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Compositional Quality and Health Benefits of Olive Oil (Review Article)

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ABSTRACT

The purpose of this paper is to introduce and discuss the most important components affecting olive oil quality and to overview the effect of those compounds on nutrition and human health. It is well accepted that the high mono-unsaturation of olive oil and the presence of several other constituents such as polyphenols and tocopherols, chlorophylls, sterols, squalene and others exhibit a significant role on the health. Olive oil, as a highly monounsaturated oil, is resistant to oxidation. Also the presence of phenols, tocopherols and other natural antioxidants prevent lipid oxidation within the body eliminating the formation of free radicals which may cause cell destruction. The flavour compounds of olive oil, as well as the chlorophyll and pheophytin pigments, increase the stomach secretion and facilitate the absorption of the natural antioxidants, which furthermore protect the body tissues from oxidation. Epidemiological studies suggest that the high consumption of the monounsaturated olive oil in Mediterranean Countries is related with the low rates of cardiovascular heart disease (CHD), cancer and of high life expectancy.

INTRODUCTION

There are several ways of defining olive oil quality and perhaps there is no single universal definition that adequately satisfies all situations. In general terms, quality is defined as "The combination of attributes or characteristics of a product that have significance in determining the degree of acceptability of that product by the user" (Gould, 1992). Olive oil quality may be defined from compositional quality, nutritional or organoleptic perspectives (Duran, 1990). The nutritional value of olive oil arises from high levels of oleic acid and minor components, such as phenolic compounds. The International Olive Oil Council (IOOC, 2004) and the EEC (EC, 1991) have defined the quality of olive oil, based on parameters that include free fatty acid (FFA), peroxide value (PV), UV specific extinction coefficients (K_{232} and K_{270}) and sensory score. Some parameters that are not included in the IOOC and EC standards, such as phenolic compounds, are known to have a significant effect on the stability and nutritional value of olive oil. The phenol profile can be followed from the fruit to the oil production and through storage, and may serve as a good indicator of olive oil quality. Indeed, there have been proposals to include phenols in the olive oil standard (Blekas *et al.*, 2002 and Psomiadou *et al.*, 2003).

Therefore, the minor components (pigments, polyphenols, tocopherols, sterols and squalene), commonly known as the unsaponifiable matter, which play an important role in olive oil quality are discussed in this paper. Moreover, nutritional value and the beneficial health effects of olive oil are reviewed.

1. COMPOSITIONAL QUALITY OF OLIVE OIL

Olive oil is considered to be resistant to the oxidation because it is low content of polyunsaturated fatty acids and the presence of natural antioxidants such as α-tocopherols, carotenoids and phenolic compounds (Ryan *et al.*, 1999 and Mailer, 2006).

1.1. Chlorophylls and carotenoids

Colour can be an important factor to the consumer when purchasing the product such as olive oil. Chlorophylls and carotenoids are the pigments responsible for the colour of virgin olive oil (Minguez-Mosquera *et al.*, 1990 and 1992). Chlorophyll pigments are known to be responsible for the green hues present in the oil. Total chlorophylls in olive oil ranged from 10 to 50 ppm and it does include chlorophyll a and b as well as pheophytin (a derivative of chlorophyll). Chlorophyll pigments are important in the stability of olive oil; they act as pro-oxidants in the presence of light, and antioxidant when the oil is stored in the dark (Salvador *et al.*, 1998). The antioxidative behaviour of chlorophyll in darkness is not well understood. It is believe that chlorophyll probably acts by quenching free radicals. These compounds can undergo oxidation under certain conditions, being degraded to uncoloured products. Many reports have shown that the inactivation of enzymes such as peroxidases, lipases and lipoxygenases prevents colour changes associated with the conversion of chlorophylls to pheophytins. The colour of olive oil could be affected by the absence or presence of this type of oxidation enzymes during ripening and storage period of the fruit (Boskow, 1996).

Carotenoids protect cells against the effect of light, air and such pigments having the ability to quench excited sensitizer molecules as well as quench singlet oxygen and can also serve as antioxidants under certain conditions rather than the photo-sensitization (Krinsky, 1989).

Minguez-Mosquera *et al.*(1990) shown that as the harvesting time of the olive fruits increases, pigment content decreases. They mentioned that chlorophyll and carotenoids can undergo oxidation under certain conditions, being degraded to uncoloured products.

Roca and Minguez-Mosquera (2001) found that during ripening, the concentration of chlorophylls decreased continuously in all varieties, concomitant with the increase in anthocyanin pigmentation. In the different varieties, chlorophylls always disappeared more rapidly than carotenoids.

Changes in chlorophyll and carotenoid pigments of five olive (Olea europaea L.) varieties destined for milling were investigated at six consecutive ripening stages by Roca and Minguez-Mosquera (2001). There was a manifest dependence between olive variety, moment of picking, and chloroplast pigment composition of the fruits. Although the content of chlorophylls and carotenoids differed with fruit variety, ripening always involved their gradual loss, which became more pronounced with increased presence of anthocyanin compounds. The relative rates of disappearance of chlorophylls and carotenoids were markedly different between varieties, implying that the catabolism of these pigments takes place at a relative rate inherent to each variety. In the five varieties studied, lutein was the lowest carotenoid to be degraded, so that its percentage in the fruits increased with ripening, whereas β-carotene was the fastest to disappear. In ripe fruits covered with anthocyanins, chloroplast pigments were retained in both skin and pulp, with the rate of disappearance being much higher in the latter.

Two varieties of olive fruit (Arbequina and Farga) have been characterized by their contents and types of chlorophyll and carotenoid pigments during the olive ripening (Criado *et al.*, 2007). All the pigments that were found in the fruit were transferred to the oils, in addition to derivative pigments associated with acidic medium in the oil extraction process. The destruction of the chlorophyll fraction was greater than of the yellow pigments during the olive oil extraction process.

1.2. Polyphenols

Over the past decade, phenolic compounds have attracted a great deal of attention in food quality because of their antioxidant property for food stability. Phenolic compounds, which are considered to be the main antioxidant compounds in virgin olive oil, are able to donate a hydrogen atom to the lipid radical formed during the propagation phase of lipid oxidation (Shahidi & Wanasundara, 1992). Virgin olive oil contains a considerable amount of polyphenols that have a great effect on both the stability and the sensory and nutritional characteristics of the product (Montedoro *et al.*, 1992, Tsimidou *et al.*, 1992 and Tovar *et al.*, 2001). Oil stability has been correlated not only with the total amount of phenolic compounds, but also with the presence of the selected phenols (Baldioli *et al.*, 1996 and Gennaro *et al.*, 1998). The antioxidant properties of phenols are mainly due to their redox properties, which allow them to act as reducing agents, hydrogen donators and singlet oxygen quenchers (Rice-Evans *et al.*, 1995).

Among the natural antioxidants present in olive oil, the most important class is polar phenolic compounds, such as 4-hydroxyphenylethanol (tyrosol), 3,4-dihydroxyphenylethanol (hydroxytyrosol), caffeic acid and other phenolic acids, as well as a number of unidentified esters and glycosides (Chimi *et al*, 1988; Montedoro *et al.*, 1992; Tsimidou *et al.*, 1992). The level of total phenols varies from 25 to 440 ppm expressed as caffeic acid (Papadopoulos and Boskou, 1991, Fedeli and Cortesi, 1993). The activity of each phenol has been measured at various levels of addition (15-200 ppm) in refined olive oil (Nergiz, 1991; Papadopoulos & Boskou, 1991), but it is difficult to understand completely the contribution of each individual antioxidant to the overall stability of virgin olive oil.

Servili *et al.* (1996) identified three new phenolic compounds (3,4-DHPEA, 3,4-DHPEA-EDA and 3,4-DHPEA-EA) as the most important phenolic compounds in virgin olive oil. Their results cleared that these three compounds showed high antioxidant activity and when these compounds were in association with α-tocopherol they had a synergistic effect. On the other hand, they found that sunlight reduced the antioxidant activity of these phenolic compounds.

The most abundant phenolic compound in virgin olive oil is mainly aglycones derived from oleuropein and secoiridoid compounds present in olives. These newly formed substances are polar compounds that are partitioned between the oily layer and the vegetation water, being more concentrated in the latter fraction because of their functional groups. Secoiridoid derivatives play an important role in oil stability; this has already been evaluated and shown to extend the shelf-life of olive oil (Baldioli *et al.*, 1996, Angerosa *et al.*, 1996 and Gennaro *et al.*, 1998).

Caponio *et al.* (2001) investigated the influence of olive crushing temperature on phenols in olive oils. Their results showed that temperature influenced the diffusion of phenolic compounds in oil. They found high amounts of hydroxytyrosol, tyrosol, caffeic acid, hydroxycaffeic acid and oleuropeine in olive oils.

McDonald *et al.*(2001) fractionated the phenolic component of freeze-dried olive fruit by high-performance liquid chromatography using ultraviolet, atmospheric pressure chemical ionization (APCI) and electrospray ionization (ESI) detection. Significant antioxidant activity was seen in most olive fractions and this was related to phenolic content. The kinetics of the oxidation process is complex and suggests that multiple pathways may be involved at different antioxidant concentrations.

It has long been known that the levels of phenols in olive oils can be influenced by the cultivar (Brenes *et al.*, 1999), the degree of maturation (Cinquanta *et al.*, 1997), and the industrial processes employed for oil extraction, as well as environmental conditions (Motilva *et al.*, 2000). Water stress could influence not only the total amount of phenolic compounds in the oil put also their profile, and therefore both the organoleptic properties and the antioxidant capacity of the product.

As olive fruits on the tree grow during the season, the content of polyphenols gradually increases and reaches a maximum level just as the fruit skin begins to change colour (veraison). As the fruit matures and colors fully all the way to the pit, the content of polyphenols and most of the other flavor components of the fruit decline very rapidly (over about 2-5 weeks). Oil quality, therefore, is very strongly tied to fruit maturity (Motilva *et al.*, 2000).

Tovar *et al.*(2001) showed that linear irrigation strategy changed the profile of oil phenolic compounds, both the organoletic properties and the antioxidant capacity of the product were affected, as these are correlated to the contents of some phenolic compounds in the oil.

Badawy and Bassiuny (2001) evaluated phenolic components and tocopherols in virgin olive oil during ripening of olive and storage of oil. Tocopherol, hydroxytyrosol, tyrosol, vanillic acid, p-hydroxyphenyl acetic acid and caffeic acid were separated and determined by HPLC for two varieties of olive oil (Picual and Kronakii). Olives were harvested at different stages of ripeness and the oil was extracted by pressure system. Stability of the extracted oil for 12 months storage period at room temperature in the dark has been evaluated. Phenolic components and tocopherols has been affected by stage of ripening of oil and during the storage of oil. Hydroxytyrosol, tyrosol and vanillic acid were decreased, while p-hydroxyphenyl acetic acid and caffeic acid were increased during ripening of olive oil. The maximum concentration of total polyphenol corresponds to the moment in which the olive is at the first stage in the two varieties. During storage, total polyphenols were decreased and tocopherol showed the same trend during ripening and storage. The quality of hydroxytyrosol and tyrosol were increased during storage up to a maximum after 6 months, and then decreased.

1.3. Tocopherols

α- Tocopherol is traditionally considered as the major antioxidant of olive oil. It comprises about 90 % of the total tocopherols of this oil and its natural concentration varies between a few ppm up to 300 ppm (Coors, 1991). α-Tocopherol is a primary antioxidant for many substances, although a pro-oxidant effect at different levels of addition has also been demonstrated (Schuler, 1990). The addition of α- and γ- tocopherols in refined olive oil is beneficial for the stability of the oil (Juillet, 1975 and Pogracz, 1984).

Blekas *et al.* (1995) studied the role of α-tocopherol in olive oil and the extent to which the presence of polar phenolic antioxidants at realistic concentrations affected this activity. The effect of 100, 500 and 1000 ppm of α-tocopherol on the oxidative stability of purified olive oil kept in the dark at 40 °C was studied. Purified olive oil was prepared by liquid column chromatography and was practically devoid of minor constituents with possible pro-oxidant or antioxidant activity. α-Tocopherol acted as antioxidant al all levels of addition, although the antioxidant effect was greater at 100 ppm than higher concentrations. In the initial stage of autoxidation a slightly pro-oxidant effect was observed.

In the presence of strong antioxidants naturally occurring in olive oil, such as *orth-*

diphenols, α-tocopherol did not show any significant additional antioxidant effect during the period of low peroxide accumulation.

Tocopherols can act as antioxidants by two primary mechanisms, a chain-breaking electron donor mechanism, in which they donate their phenolic hydrogen atom to lipid free-radicals and a chain-breaking acceptor mechanism, which includes single oxygen scavenging or quenching; this inhibits the oxidation induced by electronically excited single oxygen (Kamal-Eldin & Appelqvist, 1996). The concentration of tocopherols in the oil showed a significant changes during the various stages of maturity, where this concentration has been considered as a minimum value in fresh virgin olive oil as stated by Rahmani *et al.* (1997).

1.4. Squalene and sterols

Squalene, an intermediate compound in the biosynthesis of sterols in plant and animal world, is the major olive oil hydrocarbon. It makes up more than 90 % of the hydrocarbon fraction (Perrin, 1992; Lanzon *et al.*, 1994) ranging from 200 to 12000 mg/kg oil. Squalene content depends on olive cultivar (De Leonardis *et al.*, 1998; Manzi *et al.*, 1998), oil extraction technology (Nergiz and Engez, 2000), and it is dramatically reduced during the process of refining (Lanzon *et al.*, 1994).

Squalene is regarded as partially responsible for the beneficial effect of olive oil against certain cancers. Studies suggested that squalene posses chemopreventive activity against some types of cancer (Smith *et al.*, 1998). More attention has been paid on the *in vivo* squalene role as one of the major human skin lipids. Under sunlight exposure, it was found to be the first target lipid on human skin surface acting as an effective quencher for singlet oxygen (Kohno *et al.*, 1995).

Little is known for the contribution of squalene to the oxidative stability of olive oil or other edible oils and fats. Some data have been reported for its antioxidant activity on the heat stability of refined rapeseed oil and two model lipid systems at 170 °C for 10 h (Malecka, 1991). Their observations based on the measurement at high levels of peroxide accumulation or the reduction of fatty acid levels seems not very helpful in autoxidation studies.

The role of squalene in olive oil stability was studied for various concentrations and experimental conditions. No effect was found in iduction periods of olive oil at elevated temperatures using the Rancimat apparatus. Samples were then stored at 40 and 62 °C in the dark, and the extent of oxidation was followed by periodic measurements of peroxide value, and conjugated dienes. A concentration dependent moderate antioxidant activity was evidenced which was stronger in the case of olive oil compared to that found for sunflower oil and lard. In the presence of α-tocopherol (100 mg/kg) and caffeic acid (10 mg/kg), the contribution of squalene (7000 mg/kg) was not significant. The weak antioxidant activity of squalene in olive oil may be explained by competitive oxidation of the different lipids present which leads to a reduction of the oxidation rate. Squalene plays a rather confined role in olive oil stability even at low temperatures (Psomiadou and Tsimidou, 1999).

In a study on the content of minor constituents of Italian olive oils, derived from olives of six cultivars and different degrees of ripeness (Manzi *et al.*, 1998), it was found that squalene loss during storage of oil samples in the dark was greater than that of α-tocopherol. This was attributed to a possible regeneration of α-tocopherol from squalene implying thus an antioxidant activity of this highly unsaturated hydrocarbon.

De Leonardis *et al.*(1998) have confirmed the possibility of determining the amount of squalene in olive oils simultaneously with the fatty acid determination by using gas liquid chromatography. There was a significant amount of squalene in the virgin olive oils; the mean concentration was 342 ± 134 mg/ 100 g of oil. Squalene was varied considerably in relation to cultivar and olives ripeness, the amount of squalene decreased in the oils with ripening.

Changes in the unsaponifiable sterol fraction of virgin olive oil have been reported during fruit ripening (Malta and Benzo, 1972, Amelotti *et al.*, 1973, Camera *et al.*, 1975 and Tiscornia *et al.*, 1978). In general, the sterol fraction did not vary substantially, except for a significant increase in Δ-5-avenasterol that coincided with the highest oil content in the fruit. Sitosterol declined during the period. Gutierrez *et al.*(1999) have shown that the percentage increase in Δ-5-avenasterol was inversely related to the decrease in sitosterol. During the phase of oil formation, there was no significant variation in the total sterol content. The oil obtained from fruit picked in the first stage of ripeness contained a greater amount of sterols than that obtained in the last stage.

The antioxidative effect of unsaponifiable matter from olive oil deodorizer distillate on the stability of sunflower oil during frying and on the quality of potato chips was studied by Abdalla (1999). The addition of 1% of unsaponifiable matter to sunflower oil showed the highest effect in retarding the oxidation deterioration of oil during frying of potato chips. This protective effect was attributed to high levels of squalene (773.8 g/kg unsaponifiable matter), Δ-avenasterol (10.4 g/kg unsaponifiable matter) and tocopherols (49.4 g/kg unsaponifiable matter) found in unsapoifiable matter of olive oil deodorizer distillate.

Camera *et al.*(1987) showed that the oil obtained from olives stored at ambient temperature for different intervals contained high stigmasterol (with values equal to or higher than that of campesterol), and total sterol content. Marianni *et al.*(1991) found that total sterol content varied more in the oils obtained from olives stored for different periods than in those obtained at different ripeness stages.

Composition of the sterol fraction, fatty acid, acidity, and the sensorial evaluation of virgin olive oils were studied in two eastern Spanish varieties grown and processed under the same conditions. Fruits were stored at 5 °C and ambient temperature for different times. During fruit storage, there was no significant variation ($P = 0.05$) in fatty acid composition. However, the sterol composition of the oil varied markedly (in particular, there was an increase in stigmasterol), acidity increased, and there was a very significant decrease in sensorial quality. The stigmasterol content presented a high correlation with the acidity and sensory evaluation. The total sterol content increased gradually with olive storage time. Oils with stigmasterol greater than campesterol are graded to a low level as lampant (Gutierrez et al., 2000).

Atta and Ahmed (2005) published that antioxidants content and the stability of olive oil were higher from unripe olives harvested at mid September than from ripe ones harvested at late October. Total polyphenols and α-tocopherols recorded significant decrease as a result of the ripening as well as the infestation of fruits by olive fly. Unsaponifiable matter decreased through ripening showing highest levels for harvested fruit by mid September (1.55%) and decreased to less than 1.37% by late October.

The composition and antioxidant activity of total sterols in extra virgin olive oils obtained with different extraction technologies from olives harvested at two ripening stages, were studied by (Cercaci et al., 2007). The antioxidant activity was evaluated with an oxidative stability instrument (OSI), by using a model system (made of a mixture of treated/untreated commercial refined peanut oil) enriched with the total sterol fractions of the extra virgin olive oils. No correlation was found between the OSI time and the extraction technologies, the ripening stages or the actual amount of sterols added. No significant differences were observed in the percent composition of sterols of extra virgin olive oils produced with different technologies during the same harvesting period. The latter, however, had a significant effect on the percent of β-sitosterol and Δ-5-avenasterol in extra virgin olive oils produced with the same technology.

2. HEALTH BENEFITS OF OLIVE OIL

Olive oil is one of the edible fats most highly prized by Mediterranean people because it can be consumed without any refining process and thus retains its natural flavour and aroma. It also has highly-appreciated nutritional characteristics thanks to its balanced fatty acid composition. The beneficial health effects of olive oil are due to both its high content of monounsaturated fatty acids and its high content of antioxidative substances such as tocopherolls, carotenoids and phenolic compounds (Visioli & Galli, 1998).

The accumulation of free radicals, as a result of oxidation in the body, causes serious problems on human health. More specific, free radicals destroy the polyunsaturated fatty acids of the membranes and the DNA, which facilitates the aging process, causes damage to the liver and even cancer formation. A constant high olive oil intake in the diet, especially extra virgin olive oil rich with free radical scavengers, provides a constant supply of antioxidants as tocopherols and phenolic compounds. These may reduce oxidative stress through inhibition of lipid peroxidation, a factor that is currently linked to a host of diseases such as colon, breast and skin cancer, coronary heart disease and aging by inhibiting oxidative stress (Willett, 1990 and WHO, 1990).

On the study of the assimilation of olive oil from the human body, it has been found that olive oil is greatly assimilated by the human body. The assimilation by the body is mainly attributed to the high percentage of triolein. Also, the pigments chlorophyll and pheophytin and the aroma components present, facilitate its absorption from the human body.Olive oil is very well tolerated by the stomach. In fact, olive oil's protective function has a beneficial effect on ulcers and gastritis. Olive oil activates the secretion of bile and pancreatic hormones much more naturally than prescribed drugs. Consequently, it lowers the incidence of gallstone formation (Viola, 1997).

Olive oil contains a high percentage of the monounsaturated oleic acid. Thus, it is natural monounsaturated oil. This particular fatty acid reduces LDL-cholesterol, which is responsible for the formation of the atherosclerotic plaque, and increases the HDL-cholesterol. The latter is removed from arterial cells (Nicolaiew *et al.*, 1998). Some studies have proven that olive oil offers protection against heart disease by controlling LDL ("bad") cholesterol levels while raising HDL (the "good" cholesterol) levels. Studies have shown that people who consumed 25 milliliters (about 2 tablespoons) of virgin olive oil daily for 1 week showed less oxidation of LDL cholesterol and higher levels of antioxidant compounds, particularly phenols, in the blood (Visioli *et al.*, 1995). Moreover, scientists have identified a compound in olive oil called oleuropein which prevents the LDL cholesterol from oxidizing. It is the oxidized cholesterol that sticks to the walls of the arteries and forms plaque. Recently, Torre-Carbot (2007) published that olive oil phenolic metabolites are able to bind LDL strengthens claims that these compounds act as *in vivo* antioxidants.

Unlike other fats, which are associated with a higher risk of colon cancer, olive oil helps protect the cells of the colon from carcinogens. Spanish researchers suggest that including olive oil in diet may also offer benefits in terms of colon cancer prevention. Their study results showed that rats fed diet supplemented with olive oil had a lower risk of colon cancer than those fed safflower oil-supplemented diets. In fact, the rats that received olive oil had colon cancer rates almost as low as those fed fish oil, which several studies have already linked to a reduction in colon cancer risk. Olives contain up to 16 g/kg typified by acteosides, hydroxytyrosol, tyrosol and phenyl propionic acids. Olive oil, especially extra virgin, contains smaller amounts of hydroxytyrosol and tyrosol, but also contains secoiridoids and lignans in abundance. Both olives and olive oil contain substantial amounts of other compounds deemed to be anticancer agents (e.g. squalene and terpenoids) as well as the peroxidation-resistant lipid oleic acid. It seems probable that olive and olive oil consumption in southern Europe represents an important contribution to the beneficial effects on health of the Mediterranean diet (Owen *et al.*, 2004 and Quiles *et al.*, 2006).

There is a low incidence of skin cancer among Mediterranean populations, and olive oil consumption could be a contributing factor to this low cancer rate. Olive oil contains significantly higher amounts of squalene than seed oils, and squalene is to a large extent transferred to the skin (Kohno *et al.*, 1995). German researchers believe that this transfer mechanism is probably accomplished by scavenging singlet oxygen generated by ultraviolet light. Japanese scientists also claim that virgin olive oil applied to the skin after sunbathing could protect against skin cancer by slowing tumor growth (Quiles *et al.*, 2006).

A study published in the January 2005 issue of Annals of Oncology has identified oleic acid, a monounsaturated fatty acid found in olive oil, as having the ability to reduce the affect of an oncogene (a gene that will turn a host cell into a cancer cell). This particular oncogene is associated with the rapid growth of breast cancer tumors. The conclusion of the researchers was that oleic acid when combined with drug therapy encouraged the self-destruction of aggressive, treatment-resistant cancer cells thus destroying the cancer. Olive oil has been positively indicated in studies on prostate and endometrial cancers as well (IOOC, 2004).

Diabetics or those at risk for diabetes are advised to combine a low-fat, high-carbohydrate diet with olive oil. Studies show this combination is superior at controlling blood sugar levels compared to a diet that consists entirely of low-fat meals. Adding olive oil is also linked to lower triglyceride levels. Many diabetics live with high triglyceride levels which put them at risk for heart disease (IOOC, 2004).

The body uses the healthy fats in olive oil to produce natural anti-inflammatory agents. These anti-inflammatory agents can help reduce the severity of both arthritis and asthma. Uninflammed cell membranes are more fluid and better able to move healthy nutrients into the cells and move waste products out. A lower incidence of osteoporosis and dementia is found in areas where people consume large quantities of olive oil (Monti *et al.*, 2001).

CONCLUSION

In conclusion, oleic acid and mainly the unsaponifiable fractions of olive oil, such as polyphenols, tocopherols, chlorophylls, carotenoids, squalene and sterol components, exhibit a high nutritional and biological value, resulting in good human health.

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الملخص العربى

الجودة التركيبية والفوائد الصحية لزيت الزيتون

(بحث مرجعى)

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من المعروف أن حمض الأولييك oleic acid المتواجد بنسبة مرتفعة فى زيت الزيتون وبعض المركبات الأخرى المتواجدة بنسبة ضئيلة والتى تم التعرف عليها مثل polyphenols, tocopherols, chlorophyll, carotenoids, sterols and squalene وبعض المركبات الأخرى غير المعروفة تلعب دوراً رئيسياً فى تحديد جودة زيت الزيتون وكذا أهميتة التغذوية والصحية. ونظراً لإحتواء زيت الزيتون على نسبة مرتفعة من حمض الأولييك ونسبة منخفضة من الأحماض الدهنية عديدة عدم التشبع مثل اللينولييك linoleic واللينولينيك linolenic لذا فإن زيت الزيتون يكون ذو ثبات عالى ومقاوماً للأكسدة بجانب وجود الفينولات والتوكوفيرولات ومضادات الأكسدة الطبيعية الأخرى والتى تعمل على منع أو تثبيط أكسدة الدهون داخل الجسم وتقلل من تكوين الأصول الحرة والتى قد تتسبب فى تدمير خلايا وأنسجة الجسم. أوضحت نتائج العديد من الدراسات أن مركبات النكهة فى زيت الزيتون وكذا الكلوروفيل تزيد من الإفرازات المعوية فى المعدة وتساعد على إمتصاص مضادات الأكسدة الطبيعية المتواجدة فى زيت الزيتون والتى تؤدى الى حماية أنسجة وخلايا الجسم من الأكسدة. كما أوضحت الدراسات الطبية المختلفة أن إستخدام زيت الزيتون بنسبة مرتفعة فى دول البحر الأبيض المتوسط مرتبط تماماً بانخفاض معدلات الأمراض القلبية والسرطانية وإرتفاع معدلات الأعمار. لذا فإن الهدف من هذا البحث المرجعى هو التركيز على أهم المركبات التى تؤثر على جودة زيت الزيتون ومعرفة مدى تأثير تلك المركبات على التغذية وصحة الإنسان وذلك من خلال أحدث المنشورات والبحوث التى أجريت فى هذا المجال.