Commentary

Are health claims a useful tool to segment the category of extra-virgin olive oil? Threats and opportunities for the Italian olive oil supply chain

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A B S T R A C T

The Italian olive oil supply chain is experiencing great economic difficulties competing in the world markets. The current market scenario is characterized by increasing levels of competition based on cost reductions. Starting from the insights on the Italian olive oil supply chain, this article discuss the possibility of adopting health claims as an effective tool to segment the broad trade category of extra virgin olive oil. We conclude that including a label with the health claim based on olive oil polyphenols content would be useful to effectively signal both the “highest quality” and the “healthiest” Italian extra virgin olive oils.

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1. Introduction

The Italian olive oil supply chain is experiencing great difficulties competing in the world markets (De Gennaro, Notarnicola, Roselli, & Tassielli, 2012). This decreased competitiveness has occurred because of some structural and organizational weaknesses and profound changes in the economic and institutional framework. Most Italian olive-producing farms and processing plants are small and situated in disadvantaged hilly areas; the introduction of innovations both in farming systems (application of the best agronomic practices) and in milling firms (application of the best milling technologies) is particularly slow. Other economic weaknesses are related both to the poor coordination mechanism within the supply chain and to the ability to develop market niches for higher quality products that could better stand up to the external competition (Pomarici & Vecchio, 2013). In addition, the current competitive scenario is characterized by the internationalization of the olive oil market, which is increasingly dominated by the strategies of multinational industrial bottling companies and those of modern retailer firms that have become the key players in the olive oil supply chains (De Gennaro et al., 2012).

This article aims to highlight the main causes that have led the Italian olive oil supply chain to such a critical situation, and to illustrate some possible strategies that economic agents could adopt to find a way out of the crisis. In particular, we discuss the use of health claims as a marketing tool to segment the extra virgin olive oil (EVOO) category. Finally, we propose some practical solutions to increase competitiveness and outline the need for future research.

2. The Italian olive oil supply chain: weaknesses and new challenges

The international olive oil market is characterized by increasing levels of competition based on cost reduction strategies that have negative effects on profitability, mainly at the farming stage. One reason behind this trend is the difficulty of getting consumers to appreciate the overall quality of the oils (Barbieri, Bendini, Valli, & Toschi, 2015) and to recognize a premium price for the best products (Cicia et al., 2013). The Italian olive oil supply chain should
avoid trying to beat the main international competitors with lower prices and poor quality. On the contrary, all members of the supply chain should work to increase the volume of high quality products, characterized by their high health value, and to develop persuasive messages to raise consumers’ awareness of the perceivable quality and their willingness to pay a premium price needed to guarantee a fair income for the producers.

The production costs of Italian olive oil are normally higher than those of other Mediterranean countries (International Olive Council,) because of the extreme fragmentation of the olive orchards and production facilities, and the geological, morphological, structural and hydrogeological features of the Italian territory. Furthermore, the quality of production in Italy is usually evaluated retrospectively at the end of the harvesting season. This dynamic makes it difficult to make precise predictions in terms of the quantity and quality of the product at the start of the season, forcing the producers to accept the selling price enforced by the industrial buyers. Moreover, olive oil millers are not sufficiently trained to modulate the quality of the product by varying the extraction process depending on the olive cultivar, the maturity index and the type of product they want to produce (Bedabbis, Rouina, Salvatore, & Clodoveo, 2015). A deep knowledge of the manufacturing process can improve and preserve polyphenolic substances and hence the quality of the product (Clodoveo, 2013a; Clodoveo, Hgbaeb, Kotti, Mugnozza, & Gargouri, 2014; Clodoveo, Dipalmo, Schiano, La Notte, Pati, 2014 Clodoveo et al., 2016). Thanks to their health properties, these substances can increase the perceived value of the product, at least for some consumers (Boncinelli, Contini, Romano, Scozzafava, & Casini, 2016; Casini, Contini, Marinelli, Romano, & Scozzafava, 2014). If the best practices were applied from the orchard to the olive mill, Italian olive oil with health-giving properties would not represent a niche product, but could be a large segment of the national olive oil supply because each olive cultivar harvested at the right maturity index and properly extracted can provide health-promoting oils.

There is an unbalanced market power distribution among production stages of the Italian olive oil supply chain, which affects the formation and transmission of prices (Pomarici & Vecchio, 2013). While the olive growing (farmers) and olive crushing (mills) are very fragmented, the bottling industry and the retail chains are becoming more and more concentrated and multinational, allowing them to exert market power (Clodoveo, Camposeo, De Gennaro, Pascuzzi, Roselli, 2014). This structural feature of the EVOO supply chain has negative effects on the price paid to olive growers and on their revenue (Anania & Pupo D’Andrea, 2007; De Gennaro, Roselli, & Medicamento, 2009; Carucci, De Gennaro, Roselli, & Seccia, 2014; Roselli, De Gennaro, Cimino, & Medicamento, 2009). Another important reason behind the negative trend of revenues for producers of high quality EVOO is linked to the information asymmetry theory (Akerlof, 1970). This theory explains that in many markets, only sellers have appropriate knowledge of the characteristics of the product, while the buyer has insufficient knowledge to determine its value. This information asymmetry between sellers, who know the origin, quality, price and other credence attributes, and consumers, who are unable to judge those quality attributes, gives sellers the opportunity to propose lower quality goods than the market average and at competitive prices, thus damaging the market for high quality goods.

The trade category of “extra virgin olive oil” (EVOO) comprises different types of products, ranging in quality from excellent to standard, and differing in terms of prices and nutritional, sensory and health benefits. There is an unbalanced distribution of information between buyers and sellers with regard to the health benefits of EVOO, which can affect consumers’ choices. This situation can cause the phenomenon of adverse selection (Akerlof, 1970), whereby the buyer fails to discriminate between different quality products at the time of purchase, thus compromising the potential for producers of higher quality products to obtain the recognition of a premium price. Under these circumstances, producers of high quality products cannot remain in the market because the cost of their products exceeds the price that consumers are willing to pay. This is precisely what happens to the highest quality EVOO producers in competition against lower quality EVOO. Such asymmetry may induce consumers who are unable to distinguish between high quality and low quality products to make erroneous purchases. Consequently, there is a loss of welfare due to deception. In our opinion, therefore, it is necessary to introduce marketing tools to help consumers recognize the different kinds of products that are actually classified as EVOO.

3. Health claims as a tool to segment the EVOO category

Health claims represent a rarely used legal tool (European Commission, 2006) that could be helpful in designing comprehensive labelling to increase consumers’ knowledge about the product quality and their willingness to pay. The authors believe that increased use of these health claims could change a credence attribute into a search attribute, thus reducing the difference between the perceived and actual value of EVOO. From a theoretical viewpoint, reducing the uncertainty about a positive attribute, as in the case of the healthy properties of EVOO, could increase demand for the same quality level (Coppola and De Stefano, 2000; Nelson, 1970).

Among the list of claims approved by the EFSA, four are applicable to EVOO, as reported in Table 1 (European Commission, 2014; European Community, 2012). Three of the four claims are authorized as functional health claims (Art.13 (1) of Regulation (EC) No. 1924/2006), while the other is authorized as a reduction of disease risk claim (Art.14 of Regulation (EC) No. 1924/2006).

In particular, as described in Table 1, one of the authorized function health claims is specific to olive oil and relates to the level of olive phenolic compounds. The claimed health function concerns the protection of blood lipids from oxidative stress. The claim “olive oil polyphenols” can be used only for an olive oil that contains at least “5 mg of hydroxytyrosol and its derivatives (e.g., oleuropein complex and tyrosol) per 20 g of olive oil”. The disclaimer “daily intake of 20 g of such an olive oil provides the expected beneficial effects” must be added to the label. This concentration corresponds to a minimum content of total phenolic compounds in EVOO of no less than 300–350 mg/kg, corresponding to a bio-phenol concentration of at least equal to 250 mg/kg (Servili, 2014). The total concentration of phenolic compounds in oils belonging to the marketable class of EVOO varies widely, between 40 mg/kg and 1000 mg/kg (Clodoveo et al., 2015).

Beyond the health properties of EVOO, the polyphenol content also affects the sensory properties of the product. This feature is very interesting because it can transform a credence attribute (health property) into an experience attribute (sensory property). In fact, while much of the label information refers to properties that the consumer cannot directly evaluate (e.g. origin, extraction method, organic process), the presence of polyphenols is clearly attested by the presence of a bitter and pungent taste, which varies in intensity depending on the concentration. These last sensory characteristics are due to the activation of taste receptors and trigeminal nerve endings associated with taste buds in the fungiform papillae, which are sensitive to chemical stimuli. In virgin olive oils, these sensations are related to the presence of phenolic compounds (Servili & Montedoro, 2002) and they can persist for rather a long time after deglutition, showing a clear after effect that can strongly vary in intensity among olive oils (Vitaglione et al., 2015).
The claim of oleic acid (see Table 1) is generic and applicable to all foods that are rich in mono-unsaturated fatty acids. Whereas the claim of polyphenols is applicable only to virgin oils because any type of refining process removes these molecules, the claim of oleic acid is also valid for the other olive oil categories, such as olive oil and pomace olive oil, as well as to other types of food. The condition of use is that the product must be high in unsaturated fat, as listed in the Annex to Regulation (EC) No. 1924/2006 and subsequent amendments. In particular, a claim that a food is high in unsaturated fat, as referred to in the claim for olive oil in the Annex to Regulation (EC) No. 1924/2006 and subsequent amendments A claim that a food is high in unsaturated fat may only be made where at least 70% of the fatty acids present in the product derive from unsaturated fat, under the condition that unsaturated fat provides more than 20% of energy of the product. The claim may be used only for food that is high in unsaturated fats, as referred to in the claim for high unsaturated fat in the Annex to Regulation (EC) No 1924/2006 and subsequent amendments. The claim may only be used for foods that are a source of vitamin E, as referred to in the claim for vitamin E in the Annex to Regulation (EC) No 1924/2006 and subsequent amendments.

The only claim related to the reduction of disease risk is based on monounsaturated and/or polyunsaturated fatty acid contents. The claim is applicable to all foods that are rich in these fatty acids, as specified in the Annex to Regulation (EC) No. 1924/2006. Therefore, this claim is generic and does not allow any differentiation within the olive oil categories.

Conversely, the variability in the concentrations of the other three classes of substances (phenolic compounds, oleic acid and vitamin E) makes the related functional health claims optimal tools to differentiate within the broad category of EVOO. This is true, in particular, for the claim relative to the minor compounds — polyphenols and vitamin E.

It is important to underline that the presence of minor compounds, mainly phenols, can be modulated by the application of the best agronomic and technological practices. The phenolic profile (the quantity and types of phenol compounds) depends on the olive’s genetic makeup because it is related to the cultivar (Aguilera et al., 2005; Hajimahmoodi et al., 2008; Luna, 2002; Morelli, Vuorela, Romero, Motilva, & Heinonen, 2005; Vinha et al., 2005).

During olive ripening, the concentration of phenols progressively increases to a maximum level at the “half pigmentation” stage, then decreases sharply as ripening progresses (Rotondi et al., 2004). However, environmental factors and agronomic practices, such as fertilization and irrigation, have also been shown to affect the phenolic composition of virgin olive oil. The polyphenol content of virgin olive oil decreases with nitrogen over-fertilization (Fernández-Escobar et al., 2006). The phenolic compounds in virgin olive oil are also influenced by irrigation management (Berenguer, Vossen, Grattan, Connell, & Polito, 2006; Grattan, Berenguer, Connell, Polito, & Vossen, 2006; Gómez-Rico et al., 2007; Motilva, Tovar, Romero, Alegre, & Girona, 2000; Romero, Tovar, Girona, & Motilva, 2002; Tovar, Motilva, & Romero, 2001) during the growing season. There is an inverse relationship between the phenolic compound concentration and the amount of fruit ripening (Inglese et al., 2011). The data in the literature show a concentration range between 23 and 751.1 mg/kg (Servili, 2014). Due to its capacity to be incorporated into lipoproteins, α-tocopherol is the only tocol that is able to satisfy the human requirement for vitamin E (Traber & Atkinson, 2007). The α-tocopherol in membranes and lipoproteins acts as a radical-chain-breaking antioxidant (Azzi, 2007).
water applied to the olive trees. Because phenol levels naturally change as the olive fruit ripens, the timing of the harvest is very important. Early harvesting results in oils with higher polyphenol values (Baccouri et al., 2008; Beltrán, Aguilera, Del Rio, Sanchez, & Martinez, 2005; Dag et al., 2011; Salvador, Aranda, & Fregapane, 2001).

Virgin olive oil is exclusively extracted from the fruit by means of mechanical techniques that include crushing, malaxation and extraction. Each of these technological operations – in addition to the olive fruit characteristics (cultivar, maturity stage, etc.), the pre-processing (fruit harvesting and storage) and the post-processing (oil storage, filtering, and bottling) procedures – affects the quantities and types of phenol compounds (Amirante & Clodoveo, 2016; Clodoveo, 2012, 2013b, 2014; Clodoveo & Hachicha Hbaieb, 2013; Clodoveo, Delcuratolo, Gomes, & Coelli, 2007, 2013, 2015). High quality EVOO can be produced only from healthy, fresh fruit at the right ripening grade. If a single step of the mechanical process is not conducted properly, it can lead to a dramatic reduction in antioxidants, particularly phenols, as these molecules are susceptible to chemical and biochemical oxidation reactions. Enzymatic (Clodoveo et al., 2014a) and nonenzymatic oxidative reactions (Frankel, 2010) are the main cause of phenol destruction during the fruit storage, extraction and oil storage processes of EVOO. The phenol degradation kinetic depends on the availability of oxygen and is promoted by light, heat, metals and enzymes. It is important to underline that a direct consequence of applying best practices to increase the polyphenol content of the product during the olive tree cultivation and oil extraction processes is the optimisation of the legal parameters necessary for the classification, thus raising the overall quality of the product (Clodoveo et al., 2015). Considering the extreme variability in the concentrations of these recognized health-promoting molecules, the authors can conclude that all EVOOs are not created equal, and so cannot all be sold at the same price.

Currently, consumer choice is characterized by a growing awareness of the importance of a healthy diet and the close relationship between nutrition and psychophysical well-being (Bimbo, Bonanno, & Viscecchia, 2016; Grunert, 2005; Urala & Lähteennäki, 2004). In the literature, there is evidence of consumers’ willingness to pay a premium price for the health-enhancing features of food (Bimbo et al., 2016; Nocella & Kennedy, 2012). In addition, a few studies have found that some consumers’ segments are willing to buy and pay a higher price for EVOOs with health claims (Boncinelli et al., 2016; Casini et al., 2014). However, the olive oil industry has not taken advantage of this opportunity and the claims approved by the EC. In particular, in the specific case of the claim of phenolic compounds, several problems may have hindered its implementation. The main concerns involve the lack of clarity in determining the bioactive compounds and the analytical protocol to apply the claim (Martín-Peláez, Covas, Fitó, Kusár, & Pravst, 2013; Mastralexi, Nenadis, & Tsimidou, 2014a,b; Romero & Brenes, 2014). Tsimidou and Boskou pointed out that “the use of the term ‘olive oil’ does not help the average consumer to make an ‘informed’ and ‘meaningful’ choice because it is not clear which of the commercial products available on the shelf contain the authorized ingredients. Not all ‘olive oils’, not even all of the ‘extra virgin olive oils’ are expected to contain high concentrations of the desirable ingredients to which the claim refers” (Tsimidou & Boskou, 2015). The term ‘polyphenols’ cannot represent the most abundant molecules present in the product in their free form, such as the simple phenols hydroxytyrosol and tyrosol, which are linked to aldehydeic forms of decarboxymethyl eugenol acid (glycosylated or not). The expression “5 mg of hydroxytyrosol and its derivatives (e.g., oleuropein complex and tyrosol) per 20 g of olive oil” is unclear and can create additional confusion because it does not clearly describe the main constituents of the biophenols fraction. Therefore, the development of a validated official analytical procedure is important for the producers and other interested parties, which for the moment cannot benefit from this optional claim due to uncertainties in the implementation of the regulation.

Other minor barriers for the use of health claims by olive oil small and medium-sized enterprises (SMEs) can be related to the lack of competencies, including a lack of legal knowledge, on the use of claims on the label and communication campaigns. Moreover, olive oil producers need a tool to predict the permanence of the condition of use of the claim during the product’s shelf life. A systematic study should be performed on the relationship between the initial quantitative and qualitative profile of phenols and the evolution of these compounds during storage, to assess the length of time the claim can be made over the shelf life of the product. In addition, there is a lack of empirical studies on the wording of this claim. In particular, it would be useful to evaluate its effectiveness in communicating the health properties to the average consumer.

4. Bitter and pungent taste, polyphenols and the consumer: the other side of the coin

Increasing the content of bitter polyphenols for health may be wholly incompatible with consumer acceptance (Barbieri et al., 2015). Bitterness, like sweeteness, is a sensation mediated by transmembrane G-proteins similar to rhodopsin. Polyphenols in olive oil are the most likely source of this bitter taste. Specifically, the main contributors to the bitterness sensation in olives are derivatives of the sesquiterpenoids oleuropein and ligstroside. As oleuropein and ligstroside are quite water-soluble, their aglycones (produced by the hydrolysis of the glycosidic linkage) are more likely to be the relevant compounds in the oil, and are considerably less bitter than the parent glycosides (Blatchly, Delen, & O’Hara, 2014). The concentration of these bitter compounds is highest in green olives, and diminishes as the olives mature. Pungency, an irritation in the back of the throat that often causes a cough, is poorly understood at a mechanistic level. Compounds must pass through the epithelium of mucus cells to reach shallow nerves in the back of the throat. The compound responsible for this property, oleocanthal, has a biological activity similar to that of the nonsteroidal anti-inflammatory drug ibuprofen (Blatchly et al., 2014).

However, consumer acceptance of bitter food increases if the product is considered healthy. Moreover, preferences change with time (Szczesniak, 1972). Hedonic ratings increase even with short-term exposure to bitter foods (Matts, 1994; Stein, Nagai, Nakagawa, & Beauchamp, 2003). Pliner (Pliner, 1982) observed that with repeated exposure, subjects overcame their neophobia—the fear or reluctance to ingest novel foods. Many studies have demonstrated that overall acceptability is also influenced by extrinsic properties such as health claims, price, the appearance of the label, the brand and the colour of the product. Moreover, the hedonic response is affected by consumers’ expectations for the product, which are based on factors such as previous experience, peer pressure, expert recommendations and brand familiarity (Saba, Moneta, Nardo, & Sinesio, 1998). Social factors may be the most potent means of enhancing liking. If an adult demonstrates pleasure when consuming a food, then this positive response can influence the hedonic response of a child (Rozin, 1990). As with many food products, the positive value generally associated with the social context of consumption can be an important mechanism for learning to like a bitter EVOO, which might initially seem unpalatable.

Phenolic compounds with important health benefits are characterized by bitterness, which is often perceived as aversive. The intensity of these sensations can be modified by learning to
combine other ingredients in culinary preparation and moderating the quantities used. A bitter and pungent oil is ideal in a weight loss diet because only a small amount, containing fewer calories, is needed to add taste to food. Attenuating the sensory properties by using a lower quantity of bitter EVOO may not be the only solution, because consumers very often learn to like foods or beverages that are initially perceived as unpalatable. Learning to like bitter EVOO may require repeated exposure and is enhanced by peer pressure and consumption under positive conditions.

5. Conclusions

Although it accounts for less than 4% of the edible oil market worldwide (FAO), olive oil is attracting growing interest from new consumer countries (Roselli, Carlucci, & De Gennaro, 2016). This consumption trend is also driven by the results of scientific research confirming the positive attributes of this “liquid gold” (Caporaso et al., 2015) and its key role in the so-called Mediterranean diet. However, the olive oil market is characterized by increasing price competition based on cost reduction strategies that have negative effects on profitability. These strategies are due to consumers’ difficulties in evaluating the quality of olive oils and recognizing a premium price for the highest quality EVOO. The price war cannot last forever, and competing for quality is likely to be the only viable strategy. From this perspective, Italian EVOO producers should not try to beat their main international competitors with low prices and poor quality. On the contrary, all players in the supply chain should combine their efforts to increase the supply of the highest quality products with the greatest health value. At the same time, it is important to develop innovative and persuasive communication strategies to raise consumers’ awareness of quality and their willingness to pay a premium price to guarantee a fair income for high-quality EVOO producers. In this context, health claims represent an unexploited tool that could be useful to segment the wide and heterogeneous EVOO trade category. In particular, the claim concerning the polyphenol content of olive oils can reduce consumers’ information asymmetry about the product and can create value in the olive growing sector, thus favouring better coordination in the supply chain between farmers, millers, packers and distributors.

Finally, more research is needed to promote the adoption of health claims. In particular, it is important to evaluate consumers’ perceptions of and attitudes toward EVOO health claims and related symbols, and how they affect consumers’ purchasing and consumption behaviour. However, further research should try to measure the propensity of consumers (i) to purchase healthy EVOO and (ii) to pay a premium price for this high-quality product. Addressing this knowledge gap would help producers to design effective communication campaigns.

Health claims and the delivery of information about the origin and quality of olive oil could help to create a “culture” around this product. It is important to identify the most effective way to promote and deliver such claims to consumers to make them aware of the health benefits of olive oil, increase their knowledge about its qualitative characteristics (e.g., colour, flavour, taste) and purchase it in a more conscious way. Financial support for focused research would provide indications that could encourage producers to adopt new communication and market positioning strategies to persuade consumers to no longer perceive olive oil as a commodity, but as a product that is important for their well-being.

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