



In the ancient world, virgin olive oil was called “liquid gold” by Homer and “the great healer” by Hippocrates. Why has this mythic image been forgotten?



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ABSTRACT

The ancient Greeks said that the goddess Athena had created the olive tree. King David hired guards to protect Israel's olive groves and warehouses. Ancient peoples used olive oil not just for consumption and cooking, but also as perfume, anointment for the dead, soap, and lights. In ancient Greece, athletes ritually rubbed it all over their bodies. It has been the fountain of great wealth and power, anointing the noblest of heads throughout history. Olive oil was used to produce both medicine and cosmetics: Hippocrates called it “the great healer” and Homer “liquid gold”, Galen praised it for its positive effects on health. Currently, by contrast with its history, the Spanish Olive Oil Agency (AAO) surveys has revealed that prices paid to olive growers have been excessively low in recent seasons and have not managed to cover their production costs. This situation is apparently inexplicable considering the exclusive well-known nutritional and sensory properties of virgin olive oil. The reasons could rely on the broad and unenforced standards for extra virgin olive oil in the consumer market, which allows a wide range of olive oil qualities to be marketed as extra virgin. As a result, many consumers are unable to distinguish quality differences and gravitate toward less costly extra virgin olive oils.

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Dear Editor,

I read with great interest the article by [Santosa, Clow, Sturzenberger, and Guinard \(2013\)](#) “Knowledge, beliefs, habits and attitudes of California consumers regarding extra virgin olive oil,” which appeared online on 31 July 2013, in the web site of the journal “*Food Research International*”.

In this interesting paper, Dr. Santosa and co-workers presented a combination of qualitative and quantitative methods to gain an understanding of the relevant factors affecting purchase and consumption behavior for extra virgin olive oil (EVOO) among American consumers living in Northern California.

They established that to grow the consumption of EVOO, consumers must be informed about the nature, properties and styles of EVOOs that are ‘extra virgin’. Consumers also need to be educated about the variety of flavors (including, potentially, bitterness and pungency) to encourage greater appreciation for them when incorporating EVOO in their food consumption as well as to expand their culinary knowledge to encourage broader and more versatile applications of EVOO outside their normal cooking and eating practices. They also recognized that producers of EVOO need to provide specific information on the health benefits of EVOO consumption and the bioactive components responsible for them (antioxidants, monounsaturated fatty acids, etc.) on their

product labels to raise awareness among consumers of the nutritional aspects of their products.

We agree with their conclusions; moreover, we think that the conclusions they reached for American consumers living in Northern California can be extended to other non-producer countries of EVOO and, to a certain extent, to traditional producer countries.

We believe that a strong effort should be made by the producers to inform consumers about all the extraordinary aspects that characterize authentic EVOO and by public authorities to reduce market failures generated by unbalanced market power along the EVOO supply chain and by asymmetric information on the consumer market.

In fact, Spanish Olive Oil Agency (AAO) surveys have revealed that producer prices have been excessively low in recent seasons and have not managed to cover the production costs of olive growers ([International Olive Council - IOC, 2013](#); [MAPA, 2010](#)). One of the main reasons behind this trend is the unbalanced market power distribution among production stages of the EVOO supply chain and its effects on price formation and transmission. While the olive growing (farmers) and olive crushing (mills) activities are very fragmented, the bottling industry and the retail sector are becoming more and more concentrated and multinational, which allows the latter two to exert market power. This structural feature of the EVOO supply chain affects the price formation and transmission, with negative effects on price paid to olive growers and on their revenue ([Anania & Pupo D'Andrea, 2008](#); [De Gennaro, Medicamento, & Roselli, 2009](#)). Strict and effectively implemented and promoted protection schemes for

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geographical indications are possibly the best way to make EVOO producers increase their market power within the supply chain and capture the value consumers attach to specific origins.

Another important reason behind the negative trend of EVOO producer price relies on the market failure associated with the supply of high-quality goods under asymmetric information (Akerlof, 1970). In his seminal work, Akerlof analyzes a market for a product where sellers are better informed than buyers about the quality of the good, explaining how private asymmetric information may lead to the malfunctioning of markets (adverse selection of firms). This is what occurs in the EVOO market. In the crowded heterogeneous EVOO supply, information asymmetries are particularly problematic given the abundance and importance of credence and experience attributes the consumers have to evaluate. As a result, effective quality standards and labeling norms for EVOO are critical to help ensure that consumers can correctly match with products, enable producers to adapt production to meet consumer demands and expectations, and promote social or political economy objectives (e.g. health outcomes, growth in desirable sectors, increased exports) (Menapace, Colson, Grebitus, & Facendola, 2011).

In the U.S. market, current standards for EVOO are widely unenforced and allow a wide range of EVOO qualities to be marketed as extra virgin. In addition, broad and unenforced standards can lead to adulterated and mislabeled product, weakening the competitiveness of high-quality EVOO producers (adverse selection). Within this market context, many U.S. consumers are unable to distinguish quality differences and, as a result, gravitate toward less costly EVOOs, giving an advantage to large bottlers that sell low-cost imported product (USITC, 2013). Similar circumstances can be found in other non-producer (e.g. Canada) and producer countries (e.g. EU countries). Despite the European policy on EVOO having evolved over the last 30 years, it is now strongly focused on improving the quality of the final product, further efforts are needed in order to guarantee an exhaustive labeling and effective product traceability and quality segmentation (Cicia, Del Giudice, & Scarpa, 2005).

In the ancient world, olive oil was a sacred and precious food as many sources testify: the ancient Greeks said that the goddess Athena had created olives (Håland, 2012); Saul, the first King of Israel, was anointed with olive oil when he was crowned king. Later, both King Solomon and King David placed great importance on the olive tree, and King David even had guards watch over the olive groves and warehouses (Antol, 2004). Ancient peoples used olive oil not just for consumption and cooking, but as perfume, anointment for the dead, soap, and lights (Grigg, 2001). In ancient Greece, athletes ritually rubbed it all over their body. It has been the fountain of great wealth and power, anointing the noblest of heads throughout history (Boardman, Kenyon, Moynahan, & Evans, 1976). Olive crowns and olive branches were ritually offered to powerful figures (Harrison, 2003) and olive oil was used to produce both medicine and cosmetics: Hippocrates called it “the great healer” and Homer “liquid gold”, Galen praised it for its positive effects on health. The olive tree has long been the symbol of peace dating back to 5000 B.C. Olive oil was considered a luxury in ancient Greece (Boulanger, 1985; Foxhall & Forbes, 1982).

So, we would like to ask ourselves and others: Is it possible to restore the deserved luxury image for EVOO? This step seems to be essential to restore the right price useful to cover production costs and to guarantee the right income for the producers. Does EVOO have all the characteristics needed to again be considered a luxury food?

Through deductive analysis, the answers to these questions could be found in the conditions because a food is considered a “luxury food” if they meet the following criteria:

- a) Luxury products must be given to those who buy the perception of being of excellent quality with proven health properties (Garvin, 1984).
- b) Luxury products are, by definition, not ordinary but rather a rarity (Heine & Phan, 2011), so their value is related to this concept.

- c) The manufacturing of a luxury product requires considerable effort (Vickers & Renand, 2003).
- d) The extraordinariness may also arise from the product's history or its manufacturing process (Piron, 2000).
- e) Luxury products have a superior functionality (De Barnier, Rodina, & Valette-Florence, 2006); it satisfies not only the basic needs of the consumer but also its hedonistic needs: it is able to stimulate all the senses of those who buy it.
- f) The price is a major indicator of quality and therefore also of prestige (Keller, 2009).

Let's analyze their meaning applied to the EVOO sector.

- a) Does EVOO have excellent quality with proven health properties? Superior quality is a constitutive characteristic of luxury products. EVOO has a positive image and the product's unique nutritional and health qualities are some of the sector's strengths (Sandalidou, Baourakis, & Siskos, 2002). EVOOs are the oils obtained from the fruit of the olive tree solely by mechanical or other physical means under conditions, particularly thermal conditions, that do not lead to alterations in the oil, and which have not undergone any treatment other than washing, decantation, centrifugation, and filtration. It is the principal source of fat (Visioli, Poli, & Gall, 2002) in the Mediterranean diet. Its healthy properties are linked to its high nutritional power, excellent digestibility, high oxidative stability even when used for cooking, and strong capacity for the prevention of heart and vascular troubles (Cornwell & Ma, 2008; De Leonardi, Angelico, Macciola, & Ceglie, 2013; Santos, Cruz, Cunha, & Casal, 2013). It appears to be an example of a functional food, with varied components that may contribute to its overall therapeutic characteristics (Stark, 2002). EVOO is known for its high levels of monounsaturated fatty acids and is also a good source of phytochemicals including polyphenol compounds, squalene, and α -tocopherol (Ortega, 2006). Its peculiarity is the abundance of oleic acid, a monounsaturated fatty acid (18:1n-9), which ranges from 56% to 84% of total fatty acids, while linoleic acid (18:2n-6), the major essential fatty acid and the most abundant polyunsaturated fatty acid in our diet, is present in concentrations between 3% and 21% (usually 7–10%) (Visioli & Galli, 2002). Its richness in oleic acid, coupled with the presence of phytosterols (free sterols and sterol glucosides) (Gómez-Coca, Pérez-Camino, & Moreda, 2013; Lin, Ma, Racette, Anderson Spearie, & Ostlund, 2009; Lin, Ma, Moreau, & Ostlund, 2011), makes it appropriate for direct human consumption, as well as for use in diets designed to reduce cardiovascular diseases decreasing the LDL cholesterol (Salas et al., 2000). Additionally, monounsaturated fats also help in controlling blood sugar (Parker, Noakes, Luscombe, & Clifton, 2002). This affects insulin regulation in the body in a positive way. In terms of their phytonutrient content, olives are nothing short of astounding. Few high-fat foods offer such a diverse range of antioxidant and anti-inflammatory nutrients, some of which are unique to olives (Bogani, Galli, Villa, & Visioli, 2007). These include phenolic compounds, tocopherols, and carotenoids, which may act, by different mechanisms, as effective defense against reactive species (Devasagayam et al., 2004). These minor components also play a role in the stability of the oil and the prevention of cardiovascular diseases, neoplasms, and degenerative diseases of aging (Visioli & Galli, 2002). Hydrophilic phenols are the most abundant natural antioxidants of EVOO (Amirante, Clodoveo, Dugo, Leone, & Tamborrino, 2006; Servili et al., 2009). Several important biological properties (antioxidant, anti-inflammatory, chemopreventive, and anti-cancer) and the characteristic pungent and bitter-tasting properties have been attributed to EVOO phenols. Moreover, polyphenols are also responsible for the product's stability. In fact, it is well known that, among vegetable oils, VOO shows remarkable stability during cooking (Andrikopoulos, Dedoussis, Faliro, Kalogeropoulos, & Hatzinikola, 2002), indicating that polyphenols act by reacting rapidly with lipid radicals. α -Tocopherol is

the most important antioxidant *in vivo* and it is present at considerable levels in EVOO (Psomiadou, Tsimidou, & Boskou, 2000). Tocopherols are known to act as antioxidants by donating a hydrogen atom to chain-propagating peroxy radicals (Kamal-Eldin & Appelqvist, 1996). The major carotenoids of EVOO are β -carotene and lutein. Apart from contributing to color, they protect the oil from photo-oxidation by quenching singlet oxygen and acting as light filters (Fakourelis, Lee, & Min, 1987). β -Carotene and other carotenoids have antioxidant properties *in vitro* and in animal models (Paiva & Russell, 1999). EVOO is unique among edible oils containing chlorophyll pigments because it is consumed without refining (Psomiadou & Tsimidou, 2001). These pigments are responsible for the characteristic color of the oil (Criado, Romero, Casanovas, & Motilva, 2008) and the color is also one of the most important quality characteristics and a factor of acceptability among consumers (Sandalidou et al., 2002). Chlorophylls can exert an antioxidant activity dependent on the derivative present, the lipid substrate, and storage temperature (Endo, Usuki, & Kaneda, 1985) if EVOOs are not exposed to the sunlight (chlorophyll can become an important component that accelerates photo-oxidation) (Frankel, 2011).

b) Is EVOO a rarity?

Global output of vegetable oils has been expanding quickly in recent years. Population growth and increased income, especially in developing countries, will result in higher demand for oils and fats to match better nutrition and access to food supplies (Fry & Fitton, 2010). However, a glance at the structure of the world market for edible oils and fats reveals the relatively low presence of EVOO in markets other than in the producer markets (Mili, 2006). Even though EVOO comes from one of the world most ancient crops, it accounts for only 2% of the total fat consumed in the world today (Vasileška & Rechkoska, 2012). The world vegetable oil production is dominated by soybean and palm oil (Fitzherbert et al., 2008). Within vegetable oils, EVOO accounts for barely 3% of world consumption (Bedbabis, Clodoveo, Rouina, & Boukhris, 2010; Mili, 2006), compared with 31% for soybean oil, 28% for palm oil, 13% for rapeseed oil, and 9% for sunflower oil. These data demonstrate that it's effectively a rarity, but it is not really perceived because the main EVOO consumers are also the main producing countries (Andrikopoulos et al., 2002). In fact, nearly all the world's production is produced and consumed in the countries surrounding the Mediterranean (Luchetti, 2002). On average, 95% of the world's production and 89% of the world's consumption is concentrated in the Mediterranean region (Türkekul et al., 2007). In order to fully exploit the value of the product's rarity, it is necessary to consider the increase in the demand in the non-traditional markets. Factors such as expanding income in both developed and emergent countries, changing food habits toward healthier products, and increasing prestige of the Mediterranean diet outside the Mediterranean region, will have all encouraged export businesses to enter foreign, non-traditional (non-producer) markets (Mili, 2006). Consumption in non-traditional markets has increased almost exponentially during the last decade. These markets are also fairly relevant in qualitative terms since they mostly focus on top-quality, high-priced EVOOs so they present considerable potential for consumption, which should be gradually turned into real demand through effective marketing actions. Moreover, market indicators show that consumption can be increased only if policies focus on quality and information more than pricing (Mili, 2006). The relatively high production costs make EVOO competitiveness rely more on quality than on price.

In fact, in these new markets, purchase decisions are increasingly motivated by values, perceptions, attitudes, preferences, and other subjective extra-economic factors. Demand for the attributes of healthiness, safety, naturalness, variety, convenience, and image are more sensitive to variations in income (Senauer, 2001). Viewed from this perspective, EVOO responds very well to modern

consumer expectations, with its good image and proven gastronomic properties and health benefits. In non-traditional markets, consumers' evaluation of EVOO's rarity coupled to its healthiness, safety, naturalness, variety, convenience, and image has a positive effect on the price premium.

Consumers will perceive its real rarity, if and when worldwide demand increases, rising at a sufficiently high price to cover the production costs.

c) Does the manufacturing of EVOO require more effort than other vegetable oils?

EVOO production requires considerable effort compared to other kinds of oil since it needs complex agricultural and technological choices to obtain a good quality product (Ben-Hassine et al., 2013; Clodoveo, 2013; Jiménez, Sánchez-Ortiz, Lorenzo, & Rivas, 2013). Moreover, in the entire world, many researchers spend time and energy on developing scientific knowledge and new approaches aimed at ameliorating its extraordinary features (Bakhouch et al., 2012; Camposeo & Godini, 2010; Clodoveo, Durante, & La Notte, 2013; Clodoveo, Durante, Notte, Punzi, & Gambacorta, 2013; Clodoveo & Hachicha Hbaieb, 2013; Laddomada et al., 2013). Few geographical areas in the world have the best conditions for olive cultivation. Now, olive cultivation is concentrated between latitudes 30° and 45° at both the northern and southern hemispheres in Mediterranean-type climatic regions. Thus, 97% of the global cultivation area (approximately 10.5 million ha) is located in the Mediterranean Basin, 0.8% in the Americas, 1.5% in Asia, and 0.01% in Oceania (Bartolini, Petruccielli, & Tindall, 2002).

The quality of EVOO is dependent upon orchard practices and decisions, starting from the variety choice. Cultivar, geographic region, ripeness, harvest and processing methods can affect the EVOO composition (Arslan, Karabekir, & Schreiner, 2013; Camposeo, Vivaldi, & Gattullo, 2013). Its quality characteristics, such as polyphenols and volatile compounds, can be influenced by a number of factors, from agronomic and climatic aspects to technological ones. Inside the olive orchard, factors affecting EVOO composition can be classified into four main groups: genetic (variety), environmental (soil and climate), agronomic (planting system, irrigation, fertilization), and cultivation (plant management) (Camposeo & Vivaldi, 2011; García-González & Aparicio, 2010). Agronomic and cultivation practices heavily affect the production costs (Connor, Gómez-del-Campo, Rousseaux, & Searles, 2014; De Gennaro, Notarnicola, Roselli, & Tassielli, 2012; Godini, Vivaldi, & Camposeo, 2011; Roselli, Gennaro, Cimino, & Medicamento, 2009). Among the cultivation techniques, irrigation and fertilization are the factors with the highest influence on EVOO phenol content (Berenguer, Vossen, Grattan, Connell, & Polito, 2006; Fernández-Escobar et al., 2006; Motilva, Tovar, Romero, Alegre, & Girona, 2000; Tovar, Motilva, & Romero, 2001); these two need to be accurately balanced to guarantee the correct nutritional composition of the oil. Pruning is rightfully considered from many agronomists as the major plant management operation in an orchard (Peça et al., 2002). With pruning, the grower adjusts the tree to the specific climatic and soil condition of the area and increases the orchard's productivity (Gucci & Cantini, 2000).

The quality of VOO is strongly related to the health status of the fruit from which it is extracted (Mraicha et al., 2010). Olive growers lose in yield annually because of the attack of such pests as *Dacus oleae*, *Saissetia oleae*, *Prays oleae*, *Hylesinus olivine*, and *Phloeotribus scarabaeoides* (Amvrazi & Albanis, 2009). Considering that modern consumers show an increasing need for safe and quality food (Murdoch, Marsden, & Banks, 2000), olive growers often choose integrated pest management with the burden of more costs compared to the traditional method of spraying with insecticides.

Other costs arise from the harvesting of olives. They can represent even more than 50% of the total production cost. Nevertheless, the production of a high-quality food product requires not only an

irreproachable raw material but also an ad hoc process control and quality assurance throughout the whole manufacturing process (Fregapane & Salvador, 2013). The EVOO extraction process starts from fruit reception, storage (Amirante, Catalano, Fucci, & La Fianza, 2000; Amodio, Colelli, Rinaldi, & Clodoveo, 2010), and cleaning. Subsequently, the olive paste preparation occurs through two phases: fruit milling and paste kneading (Clodoveo, Hachicha Hbaieb, Kotti, Scarascia Mugnozza, & Gargouri, 2014). The fruit milling has the main objective of breaking the plant tissues in order to liberate the oil drops contained in the mesocarp cells. The malaxation of the olive paste improves the drop coalescence into larger drops and breaks the oil–water emulsions (Clodoveo, 2012). After this stage, three different systems can be applied to separate the oily phase: pressure, percolation process, and centrifugation (Amirante & Catalano, 2000). Finally, the oily phase, which has between 1% and 3% wastewater, has to be cleaned with a vertical centrifuge. Afterward, the product can be filtered and bottled (Clodoveo et al., 2014).

- d) Does EVOO have an extraordinary history compared with other vegetable oils?

The extraordinariness of EVOO may also arise from the product's history or its manufacturing process. As other typical foods (Caporale, Policastro, Carlucci, & Monteleone, 2006), EVOO is characterized by a complex quality profile defined by several conditions such as geographic origin, culture, tradition, environmental factors, genetic properties, and the manufacturing process know-how. These factors may affect the sensory profile of products determining their specificity. This oil is part of human culture and history, being used for preparing food, oil lamp, medicine and cosmetics, or for sacred rituals (Bartolini et al., 2002). Abundant archaeological evidences demonstrate the significance of this plant, which is a long-living and legendary tree with more than just economic importance (López-Escudero & Mercado-Blanco, 2011). Its fruit and oil are part of the history and culture of different Mediterranean peoples. Thus, it is cited in the Bible and the Koran, repeatedly mentioned by Homer in the *Odyssey*, and frequently present in Greek mythology. The origin and domestication of olive is debated among historians, but it likely originated from the region surrounded by the south of the Caucasian range, the Persian high plateau, and coastal Syria. It is assumed that its expansion throughout the Mediterranean Basin took place from the Anatolian peninsula, Cyprus, Crete and Egypt, at first by the Greeks and Phoenicians, later by the Carthaginians, Romans, and Arabs. Therefore, olives are linked to the history of some of the most ancient Mediterranean civilizations. Later, at the time of the large transoceanic voyages in the 15th and 16th centuries, it spread to the Americas, and more recently, it was introduced and cultivated in South Africa, China, Japan, and Australia (Civantos, 2008).

Moreover, EVOO is a fundamental component of the Mediterranean diet (Bedbabis et al., 2010). The fine flavor (aroma and taste) and color of EVOO distinguish it from other edible vegetable oils, giving it a superior quality that is traditionally appreciated by the consumers.

- e) Does EVOO satisfy consumer's hedonistic attitudes?

"Pleasure is a human right because it is physiological; we cannot fail to feel pleasure when we eat." Thus claims Carlo Petrini (2007) on page 50 of his *Slow Food Nation*, while arguing for the importance of the hedonistic dimension of eating. Gastronomic hedonism is the principle of conduct according to which the motivations for nourishment are the pleasures derived from eating. EVOO responds very well to modern consumer expectations, with its good image and proven gastronomic properties and health benefits (Mili, 2006). It is a gourmet product intended for food decoration and a hedonistic gastro-experience. It adds a final touch to beautifully prepared meals, sweets, soups and other foods, and stands out as a unique present or decorative element (Styler, 2006). The senses involved in the perception of organoleptic characteristics of EVOO are sight, smell, and taste (Morales, Alonso, Rios, & Aparicio, 1995).

The color of foods is certainly the most important visual characteristic and it can have fundamentally important psychological effects (Imram, 1999). Whereas formally the color of EVOO has a secondary role, in fact, during sensory assessment, blue glasses are employed. From a hedonistic point of view, the color of EVOO can be considered an important organoleptic attribute that is a basic criterion in assessing quality according to consumer preferences (McEwan, 1994; Pagliarini & Rastelli, 1994; Predieri, Medoro, Magli, Gatti, & Rotondi, 2013). The compounds responsible for the color of EVOO are the chlorophylls, carotenoids, and flavones (e.g. apigenin and luteolin) (Minguez-Mosquera, Rejano-Navarro, Gandul-Rojas, SanchezGomez, & Garrido-Fernandez, 1991) present in the oil because it is consumed without refining.

The sense of smell is extremely important in the perception of flavors (Prescott, Young, O'Neill, Yau, & Stevens, 2002; Shepherd, 2006). Regarding EVOO, the most remarkable sensory perceptions for consumers are green (leaves, grass), sweet, fruity, ripe fruit, and ripe olives (Kesen, Kelebek, Sen, Ulas, & Selli, 2013; Morales et al., 1995; Peres et al., 2013). Most of these sensory perceptions are produced by volatile compounds, which are triggered when olives are crushed during the process of oil extraction (Sánchez-Ortiz, Pérez, & Sanz, 2013).

Finally, the sense of taste identifies four basic flavors—salty, sweet, sour (or acidic), and bitter. Bitterness and pungency are proved to be the most appropriate sensory descriptors of certain typical EVOOs (Caporale et al., 2006). Phenolic compounds are responsible for its peculiar pungent taste (Visioli et al., 2002). With regard to flavor, Santosa and Guinard (2011) recently reported that this is an important aspect in both the consumption and purchase motivations for EVOO (Santosa et al., 2013). According to Thompson, Haziris, and Alekos (1994), this is also a consequence of improving the taste of salads and meals (Caponio, Summo, Clodoveo, & Pasqualone, 2008; Jiménez-Guerrero, Gázquez-Abad, Mondéjar-Jiménez, & Huertas-García, 2012).

- f) What can EVOO's price tell about its prestige?

Luxury products belong to the most expensive products in an intra-categorical comparison, which requires a considerable price premium for products with comparable functional characteristics (McKinsey, 1990). Even if EVOO has a price higher than other vegetable oils, there is a limit to the price many consumers are willing to pay in the traditional market. This limit, relatively speaking, is not very high, partly because consumers in producer countries generally perceive EVOO to be a basic, intrinsically high-quality product for which they are not willing to pay a price premium without justification (Jiménez-Guerrero et al., 2012). Such reference prices do not exist or are very weak in non-traditional markets in which there is less product familiarity and consumer expertise in EVOO consumption (Mili, 2006).

Last but not least, EVOO is also a "green" food choice!

Sustainable development is a global concept promoting a society that can persist over generations. As a result, it should make prudent use of the planet's resources (physical, human, and biological). Beyond ecology, sustainable development promotes the conservation of biodiversity, of natural resources, and is also concerned with social equity. Sustainability demands impact from the consumers themselves either as polluters through the type of purchases they make, or as guardians of productive actions (Kilcher, 2007). Some say that sustainability and luxury are incompatible terms, but this sentence is not true in reference to EVOO. This last question is not included between the conditions because a food can be considered a "luxury food", but it can become the first mechanism to orientate the purchase decision process of EVOO with respect to other oils that are extracted by means of solvents (Dugo et al., 2007). EVOO, in fact, is a sustainable "green" product. The cultivation of the olive, even if it constitutes a form of exploitation of the soil by man, has an ecological importance: the ecosystem of the olive is quite stable when compared with other

agricultural ecosystems because the artificial system of an olive grove, as opposed to what stands in other agro-ecosystems, is very similar to the natural Mediterranean ecosystem (Loumou & Giourga, 2003). Olive cultivation is of multiple importance for the Mediterranean. The olive tree is indissolubly linked from antiquity up to present times with the culture, the nutrition, and the economy of this region. Being selected for cultivation, it mandates knowledge of environmental conditions as well as the alimentary needs of humans. Through the centuries, its distribution, expansion, and, finally, its dominance, has given the Mediterranean landscape its distinctive character and has supported the equilibrium of the ecosystems via the formulation of an admirable biodiversity. Thanks to the conservation of the soils and the limited input that it requires, olive cultivation contributes to the sustainability of natural resources. In the frame of modern perceptions, the olive cultivator constitutes a real model of a farmer who is not only a producer of goods but is also a preserver of the environment (Loumou & Giourga, 2003).

Conclusions

In conclusion, we think that EVOO has a positive image and the product's nutritional and health qualities are the sector's main strength. Moreover, this oil is part of human culture and history, and it responds very well to modern consumer expectations, with its good image and proven gastronomic properties and health benefits. EVOO is also a gourmet product intended for food decoration and a hedonistic gastro-experience. However, other assurances could be given to the consumers: EVOO is part of an international market, dominated by competition on price, this discourages the production of oils of excellence, and tends to standardize the quality, destroying the diversity of sensory profiles and niche products. The radicalization of the situation, also common to other markets, can be explained by the asymmetric information theory. This theory explains that in many markets, only sellers have appropriate knowledge of the characteristics of the product, while the buyer is often oblivious to everything and does not have enough knowledge to determine the value of the product being thus determined only by the seller. This asymmetry of information between sellers (who know the origin, quality, and price) and consumers (who are not able to judge the quality of the product), gives sellers the opportunity to propose goods with lower quality than market average and at competitive prices, thus damaging the market for quality goods (Akerlof, 1970). The result is that consumers fear purchasing low-quality EVOO, or olive oil blend with olive–pomace oil or seeds oil. This fear has been alimented by the recent news of fraud related to olive oil and the topic has been the subject of many headlines in newspapers. Ensuring the authenticity and the quality of olive oil is crucial, especially since consumers choose olive oil because of its health benefits. Giving knowledge to consumers, or in general to the actors of the EVOO supply chain, behaves accordingly with greater symmetry of information that increases the competitiveness of the quality production in the market, increasing the confidence of consumers. The concept of quality for EVOO currently goes beyond compliance with the legal analytical parameters, which guarantees authenticity and, to a certain extent, quality. Protecting consumer rights and preventing fraudulent or deceptive practices such as EVOO adulteration are important and challenging the issues facing the EVOO industry. In fact, in recent years, more and more attention has been given to the superior concept of EVOO quality, which is based on the sensory and health properties of this vegetable fat, but this concept is not widely acknowledged by regulations (European Commission Regulation 2568/91 and successive amendments). These legal parameters are characterized by large ranges including the top and the most common quality standard products. Beyond the legal information, consumers desire more assurances and information to give a premium price to the product. Consumers would also welcome to find on the label other voluntary information on the part of the producer, such as the olive variety used (Delgado, Gómez-Rico, & Guinard,

2013), the total phenol content and the declaration of, olive harvesting year, could be an innovation useful in orienting the consumer's choosing. In fact, EVOO is a perishable product.

From a legislative point of view, the specific challenge consists of developing, validating, and harmonizing analytical methods and quality parameters that specifically address technical authenticity issues. In the light of these observations, the European Commission, inside the 2014–2015 work programme in the framework of the Specific Programme Implementing Horizon 2020 (The Framework Programme for Research and Innovation; 2014–2020), has recently promoted a research program aimed at preserving the image of olive oil and to guarantee its quality and authenticity.

We hope that these observations can sustain the consumption of EVOO and an increase of its prices. We also hope that the ideas reported in this letter can also stimulate a debate between the researchers who will participate in the special issue of your journal on “Mood, Emotions and Food Choice.”

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