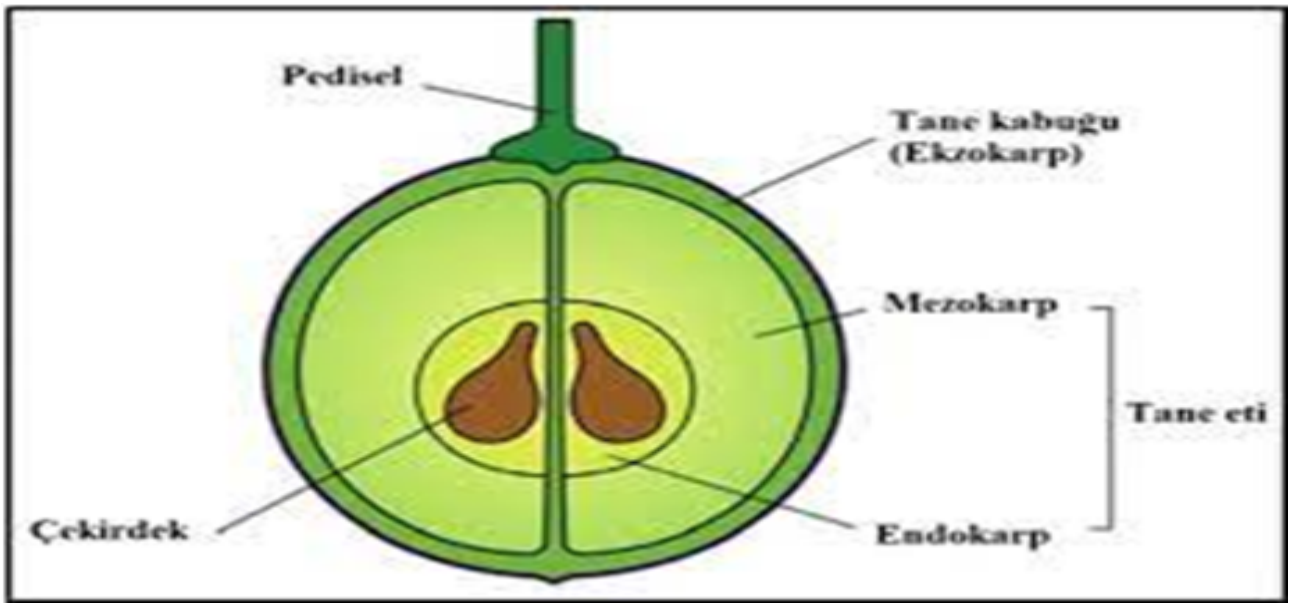

Figure 1. Structure of a grape berry (Conde et al., 2007).

Grapes are grown on about 7.9 million hectares worldwide. Grapes can be consumed directly as fresh, i.e. table and raisins. However, it is also used as vinegar, juice, compote, compote, juice, jam and wine. Grape juice can be concentrated. The ground seeds of grapes can be used in making biscuits, bread and cakes (Reisch, Owens and Cousins, 2012; Williams, Dokoozlian and Wample, 2018). Grapes contain various phytochemicals such as phenolic acids, stilbenes, anthocyanins and proanthocyanidins, which are powerful antioxidants (Van de Wiel, Van Golde & Hart, 2001). With its strong antioxidant activity, grapes inhibit cancer cell proliferation, suppress platelet aggregation and lower cholesterol (Yang & Xiao, 2013).

Strawberry: Widely distributed in the northern hemisphere and also extends southward along the west coast of South America and as far south as Hawaii (Chandler, 2012). The main parts of the strawberry flower: (a) cup; (b) female organ and fruit wall; (c) anther; (d) sepal; (e) petal (Figure 2) (Galetta and Maas, 1990). Botanically, a strawberry seedling is a flower stalk with many seeds embedded on its surface (Poling, 2012). The familiar fleshy red strawberry "fruit" is actually an enlargement of the strawberry flower. The true strawberry fruit is the seed-like achenes carried on it. It is derived from a single female organ and contains a single seed if successfully fertilized (Larson, 2018).

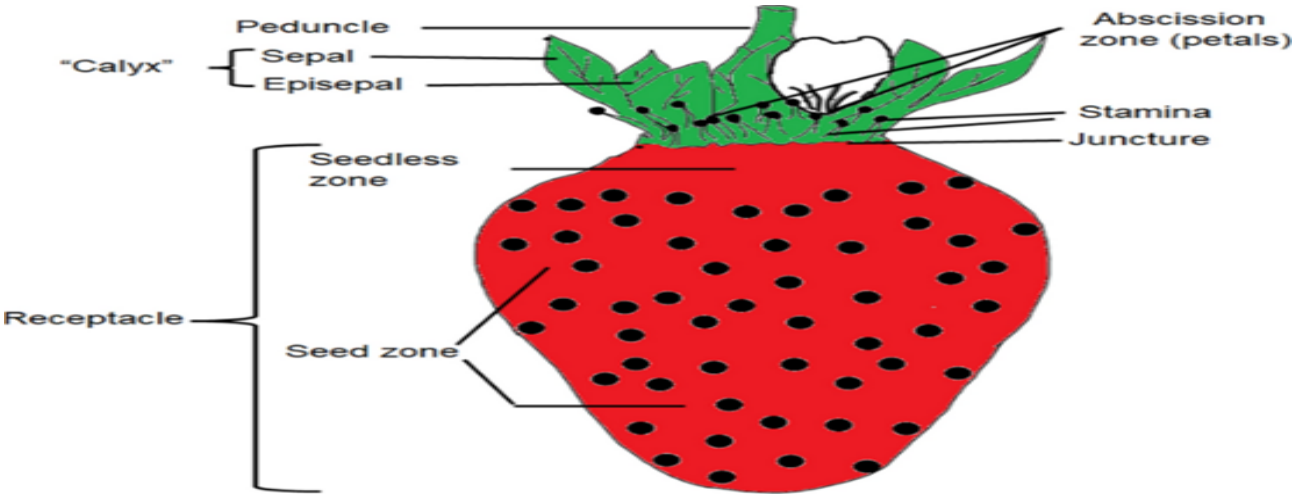

Figure 2. Structure of strawberries (Poling, 2012).

Strawberries can be processed, dried or frozen (Davis, Denoyes-Rothan & Lerceteau-Köhler, 2007). Alcoholic and non-alcoholic drinks or cocktails are made from the fruit. It is used as raw material in the ready-to-eat food industry as jam, marmalade, confectionery, pastry, fruit juice, fruit-flavored soda and canned (Maas, 2004; Bayram, Özeker & Elmacı, 2013).

Strawberry (Fragaria X ananassa, Duch.) is known for its anti-inflammatory effects. They have direct and indirect antimicrobial, anti-allergic and anti-hypertensive properties as well as inhibitory capacity (Giampieri et al., 2012). Strawberry is a fruit rich in minerals, vitamins, anthocyanins, antioxidants, flavonoids and phenolic acids. Pelargonidin 3-glucoside and cyanidin 3-glucoside substances give the fruit its red color. Anthocyanin, which gives strawberry its red color, increases antioxidant capacity. Its anticarcinogenic effect on cancerous cells has been observed (Maas, 2004; Bayram, Özeker and Elmacı, 2013).

Raspberries: Red raspberries contain essential nutrients and beneficial phytochemicals. For this reason, they are a common and important fruit in the Western diet. Anthocyanins and ellagitannins are polyphenolic compounds and major antioxidant phytochemicals found in raspberries. Raspberries are of great importance for human health. The fruit is rich in organic acids. It is recommended for diabetics with limited consumption due to the fruit sugar it contains. Its juice is also useful for those with rheumatism (Rao and Snyder, 2010). Raspberry fruit is processed in the food industries as juice, canned, pastry, jam and cream and is consumed widely. Syrups obtained from raspberries are used in the pastry sector (Ağaoğlu, Çelik and Atilla, 2003; Golovinskaia and Wang 2021). Figure 3 shows a raspberry Figure 3.

Figure 3. Raspberry Figure (Milliyet news, 2023).

Blackberries: Blackberries are consumed both fresh and dried. Blackberries are consumed as marmalade, preserves, cakes, ice cream and the pulp is used as fruit juice and liqueur. The leaves are collected in spring and dried. Dry leaves are boiled and drunk. With the pectin substance it contains, it is used for thickening in pastry and for making jelly in kitchens (Radovanović et al. 2013, Yang and Kortesniemi 2015). Blackberries are rich in minerals, vitamins and organic acids. For this reason, it is very beneficial for human health. These plants cleanse the blood, break down toxic substances in the blood and facilitate the sweating process (Ağaoğlu, 1986; Pehluvan and Güleryüz, 2004). Blackberry syrups are useful for people suffering from respiratory and pectoral diseases (Keipert, 1981, Radovanović et al. 2013, Yang and Kortesniemi 2015). Figure 4 shows an Figure of blackberries.

Figure 4. Blackberry Figure (Blackberry, 2023).

Blackcurrant: Fresh consumption of blackcurrant is relatively small compared to dried consumption. With its taste and odor, it is more suitable for the food industry. It is used in juice, jam, jelly, jelly, concentrate, marmalade, compote, candy, cake, ice cream, wine, fruit extract yogurt, etc. Drinking the leaves by boiling or brewing helps the kidneys to work (Onur et al., 1999; Yang and Kortesniemi 2015). Blackcurrant reduces fatigue due to its inflammatory effect. It is known to be beneficial for human health with its biochemical properties. It helps the intestines to work. It strengthens the gums and prevents bleeding (Onur et al., 1999; Yang and Kortesniemi 2015). Blackcurrant is as shown in Figure 5.

Figure 5. Blackurrant (Habertürk, 2021).

Dogwood: Dogwood is a tree species belonging to Bolu and the surrounding region, known to belong to the dogwood family. The tree grows up to 5-8 m in length. The leaves of the tree are dark green, veins are parallel and hairy along the veins. The small yellow flowers bloom in February-March. The fruits are elliptical in shape and red in color. Cranberry fruit can be consumed fresh or dried, as well as tarhana, sherbet and marmalade. Sandwiches, fish with cranberry, cranberry tarhana, stuffed leaves with cranberry and salad with cranberry are among the dishes made with cranberry fruit (Koca et al., 2006). The Figure of cranberry is shown in Figure 6.

Figure 6. Cranberry (Anadolu News Agency, 2022)

Rosehip: Rosehip is a fruit that has been used in the field of health since ancient times (Çağlar & Demirci, 2017). It is known to be especially good for oral and dental health. In addition, it has been used against diseases related to the digestive system, kidney and gallstones, tapeworm and snake disease. In Turkey, it is generally consumed as tea or marmalade. It is good for joint pains, cholesterol, heart and skin health. The tiliroside antioxidant in its content can help to lose weight (Koca, Koca, & Yolcu, 2008; Çağlar & Demirci, 2017).The picture of rosehip is shown in Figure 7.

Figure 7. Rosehip (Akgün, 2021).

Hawthorn: Hawthorn is a tree from the Rosaceae family that has been growing in the Mediterranean basin for a very long time. It is popularly called hawthorn and barutan (Chang et al., 2002; Fong and Bauman, 2002; Rigelsky and Sweet, 2002; Chang, Dao and Shao, 2005; Dahmer and Scott, 2010). There are more than 50 species of hawthorn fruit. The colors of the fruit vary from red-brown, red, yellow. Hawthorn fruit is consumed both fresh and dried. Its leaves are also utilized (Chang et al., 2002; Fong and Bauman, 2002; Dahmer and Scott, 2010).

Hawthorn *(Crataegus oxyacantha)* is a fruit. It used as an herbal medicine history. Fruit has been used to treat digestive disorders and cardiovascular disorders (Chang et al., 2002; Fong and Bauman, 2002). It is believed to have the ability to increase the integrity of the blood vessel wall and improve coronary blood flow through the action of flavonoids. Clinical studies conducted that it can be used in the treatment of heart failure (Chang et al., 2002; Fong and Bauman, 2002; Rigelsky and Sweet, 2002; Chang, Dao and Shao, 2005; Dahmer and Scott, 2010). The Figure of hawthorn is shown in Figure 8.

Figure 8. Hawthorn Figure (Habertürk, 2023).

Blueberry (Blueberry): Blueberries belong to the genus Vaccinium and subgenus Cyanococcus. In general, long blueberry (HB, V. corymbosum L.) and rabbit's eye blueberry (RB, V. ashei Reade) are recognized as commercially important blueberry species (Yang et al., 2022). Blueberry (Vaccinium sp.), a

fruit crop belonging to the Ericaceae family, is recognized as a storehouse of functional phytochemicals. Its constituents, phenolic acids (caffeic, chlorogenic, ferulic, p-coumaric and cinnamic acids) and flavonoids (anthocyanidins) have been recognized to confer numerous healthful properties (Smith, 2000). Consumer interest in these berries has led to increased food production (Brazelton, 2013; Petal, 2014).

In recent years, numerous studies have been published on the effects of blueberry anthocyanins on the human nervous system (Camire, 2000). These studies have shown that blueberry anthocyanins have positive effects on age-related cognitive impairment, neurodegeneration and memory damage (Norberto et al., 2013).

Blueberries, which are found in Northern Europe and America, are distributed in cool and mountainous areas. The taste is both sour and sweet. It is a purple colored fruit with blue berry flesh. It grows suitable for temperate climate conditions. In Turkey, it is most commonly grown in the Black Sea region (Rowland, Hancock & Bassil, 2016).

Blueberry extracts are widely used in the food and pharmaceutical industries. It can be used dry or wet. In milk and dairy technology; it can be added to kefir, ice cream, milk or yogurt. It can be consumed as jam, marmalade and tea (Rowland, Hancock & Bassil, 2016). An Figure of blue berries is shared in Figure 9.

Figure 9. Blue berries [blueberries] (NtvHaber, 2023).

Goji (Wolfberry): Goji is gaining importance both medicinally and pharmaceutically, and its applications in the food industry are also increasing (Vidović et al., 2022). The genus comprises about 100 species distributed from temperate to subtropical regions. It is thought to be derived from two species, Lycium barbarum L. and L. chinense Mill (Donno et al., 2015).

Lycium barbarum is a perennial deciduous shrub with elliptical orange-red fruits and a sweet-tangy flavor (Jeszka-Skowron et al., 2017). The original region of origin is not precisely determined, but it is thought to be between Southeast Europe and Southwest Asia (Potterat & Hamburger, 2008). The plant is particularly widespread in warm regions such as the Mediterranean, Southwest and Central Asia (Ma et al., 2019).

Lycium chinense is native to China, Tibet, Taiwan and Japan and is widely cultivated in Asia, but is also grown in Europe and the United States. Black goji berries with a special composition and flavor are obtained from the Chinese native species L. ruthenicum Murr (Jeszka-Skowron et al., 2017).

Goji berries have been highly valued in traditional Chinese medicine since ancient times. They have been used as food in raw, dried or processed forms such as tea, juice, wine or liquor. Goji berries are a good source of nutrients such as lipids, proteins, fibers, vitamin C and minerals (Ma et al., 2019). It also contains non-nutritive bioactive compounds such as phenolic compounds, polysaccharides and carotenoids (Wenli, Shahrajabian & Qi, 2021; Vidović et al., 2022). On the other hand, in vitro antioxidant assays, in vivo studies and clinical trials have contributed to the understanding of some health benefits of goji berries (Potterat & Hamburger, 2008; Ma et al., 2019; Wenli, Shahrajabian & Qi, 2021).

Today, goji berries are available on the global food market as food or food supplements. In Italy, goji berries have been added to the list of foods with physiological antioxidant properties by the Ministry of Health and are widely available in food supplements (Jeszka-Skowron et al., 2017). Goji berries are also utilized in a variety of food products, including juice, ice cream, marmalade, sauces, salads and beer, as well as baked goods and dairy products (Potterat & Hamburger, 2008). There is evidence that goji berries can trigger allergic reactions in sensitive individuals, especially in Mediterranean populations (Vidović et al., 2022). Figure 10 shows goji berries.

Figure 10. Wolfberry [Goji] (Hürriyet, 2018).

Conclusion

With the development of technology, individuals have shortened the duration of the routine work they used to do before. Working conditions have improved, leisure time has increased and wages have increased. Throughout history, people have turned to leisure activities in order to satisfy their personal tastes according to the possibilities of the period.

Nutrition, one of the most basic needs of human beings, has ceased to be a need and has become a pleasure (Hatipler, 2017). People strive to spend their remaining time in a quality way. In this sense, the first quality search they apply for is related to food health. Accordingly, spending quality time is achieved by ensuring food safety at the maximum level. With the rapid increase in population, pesticide disposal has become widespread in order to ensure the continuation of fruit production and reduce losses during the harvest phase. The issue of cleaning pesticides puts food safety at risk.

Access to healthy and clean food is becoming increasingly important. Fruits and fruit extracts are known to have important properties (i.e. vitamins, minerals, phenolic acids, flavonoids and anthocyanins) for disease prevention (Szajdek and Borowska 2008, Radovanović et al. 2013, Yang and Kortesniemi 2015, Golovinskaia and Wang 2021). Fruits are among the important food groups that regulate human health. Among these, grape fruits attract attention with their colors and Figures. It can be said that grapes, strawberries, blackcurrants, cranberries, rose hips, blackberries, blueberries and raspberries are among the highly attractive food groups. They are also rich in polyphenolic compounds and major antioxidants.

If the fruits are properly cleaned and balanced consumption is ensured, it has been understood that they have the power to eliminate oxidative stress in the human body caused by pesticide consumption and radiation. In this study, attention was drawn to the health properties of grape fruits. However, a starting point for future studies has been created. As a result of the literature review, it was seen that current information about berry fruits is insufficient. Within the scope of the study, it is recommended to carry out current studies on berries.

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