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Review

Sustainability Labels on Olive Oil: A Review on Consumer Attitudes and Behavior

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Abstract: Product labeling is a way to inform consumers and increase their awareness about sustainability attributes of products. It guarantees the use of specific production conditions, promotes market incentives and highlights environmental, social and/or ethical product attributes. This study provides a literature review of sustainability labels on olive oil including consumer attitudes and behavior towards this product. Results show that consumers have positive attitudes towards olive oil carrying sustainability labels and are willing to pay more for olive oil carrying those labels. However, the major drivers of this behavior are far from being related to sustainability. This insight jeopardizes the main objective of those labels and suggests more clarifications about the information delivered by them. More in-depth investigations are needed about the drivers of consumer behavior towards olive oil carrying sustainability labels.

Keywords: sustainability; labels; consumer behavior; attitudes; olive oil



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1. Introduction

Recently, food production and consumption habits have become unsustainable [1]. At the same time, the human population is keeping growing and the demand for food products is increasing. Moreover, there are significant changes in dietary regimes mainly due to growing wealth and globalization [2]. Keeping in mind that agrifood systems strongly depend on natural resources, responding the growing demand for food product and the unhealthy overconsumption are creating pressures on natural resources and leading to negative impacts on the environment, such as high consumption of fuels for packaging and food distribution, greenhouse gas emissions, water consumption or waste [3]. The use of resources is inefficient and high rates of agricultural products and food are wasted at all stages of the food system [4,5]. According to the UNEP [6], approximately 60% of the global biodiversity loss is related to food production. Agrifood systems generate around 24% of the global greenhouse gas emissions, and an estimated 33% of soils are moderately up to highly degraded. Additionally, many conventional food production and consumption patterns are contributing to the ethical and social problems observed around the world [7–9]. This calls for a reconsideration of the current agrifood systems with the aim to switch to more sustainable ones [10].

To be considered sustainable, agrifood systems need to generate for an indefinite period economic, social and environmental positive values [11,12]. The economic dimension is usually based on the commercial or financial viability of a local economy and its capacity to improve all categories of stakeholders' incomes. An evaluation of the economic sustainability of a food system may be done using criteria like farmers' incomes,

producers' minimization of risks and position in markets [11,13,14]. Concerning the social dimension, sustainability mainly refers to the equity and fairness in the distribution of the economic value added. But it can also be based on the preservation of the nearby know-how, traditions and culture, or on the enhancement of the working conditions and the intergenerational continuity in agriculture to avoid the threat of abandonment of rural activities [11,13,15–17]. Finally, sustainability is associated with environmental objectives. This means that actions and activities of agrifood systems should contribute to ensure neutral or positive impacts on natural resources and their preservation for future generations. Indeed, several impacts can be taken into consideration, such as issues linked to biodiversity, uses of soil and water, the carbon and water footprint, the economy of energy, or waste [14,17].

In general, consumers are likely to be concerned nowadays about environmental and social features of products, although their attitude is not always consistent with their behavior [18]. Consumers can significantly contribute to the sustainability of agrifood systems by avoiding food waste and choosing products that are economically, socially and/or environmentally friendly. Product labeling is one way to inform consumers and increase their awareness about the sustainability attributes of products. Some well-known sustainability labels are Geographical Indications, Organic Farming, and Fair Trade. In the olive sector, labels are particularly important as olive oil production, especially in the Mediterranean region, is related to several social and environmental challenges and to increasing market competition [19]. Knowledge on consumer attitudes, behavior and willingness-to-pay (WTP) for olive oil with sustainability labels can help olive producers and processors to improve their marketing strategies, competitiveness and sustainable practices.

There is an increasing number of studies dealing with consumers' preferences and WTP for diverse sustainability (agrifood) products or labels [20]. However, no systematic review has been done so far on studies regarding consumer attitudes and behavior for sustainability labels on olive oil. Therefore, this paper aims to systematically review the literature regarding consumer attitudes and behavior towards sustainability labeling on olive oil. Our findings can help to refine knowledge about:

- How consumers perceive the sustainability labels on olive oil?
- How the use of sustainability labels (separately or together) impact consumers' preferences and willingness to pay for olive oil.

The study is structured as follows. Section 2 expounds on the background and classification of sustainable labeling on food products. Next, the research methodology is presented in Section 3. Section 4 outline the results of the study. In Section 5 the findings are discussed and finally, some concluding remarks of the study are presented in Section 6.

2. Background: Sustainability Labeling on Food Products

Currently, sustainability has become an important differentiation and communication tool [21–24]. However, as sustainability is a credence attribute, it is difficult to be verified and checked. In this context, labels for food products have a crucial role in providing relevant information to consumers. Numerous public and private schemes of labeling and certifications are used to communicate information about sustainability, enable consumers to identify these issues, and increase transparency along the food chain [23–25]. Besides, they guarantee the application of specific production conditions, promote market incentives and highlight environmental, social and/or ethical product attributes [26]. Although these labels highlight aspects of sustainable food products, they can also create confusion among consumers [27], because until today there is no general sustainable food label available.

According to Ipsos and London Economics report [28], more than 900 food labeling schemes exist across Europe. These labels are linked to either one, two or all three dimensions of sustainability. The classification of these food labeling schemes by the attribute claimed in the label, indicate that the most claimed characteristic is the origin of production, which was covered by 60% of all schemes, followed by organic certification, traceability,

traditional production methods, taste/smell, environmental-friendly production methods, safety and animal welfare.

Consequently, in this article, different types of origin-based, eco and organic as well as fair trade labels and their related studies will be analyzed being representative for the three different categories of sustainability labeling for food products. The different categories, sub-categories, denomination and definitions are described in the following Table 1. It must be noted that some labels also include more than one category of sustainability, e.g., origin-based labels are supposed to contribute not only to the economic, but also to the social dimension.

Table 1. Different categories of sustainability labeling for food products.

Category	Sub-Category	Denominations	Definition
Origin-based labeling (economic, social sustainability dimension)	Country	'Country of origin', 'origin', 'place of origin' or 'place of provenance'	The country where the product comes from
	Region	Certified label	Protected Designation of Origin "PDO"
			Protected Geographical Indication "PGI"
		Not certified label	The name of region of origin
	Local	'Farm to fork', 'short supply chain', 'traditional product'	
Environmental sustainability	Eco-label	Environmental labels	
	Organic agriculture	Organic farming, organic production, Bio	
Social and cultural sustainability	Fair-trade		

Source: Own illustration.

The first category includes different types of Origin-based labeling, which appears to be the most important and a relevant tool for the development of a new model meeting the requirements of quality, traceability, food safety, social and environmental sustainability, economic profitability and effectiveness of public agricultural and rural development policies [29,30].

The terms 'Country of Origin Labeling' (COOL), 'origin', 'place of origin' or 'place of provenance' are used to indicate the geographical origin of food products [31]. The concept of 'made in', most often used to reflect country-of-origin information, has been considered ambiguous and reductive [32] and therefore been replaced by 'country image' [33,34], which focuses on the general characteristics of the country. Kotler and Gertner [35] believe that the country image results from its history, geography, artistic heritage, famous people and other characteristics. According to these authors, the images represent a synthesis of many associations and information related to a geographical area. While positive images of the country of origin may lead to favorable evaluations of products, negative images are sometimes formed from false or erroneous perceptions play a negative role [36]. Yeh et al. [37] highlight the country of origin effect and show that consumers value food differently according to their country of origin. However, Verbeke and Ward [38] believe that the country of origin does not affect consumer preferences or perceived product quality. During a purchasing decision implying a choice of imported products mentioning foreign countries, consumers tend to prefer domestic products for a quality reason [39–41], or rather for an ethnocentric reason [42] when they believe that the purchase of imported products is adversely affecting the local economy. The trend of ethnocentrism has a significant impact on consumers' purchasing decisions [43].

Like the country of origin, the region is also used as a quality reference [44]. In recent years, the region of origin of agri-food products has developed more strongly in European countries in the context of product sustainability labeling. Due to the wise use of natural resources in the area, the consumer, by purchasing these products, contributes to protecting of the environment, supports the economic development of the area and helps to improve rural population lives [45]. Verbeke and Roosen [7] show that consumer interest for origin cues is heterogenous across European studied countries mainly Belgium, Denmark, the Netherlands, Poland and Spain. Moreover, Belgium consumers were more interested on quality labels and quality marks than geographical indicators such as PDO/PGIs. In contrast, Spanish consumers valued highly origin information for fish than did Belgians and Northern Europeans. To capture this market potential for regional food, many regional labels have been introduced, ranging from labels launched by small-scale producer cooperatives to those initiated by large-scale retailers [46]. The protected designation of origin (PDO) and protected geographical indications (PGI) are among the certified geographical indications (GIs) used for regional products. These certifications can generate positive effects like product's contribution to the economy of a local area, the promotion of the environmental sustainability of farming methods, and the ability to meet consumer expectations for quality products by guaranteeing the link between the place and the production [11]. According to Van Ittersum et al. [47], consumers' perception of PDO is related to quality warranty and to the economic-support dimension (rural development). These authors have shown that the perceived quality of this label has a substantial impact on willingness to pay (WTP).

In addition to these established indications and certifications, producers, retailers, and marketers have revealed the potential of local food movements and increasingly started to promote locally grown vegetables and fruits to meet the increasing consumer demand [48]. The movement mentioned above leads to a growing diversity of labels indicating products as 'local'. This is mainly due to the lack of uniform or common agreed upon definitions of 'local' labels and to the lack of official regulations in some countries. In fact, 'local' food has been approached in many ways. The most used definition, has been mainly issued from the USA, it defines local food based on the distance that the food travels from production to consumption [49–51]. According to Sneed [52], the most common means of conceptualizing

geographic distance include the use of geo-political boundaries (city, community, county) and driving distance (50 miles, 100 miles). Within the UK, definitions using a geographic proximity approach range from distances of 30 miles, within a county, sub-region, or even a whole country [51]. Several publications have revealed a growing consumer interest in local food products, as they are perceived as products characterized by huge benefits. Purchasing food labeled as local is mainly motivated by quality attributes such as freshness and healthiness [53–55]. In other cases, consumers buy local food to support small-scale farmers and their local economy [56,57]. Some consumers consider that local food is more environmentally friendly than imported food because of its short transport distance [56,57]. Besides, Conner et al. [58] explain the growing interest of consumers for local foodstuffs by their ability to improve the food system's sustainability by reducing the carbon footprint and offering new market opportunities for local farms.

The second category of labels primarily related to the environmental dimension of sustainability are 'Eco-labels' and 'Organic Agriculture', which have widely developed in recent years. Defined as official certifications of products or services with ecological benefits, these labels allow consumers to be informed of these characteristics [59]. However, despite the involvement of an independent third party and the official character, the effectiveness of eco-labels is not guaranteed. Faced with the proliferation of ecological signs and messages (sometimes applied to the same product) and their coexistence with logos, private brands or other quality signs, consumers are wondering about the credibility of the information provided by the seller [60]. As buying motivations, the literature indicates that consumers purchase organic products because they perceive them to be natural, not using synthetic chemicals components [61], safe and healthy [62], tastier and having better quality than conventional products [63]. In addition to these drivers for quality and health, some authors have identified environmental [64,65] and marginally social motivations, particularly related to animal welfare [66]. Several studies have investigated consumer preferences for organic labels, the willingness to pay for these labels and the impact of certification on the purchase decision. According to de Magistris and Gracia [67], the recognition of organic labels rely upon the level of consumer knowledge. Yiridoe et al. [68] postulate that the lack of awareness toward organic labels is the principle motive for impeding the purchase of these products. In addition, the consent to pay is higher for certified organic products than for unlabeled products [69].

The third category is mainly related to social and cultural sustainability and includes the 'Fair Trade' label. This label is a sustainable development initiative that promotes the improvement of socio-cultural, but also economic and environmental components [70]. The Fair-trade label informs consumers that disadvantaged small producers receive a fair price [71,72] and refers to the notion of justice [73]. Among the motivations for purchasing fair trade products, Delpal and Hatchuel [74] identify especially the sensitivity to child labor, respect for employees' working conditions, and support for human rights. On the other hand, several obstacles to the purchase of fair-trade products have been identified. These include consumer mistrust of existing claims on the market, insufficient information [75] and lack of confidence in certifications [76], the higher price and limited availability of these products in traditional outlets [77]. Studies of consumer preferences for fair trade products show that consumers are willing to pay more for example coffee [78], chocolate [79] and bananas [80]. Mahé [81] indicates that the consent to pay for Fair Trade certified products is positively influenced by confidence in certification and negatively influenced by age and income. In addition, numerous studies [71] emphasize that additional information on fair certification standards and the meaning of their content concerning different social issues should have positive effects on consumer attitudes and the credibility of labeling.

Following this background, we can conclude that a positive effect of sustainability labeling on consumers' behavior in general is difficult to confirm. It depends on various factors, including the product category, the type of labeling (label, self-identification), the dimension of sustainability covered and the characteristics of the consumer. This article's specific objective is to show how the sustainability labels are applied to olive oil and how

they affect consumers' behavior and attitudes. This is done through a systematic literature review as explained in the next section.

3. Methodology and Materials

This systematic review follows the PRISMA Checklist (preferred reporting items for systematic review and meta-analysis protocols). As shown in Table 2 below, eight databases were searched covering several specialty areas to guarantee an interdisciplinary research strategy. A search strategy was developed and subsequently adapted for each database. No limitations on the publication date were defined. Search terms included the following key words: consumer attitudes towards olive oil, consumer behavior towards olive oil, consumer preferences for olive oil, consumer research on olive oil, consumer behavior towards olive oil carrying sustainability labels, consumer behavior towards olive oil carrying a PDO or PGI label (GI, region of origin, country of origin), eco-label, organic label, carbon footprint label, water footprint label, fair-trade label, consumer behavior towards purchasing olive oil produced by a cooperative/with a circular economy approach/in a short supply chain. The publications were, as far as possible, saved as PDF files and cited in a Word file.

Table 2. Overview of applied databases for literature research.

Number of Databases	Language	Database
8	English	AgEcon, Web of science, EconPapers, NAL Catalog, Google Scholar, Emerald insight, Taylor and Francis online, Science Direct

Source: Own illustration.

3.1. Study Selection

Inclusion criteria were predefined to guarantee study selection importance, with eligibility criteria formatted following the population, intervention, comparison, outcomes, situation, and type of study (PICOST) framework:

- Population—Independent consumers and/or purchasers of olive oil aged 18–75 years old.
- Intervention—Labels/logos/claims/information linked to economic, environmental and/or social or cultural sustainability of olive oil.
- Comparison—Consumer preference for the different sustainability labels.
- Outcomes—Qualitative results included consumer evaluation, interpretation and liking of different labels. Empirical results included attribute utility estimates and willingness-to-pay.
- Situation—No geographical limits.
- Type of study—Primary research studies only.

Titles and abstracts of studies were first screened for their relevance, and selected studies were screened using a full-text article review form. In total, 100 studies were identified and subsequently assigned to the single topics. All papers that they didn't meet all the eligibility criteria for our study's aim were excluded and only 42 of those studies included at least one dimension of sustainability and several studies comprised more than one. The studies assigned were displayed in a matrix shown in Table 3 which displays one study as an example.

In the first column, the authors and the publication year are displayed. The studies are listed by time, displaying the development of the publications over the last twenty-six years.

The second column describes the country of origin of the study; the third indicates the survey's exact location. The location could be a region or town; depending on how precisely the study is described. Knowledge about the origin of the study allows discovering the geographical coverage of the studies. The next columns of the table describe the purpose of the investigation, the type of the label including the certification or the sustainability information communicated (Organic, Ecolabel, Fairtrade, local product: country-of-origin

or regional origin, etc.), the subtopic of the study, the methodological approach, the sample size and finally the main results.

Table 3. Extract of tabular matrix used to display studies.

Authors	Country	Region	Purpose of the Studies	Type of Label or Sustainability Aspect	The Aspect Studied	Methods Used in the Studies	Sample Size	Main Results
Finardi et al. (2009)	Italy	Not specified	Analyze the introduction of country-of-origin labeling and new health claims	Local product	consumer preferences	Focus group, Questionnaire, choice experiment	196	The attribute related to the Italian origin carried the highest parameter relative to the other attributes, health claim and acidity level information.

Source: Own illustration.

3.2. Overview of the Publications

Descriptive analyses were carried out in the first phase. Using Excel, we generated a series of graphs to reveal the evolution in time of the published papers on the sustainability labels. Figure 1 illustrates the number of studies published in the last 26 years—from 1994 until 2020. The peak with 12 studies represents 2013. The development of the publication numbers reveals a tendency towards increased research intensity since 2008. Others evident peaks were in 2019, with 9 published studies.

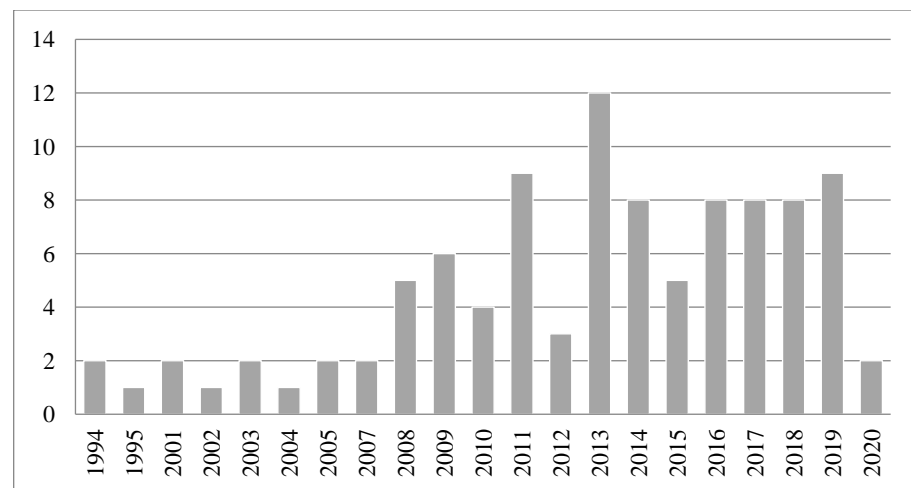


Figure 1. Consumer research on olive oil ($n = 100$) from 1994 to January 2020. Source: Own illustration.

Studies regarding the consumption of olive oil mostly originated from Italy, as shown in Figure 2. Italy had 26 studies, which is the highest number, followed by 19 studies from Spain and 10 studies from Greece. As expected, the leading countries in the production of olive oil, mostly Mediterranean countries, were also leaders in research about this product. Remarkably USA with 9 publications occupies the 4th rank. In fact, besides being olive oil producer, US Olive oil consumption and imports have increased rapidly during the last two decades.

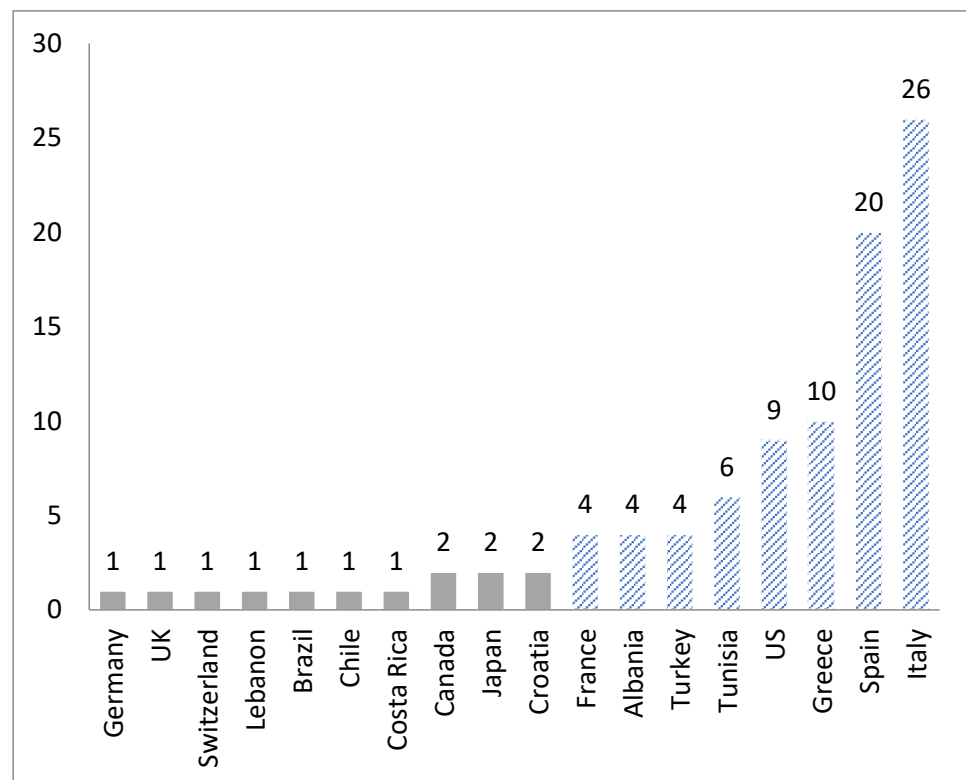


Figure 2. Involved countries in Consumer research studies on olive oil from 1994 to January 2020. Source: Own illustration.

Titles and abstracts of the identified research studies were first screened for relevance, before remaining studies were screened using a full-text article review form. Most of the publications were screened in duplicate in order to minimize potential bias.

3.3. Preferred Reporting Items for Systematic Reviews (PRISMA)

A two-stage screening process was applied, 100 publications were screened at first and led to only 54 articles remained.

Based on criteria explained in Section 3.1, the selection process of scientific articles to be included in the literature review was undertaken by verifying that:

- The paper presents a result of an empirical study (literature reviews are excluded);
- The objective of the study deals with aspects related to consumer attitudes and behavior (perception, preferences, buying and consuming habits, etc.).
- The empirical work is a consumer study (studies with farmers, manufacturers, experts are not considered);
- At least one olive oil sustainability label is studied;

The second stage was mainly a full text assessment in which repetitions and redundancies are examined. In fact, if the results are published in conferences and journals, only journal articles are retained. This last stage gave us as a result the consideration of a 42 publications that met all the study eligibility criteria (Figure 3).

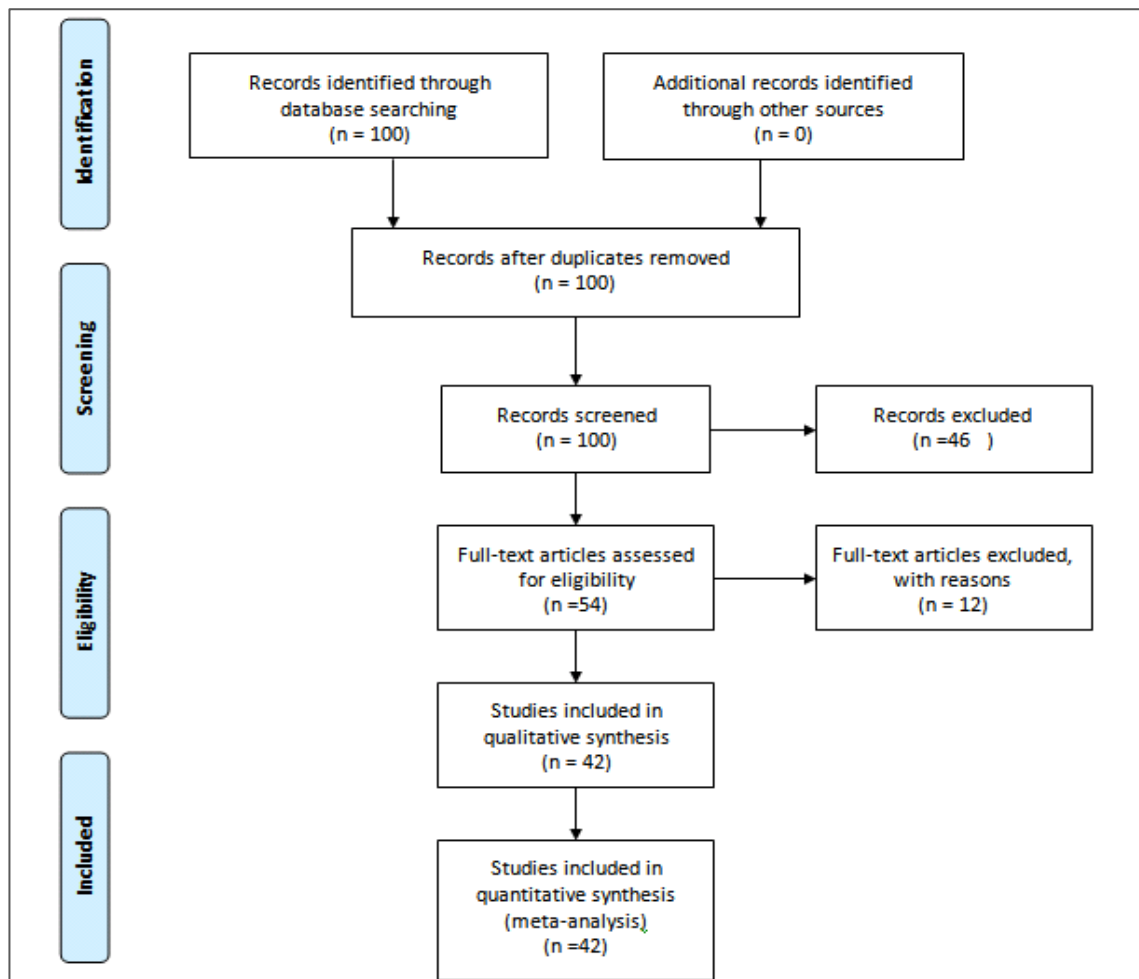


Figure 3. Preferred reporting items for systematic reviews (PRISMA) flow diagram showing study selection. Source: Own illustration.

4. Results

In this section, results are presented, starting with consumer attitudes and behavior regarding origin-based labeling on olive oil (Section 4.1), followed by consumer attitudes and behavior regarding environmental sustainability labels (Section 4.2.) and social and cultural sustainability labeling (Section 4.3). Finally, in Section 4.4 results related to the competition or the complementarities between sustainability labels on olive oil are presented.

4.1. Consumer Attitudes and Behavior Regarding Origin-Based Labeling on Olive Oil

Several studies investigated consumers' behavior regarding origin-based labels on food products and on olive oil. This literature review shows that while there is a growing interest on studying the use of both country-of-origin and region of origin (GIs), there is scant literature on consumer preferences and purchase behavior regarding 'local' olive oil. Moreover, using 'local' as claims on food labeling can have various nuances and can be perceived and understood differently among consumers.

4.1.1. Country-of-Origin Labeling (COOL)

Regarding consumer perceptions of olive oil, various studies considered the country-of-origin cue as a relevant factor for the purchase and consumption of olive oil. Consumers seem to prefer, regardless of other items, the standard or typical product of the area of consumption. The influence of the country-of-origin on consumers depends on the level of consumption and production of olive oil in their country.

Starting with countries with high levels of olive oil production and consumption, just a few studies focused on the country-of-origin label. Most of the studies conducted on COOL were from non-producing countries. Finardi et al. [82] analyzed the introduction of country-of-origin labeling in Italy. The authors observed that the attribute related to the Italian origin carried the highest parameter relative to the other attributes like health claim and acidity level information. This confirms that Italians strongly value their country of origin production and processing of olives. Consumers' choice in this study could be linked mainly to ethnocentric reasons since the highest WTP was mainly registered for the variable 100% Italian origin. This finding reveals that origin labeling contributes to the protection of the local economy (purchasing only Italian olive oil). In the same line, Zulug et al. [83] studied consumer preferences for country-of-origin labeled olive oil in Turkey and found out that consumers who are more concerned about the health of the household members were willing to pay higher prices for COOL olive oil. They matched up the concept of COOL food products with healthy products. Besides this perception, they believed that the COOL products are produced with original recipes and their ingredients are the source of health benefits. These authors concluded that COOL was important not only in the local but also in the international arena to protect these products. Besides protecting of the product itself, producers of these products should also be supported and protected via price premiums. Those findings reveal the impact of COOL on consumer decision for the purchase of olive oil and provide the hidden role played by this label in promoting economic (premium prices) and social (protecting producers) sustainability. Picolo et al. [84] emphasized those findings for Italian consumers that associate the Italian origin and the health benefits of extra virgin olive oil (EVOO) to their choice in the purchase process. Certainty of Italian origin, the region where the olive trees were grown and territorial certification (PDO/PGI) were important drivers for purchases. Those items were strongly positively judged by consumers. They attached great importance to the Italian origin of EVOO and to territorial certification, but they recognized that products of other Mediterranean countries were worth attention.

For the non-producing countries, the study of Mtimet et al. [85] on Japanese olive oil consumers' behavior found that the country-of-origin was the second most considered attribute when buying olive oil, being the Italian originating more preferred than Spanish and Tunisian ones. It should be noted that the consumers' evaluation of olive oil was depending on the type of origin information provided by the label. For instance, Japanese consumers preferred olive oil with a 'Mediterranean label' which is linked to the Mediterranean region. Those results confirm that consumers from non-producing countries rely on the country's image in their olive oil purchase decision which is linked to its history, geography, artistic heritage, famous people and other characteristics [35]. Furthermore, Romo-Muñoz [86] analyzed Chilean consumers' preferences and willingness to pay for extra virgin olive oil attributes. The authors found out that these consumers valued more foreign olive oils since olive oil was considered a new product in Chile despite significant increasing rates of the domestic production and consumption. Chilean consumers have less knowledge about olive oil attributes and may use price as a proxy for quality. Another study conducted by Dekhili et al. [87] have investigated the relevance of origin cues on olive oil choice in two countries, France and Tunisia. The results using the best-worst method indicated that country of origin, region of origin and olive variety which represent the levels used for origin attributes of olive oil were determinants of choice for both Tunisians and French consumers. In France, olive oils from different countries are commonly sold in supermarkets; therefore, French consumers seem to value more the country cue than the region. However, Tunisian consumers have shown relevant interest in the region and olive variety during the process of purchasing olive oil. In fact, Tunisia doesn't import olive oil and all olive oils are from national origin. Thereby consumers used the region of origin as purchasing criteria.

4.1.2. Region of Origin' Labeling

Several empirical studies investigated the influence of 'Region of origin' labeling on consumers' behavior using different schemes of labeling on olive oil like the indication of the region of origin, or the official certifications of geographical origin through the PDO and PGI.

Starting with studies focused on non-certified geographical indications, Caporale et al. [88] assessed the impact of information about the origin of the product on the sensory profile perception in Lucania (Italy) and managed to point out that information evoking the origin of olive oil created a favorable hedonic expectation in familiar consumers. Moreover, the study of Duman and Guldaz [89] in Bursa (Turkey) analyzed the impact of origin labeling on olive oil. Results of this study showed that consumers associated regional olive oil with quality, and origin labeling was used as a signal of quality. They preferred to buy specific region's olive oil directly from producers in the producing region which leads to reinforcing their local economy, protecting the environment by consuming olive oil from a nearby region and restoring the lives of the rural population. Delgado et al. [90] also conducted a study in California in the US and confirmed that region of origin was the variable that showed the greatest influence on the overall liking of the bottles and labels in the packaging. There was a greater preference for EVOO carrying California as 'region of origin' opposed to those labeled as imports. Those results confirm the ethnocentric trend of olive oil consumers. By contrast, while consumers in the olive oil-producing countries of the northern Mediterranean showed great interest in the region of origin, Mtimet et al. [91] study of Tunisian olive oil consumers behavior showed that contrary to a common finding in Tunisia, the region of origin attribute did not have a significant impact on consumers' purchasing behavior. In fact, Tunisian consumers showed a higher preference for 'in-bulk' purchases due to a rooted tradition in Tunisia. As explained by the authors, this could be due to the small number of quality and origin labels for foodstuff products in Tunisia as well as the price sensitivity of consumers. Those findings highlight consumers' preferences for a region of origin even if it is without certifications.

Regarding studies on certified geographical indications on olive oil, Fotopoulos and Krystallis [92] studied the efficiency of the PDO scheme and its acceptance among consumers in Greece and found out that awareness of the PDO/PGI system of certification was very low. However, after being provided with the PDO/PGI certification definition, consumers' attitude towards it was very positive. Besides, both types of certifications have a positive influence on consumers and the existence of PDOs is seen as an important purchasing factor than price. Espejel et al. [93] examined the impact of satisfaction towards olive oil with Protected Designation of Origin (PDO) on the loyalty and purchase intent of consumers of olive oil carrying "Bajo Aragón" in Spain. The results showed the importance of the consumers allowance towards the links such as the origin, the territory, the raw materials, the know-how and the strict controls by the Regulatory Council of the PDO. All these aspects were decisive for the perceived quality of olive oil with PDO. In fact, these findings confirm the presence of high level of satisfaction and loyalty as well as of a major willingness to continue buying the olive oil from the PDO Bajo Aragon (Spain). In Spain also, Erraach et al. [94] examined the relative importance of designations of origin (the PDO certification, geographical indication without certification) related to extrinsic (price and packaging) and intrinsic (color) cues of olive oil for consumer preferences in Andalusia (southern Spain). Findings of this study revealed that price and origin labeling (PDO label) are the attributes that most influence consumers' preferences. Moreover, among 'origin' attribute levels, PDO label on extra-virgin olive oil was the most valued compared to geographical indication (without certification) and the absence of any information about origin. These authors have confirmed that for Spanish consumers, olive oil quality is not only related to intrinsic attributes, but also what it's affected by: the origin and the tradition of its production, identification with what is natural, and other peculiarities linked to territory and extrinsic characteristics. This outcome confirms the positive impact on (GIs) mentioned in previous studies as the product's contribution to the local economy,

promoting the environmental sustainability of farming practices and the ability to meet consumer expectations for the link between place and production.

4.1.3. Consumers Attitudes and Behavior Regarding 'Local' Labeling on Olive Oil

The lack of a clear definition represents an obstacle in the analysis of local food demand [57]. In the case of olive oil, various studies conducting consumer research on olive oil have considered the local attribute as an influencing factor on consumer behavior for olive oil [95–99], but the different perceptions and definitions of the term 'local' among consumers, researchers, regions and policymakers led to a variety of judgments among consumers.

Using a 'local' label to distinguish Californian olive oil from imported ones, Santosa and Guinard [95] found that US consumers who purchased and consumed local extra virgin olive oils as part of their diet appeared to be more likely to be motivated by other olive oil properties and consequences such as personal connections and supportive friends. Moreover, their results revealed that consumers who only consumed locally produced extra virgin olive oils were more likely to purchase extra virgin olive oil at farmers' markets than the other consumer segments who bought both imported and local olive oils or just imported ones. Besides local extra virgin olive oil consumers seemed to have the tendency of all consumer groups to read product labels constantly. Among the most relevant information items of interest when reading the label was where it was made (whether local or imported) and how it was made (organic or conventional). Within the same meaning, the study of Chan-Halbrendt et al. [96] in Tirana (Albania) used the attribute 'local' to distinguish Albanian olive oil or domestic one from the imported olive oil. The results of the latent class analysis showed 6 different classes of people with heterogenic olive oil preferences. Most respondents preferred national olive oil, although a small percentage preferred imported oil. Therefore, origin is an important factor of choice for three of the six consumer segments. which together make up 82% of those surveyed. In another research of Muça et al. [97], dealing also with Albanian consumers, it was found that they usually develop trust relationships with suppliers because they lack other information about the quality of the olive oil at the time of purchase. Hence, Albanian consumers preferred domestic olive oil, mostly from the south of Albania, because they were familiar with the taste and believe in its qualities not like when olive oil is imported. On the other hand, these consumers tend to buy olive oil based on family tradition and information heritage from generation to generation over time. Al Ganideh and Good [98] investigated the most important trends in Jordanian consumers' perceptions toward local olive oil and to examine whether they are ethnocentric toward purchasing their local olive oil. The results revealed Jordanians loyalty to their country's olive oil; they expressed strong ethnocentricity toward purchasing it with a purchasing tendencies influenced by nationalism. They ranked their local olive oil as the best olive oil worldwide.

Another important factor that explains the tendency of consuming local olive oil is the consumers' ethnocentricity, especially in producing regions that have a long tradition in olive oil production.

Chaaban [99] revealed the willingness of Lebanese consumers to consume olive oil carrying a national label. His findings showed that Lebanese consumers were highly concerned to buy their olive oil from a region they preferred, even if this region of olive oil origin is not their home region.

Another branch of literature focused on the use of local labeling as a reference for regional products. E.g. Perito et al. [100] explored what Italian consumers were looking for when purchasing olive oil. The results of comparison between different regions of production have shown that the respondents preferred their own region, suggesting that among regional products the local olive oil is preferred. This result influences the purchasing habits of the respondents since most of them purchase EVOO from the local market or directly from the local producer. Polenzani et al. [101] found out that revealing the consumers' opinion about the sustainability of this local product can be relevant in

order to assess how EVOO's local production could be developed. The results highlight implications related to the management of products. The local EVOO should not be sold by large retailers, nor should it be interested in sales and discounts, because these are items that consumers do not expect from a local and sustainable extra virgin olive oil. Furthermore, an exchange of information, between producers and consumers, is a relevant detail to facilitate the recognition of this olive oil by the consumers as a sustainable product, rewarding as a result the small local producers.

4.2. Consumers Attitudes and Behavior Regarding Environmental Sustainability Labels on Olive Oil

Several studies investigated consumers' behavior regarding environmental sustainability labels on olive oil being the organic production process the most common. Sandalidou et al. [102] used a multi-criteria customer satisfaction approach to examine whether the quality of organic olive oil could affect consumers' purchasing behavior in Thessaloniki (Greece). Findings of this study showed that the attribute 'health' was considered the competitive advantage of organic olive oil. In the same line, Kalogeras et al. [103] conducted a study to identify Dutch consumers' willingness to pay (WTP) for organic olive oil. The authors found out that from all the factors hypothesized to positively influence Dutch consumers' WTP, only the experience of buying organic olive oil, the perception of the best quality organic olive oil, the attitude toward the organic concept, and the preference for purchasing organic olive oil from supermarkets were found to be significant for the choice of a bid. Surprisingly, the environmental-related factors have not been assessed with statistical significance, and the results suggest that WTP is influenced by experience, awareness, and consumer perception of better quality and higher price, and preference for retail distribution of organic olive oil. Liberatore et al. [104], who examined the factors influencing the purchase of organic extra virgin olive oil for Italian consumers. Factors related to environmental sustainability and support from the Italian food system were considered important but do not play a fundamental role in increasing consumer WTP. On the contrary, the perception of safety, nutritional and health benefits had a major impact on the WTP of organic olive oil among consumers. Torres-Ruiz et al. [105] analyzed the relationship between consumption levels and the factors limiting it. They found out that the 'organic' attribute is not highly appreciated by Spanish consumers. In fact, this lack of appreciation and desire for the 'organic' attribute is mainly due the consumer perception of the characteristics of organic olive oil that do not represent added value to these consumers.

Concerning the use of eco-labels on olive oils, only the study of Menegaki et al. [106] investigating consumer preferences and attitudes toward olive oil carrying exclusively eco-label was identified in this literature review. These authors investigated the willingness to pay (WTP) for olive oil from trees irrigated with recycled water. This research explores consumers attitudes towards the use of recycled water in agriculture. The results showed that the mean WTP for olive oil produced from olive trees irrigated with recycled water was €2.65, that represent 88% of its market price at the time of study. The authors concluded that public acceptability is a prerequisite for society to establish and promote water reuse projects.

4.3. Consumers Attitudes and Behavior Regarding Social and Cultural Sustainability Labeling on Olive Oil

Regardless of being a precious product with a high social impact in cultures and religious from antiquity, only a few studies have been conducted about social and cultural dimensions of sustainability impact on consumer behavior for olive oil.

Moreover, Kitagawa et al. [107] examined the effect of religious and cultural information on consumption behavior of olive oil. Results confirm the hypothesis that the rich cultural and religious unique background of the Mediterranean region makes it possible to differentiate the Mediterranean olive oil especially Greco-Roman images that are favorable to endorse olive oil among Japanese consumers. The study of D'Adamo et al. [108] aimed to reveal the role of family business assessing the opportunities associated with the development of circular economy (CE) models. Results showed that Italian consumers pay

attention to the use of natural resources and olive oil is considered as a natural product. In addition, family-owned olive oil mills (FOOMs) are considered more trustful since the relevant role of family guarantee that the entire life cycle of olive oil is shown. FOOMs that work for residential markets are the most preferred by consumers in comparison to the industrial ones that manage single lots of olives belonging to the same customers' land [108].

4.4. Competition or Complementarities between Sustainability Labels on Olive Oil

Consumers' purchasing behavior in choosing olive oil is complicated and multifaceted, because various factors are considered and evaluated during the purchasing decision-making processes [100]. Most research on sustainability labels investigated their importance without examining the competitions and complementarities between those labels [109–112]. Not surprisingly, such studies revealed that adding a sustainability attribute to a product adds value.

For example, Di Vita et al. [109] conducted a study to determine extra-virgin olive oil's main attributes that comprise the area of origin, the geographical designation (PDO and PGI), the organic certification, and price. A qualitative analysis of consumer behavior in Sicily, Rome and Milan showed that consumers from traditional olive oil producing areas, such as the southern Italian regions, are more likely to rate their local olive oil as better, while consumers from non-producing olive areas consider a high price as an indicator of quality, often buying the most expensive products. Furthermore, findings highlighted how organic production method and PDO certification influence Italian olive oil consumers. Markovina and Caputo [110] also tested the importance of various olive oil labels like country of origin, method of production and health claims, on purchasing decisions of Croatian consumers. The results reveal strong consumer preferences for local products and organic production methods. Those results are consistent with previous studies treated in the part of the origin labeling that confirm the relevance of the origin to olive oil consumers. At the same line the study of Panico et al. [111] estimated Italian consumers' willingness to pay for the olive oil origin (Italian, EU blended, EU and non-EU blended), certification (PDO/PGI/ Organic), price and taste. The findings indicate that geographical origin (100% Italian origin) and credence attributes (PDO/PGI certification and organic production) influence positively consumer preferences. In contrast, organoleptic properties still have little influence on consumer preferences. Liberatore et al. [112] investigated consumer attitudes toward Protected Denomination of Origin (PDO) and organic certifications in the Italian extra virgin olive oil market. Their results showed three main groups; the first includes consumers of extra virgin olive oil (EVOO) with PDO (27.2%), the second includes both certifications (PDO and organic) EVOO consumers (32.4%), while the third cluster consist of indifferent to certifications consumers (40.4%). Recently, Chousou et al. [113] highlighted that country and region of origin, regional certification and organic production certification are the main extrinsic properties that Greek consumers easily recognize, trust and associate with the authenticity of olive oil. The results of Chousou et al. [113] revealed the complementarities between (GI) certifications and organic certifications of olive oil and their importance as an initial determinant of consumer purchasing behavior.

Roselli et al. [114] also confirmed the existence of synergies and correlation between GIs and Organic Agriculture, emphasizing the promising use of those certifications for olive oil products. Consumers of EVOO with GIs and organic labels were more environmentally concerned and more interested in the health benefits of consuming EVOO.

In other studies, a comparison between different types of labels was done in order to reveal the most valuable one to consumers. For example, Scarpa and Del Giudice [115] found that the origin of the product (PDO and PGI) play a crucial role in consumer preferences for olive oil, and that local products were more popular because they found that olive oil from southern Italy was the first choice and was more common in the south than in the north. In addition, their results also show that the PDO and PGI labels are rated higher than organic certification. Menapace et al. [116] confirmed that Canadians consumers were

also willing to pay an additional premium for GI olive oil. Canadian consumers' willingness to pay for imported olive oils varies significantly from country to country and consumers are willing to pay an additional premium for GI oils. Erraach et al. [19] suggested based on Choice Experiment' results that consumer's utilities regarding the sustainability labels (Protected Designation of Origin, Organic Farming and Carbon Footprint) are positive which engender a higher probability of purchase of olive oil oils with those labels by consumers. However, the willingness to pay revealed that respondents would pay a higher differential price for olive oil with Organic Farming label compared to Protected Designation of Origin or Carbon Footprint. It is believed that these findings are consistent with those of Giannoccaro et al. [117] who finds that most Italian consumers value all eco-labels tested on olive oil, and that the organic label is the first eco-label with the highest WTP. Those results can be explained by the fact the organic label is already established on the market and strengthened by knowledge, familiarity, and trust. The results of the study also highlight that although the consumer awareness toward environmental sustainability for olive oil production, to add, consumer preferences are also highly heterogeneous.

More recently, Tempesta and Vecchiato [118] analyzed the demand for extra virgin olive oil in terms of some extrinsic characteristics such as region of origin (Veneto region), denomination of origin, organic certification and type of processing (artisanal or industrial). They confirmed that the region of origin was one of the most relevant attributes considered when purchasing EVOO and that the olive growing that guarantee the traditional landscape preservation appears to have a significant effect on consumer behavior, but only for some consumer segments. By contrast, the findings of Krystallis and Ness [119] showed that organic brand with HACCP is preferred to the PDO brand with HACCP, while both olive oils are preferred to the common olive oil with the country-of-origin information. Those findings emphasize the importance of certifications to consumers as a guarantee of quality and safety. Yangui et al. [120] found that olive oil preferences in Catalonia (Spain) are more induced by dietary traditions than the healthy food choices. In fact, Catalan consumers perceive a disutility from the organic certification in comparison to other production system alternatives (conventional and PDO). Moreover, Cavallo and Piqueras-Fizman [121] proved that the healthiness perception was improved by key elements on the label such as organic production, COOL and by the traits of consumers such as sustainability concerns. As a matter of fact, the EVOO origin was determined as the main attribute influencing EVOO healthiness perception that was by its way driven by organic production. This effect was lower to environmentally friendly consumers; We can assume that they are more conscious of the effects of organic production on the planet, but this does not affect the objective quality of the products, such as the content of health-promoting substances.

5. Discussion

5.1. Summary of the Key Findings

The main objective of this study was to reveal the state-of-art of research on consumer attitudes and behavior towards olive oil with sustainability labels.

This review concludes that the most prevalent sustainability labels on olive oil are origin labels. Most of the studies have confirmed the importance of origin as an extrinsic attribute to consumers [87,88,116], but with different preferences for the place of origin, which can be the country, the region or even the locality (village). Geographical origin labels supply consumers with an amount of information that is largely interpreted and valued by consumers differently and on an individual basis. Consumers' perception of olive oil quality based on the region of origin varies among countries [87,116]. Consumers from producing countries are more likely to show more sensitiveness to origin and to choose olive oil from their country-of-origin or the region-of-origin if they are from producing regions [89,90,96–98,100]. On the other hand, consumers from non-producing countries accord importance to the country-of-origin of the olive oil they would also consume [91,116]

and rely sometimes on certified geographical indications to choose the origin of olive oil they would consume with a higher value attributed to PDO compared to PGI [116].

Regarding studies that have primarily treated the environmental dimension, the 'organic' certifications are sometimes more valuable to consumers than the GIs certification [19,115,119] and less valuable in another study [120]. However, the findings show that the existence of both certifications for olive oil favors its probability to be chosen by consumers which emphasize the existence of correlation between both certifications, which prove the promising use of both certifications for olive oil. Moreover, consumers of olive oils with GIs and organic labels consider these as more environmentally friendly; here, consumers are very interested in health benefits of olive oil [19,111,120,121]. In addition, most of consumers independently of their locations valorize olive oil carrying an organic label and are willing to pay higher price for this attribute [102–104]. Motives for consuming olive oil organically produced were mainly self-interest-centered factors (i.e., better tasting, safer) not altruistic factors (concerning environmental sustainability).

Studies about the social aspect in sustainability labeling were merely present. Only 2 studies [107,108] were identified and their results confirmed consumer's sensitiveness to the rich cultural and religious unique background of the Mediterranean region and their great sense of trust towards olive oils family mills.

5.2. Consumer Preferences towards Sustainability Labels in the Context of Olive Oil

Consumers play a relevant role in making food chains more sustainable. In fact, by the choice's consumers make when purchasing food, they have a major impact on which foods are being produced, and the way they are produced. Based on that information, consumers decide whether to buy the product or not.

The results of this literature review confirm that consumer's preferences for olive oil carrying sustainable labels are positive and are willing to pay more for olive oil carrying those labels. However, the major drivers of this behavior are far from being sustainability as also concluded by Kaczorowska et al. [122], whose findings reveal that the sustainable consumption issue determines purchasing behavior of Polish consumers of olive oil only to a small extent. This jeopardizes the main objective of those labels.

For example, the endorsement of origin-based production systems and the protection of geographical indications (GIs) are crucial elements of the EU policy that aim to achieve sustainable rural development [123] while at the same time enhancing consumer confidence by reducing information asymmetry. The findings of studies investigating consumers' preferences for olive oil confirm that consumers were increasingly looking for quality products and able to pay a premium for authentic products from a geographical area [124]. This reveals the contribution of olive oil origin labels to the economy of local area, the promotion of the environmental sustainability of territorial farming methods, and the ability to meet consumer preferences and needs for quality products by guaranteeing the link between the place and the production [124,125].

If GI labels may assure consumers of a more authentic, unique, and better-quality food [126] while offering producers the chance to differentiate their products and perhaps obtain high prices, this reasoning does not necessarily imply that GIs have been treated from the sustainability perspective to both consumers and producers although the major aim of their creation in EU policy is sustainability.

For the case of olive oil, the findings indicate that consumers choose olive oil with sustainability labels for self-interest-raisons (taste, health, quality) and they are less conscious about the environment, the income of rural producers or the heritage and the tradition related to the product unless they are from a producing region as it is the case for the Italian consumers [112,115,117,118].

As it is the case for origin labeling, altruism does not drive organic share of purchases of olive oil [103,104,127]. Yet, consumers faced with an explanation of the techniques used to preserve the natural resources (olive oil from trees irrigated with recycled water) and protect the environment (obtained from ancient trees, produced in mountainous areas) or

cultural or religious image where olive oil have been considered an essential product of antiquity show more awareness and sensitiveness to the product [106,107,117].

Another interesting fact to mention in explaining consumer preferences for sustainability labels is the importance of familiarity and trust. Labels and certifications are common means by which this information is transmitted and checked, which deal with social issues, develop and implement standards, and train and disseminate labels and certifications. However, findings of Kaczorowska et al. [128] showed that even if most of the surveyed consumers were aware of certified labels, their understanding of the exact meaning of labels and what they stand for and what institutions or organizations issued them was very low. Consumers also need time to wake up and use the label. The consumption process is not homogeneous; not all consumers have the same values or want the same attributes [129].

Those findings are consistent with studies who have investigated more than one sustainability label of olive oil. Even if consumers value new eco-labels, they tend to value the organic label more highly, as it is already established on the market and is strengthened by increased consumer awareness, familiarity and trust [19,117]. In other words, values shared by consumers do not necessarily drive behavior.

Another relevant aspect that is crucial for sustainability labels is good images and a clear message to promote and protect the reputation of the label [130].

5.3. Perspectives for Future Research

The insights and findings from the relevant papers included in this review highlight the importance of consumer perspectives for the general research topic of sustainability.

Many researchers have already contributed with various valuable contributions to the questions of consumer behavior towards sustainability labeling, in general, and for olive oil. However, this review provides insights into research gaps and needs for future research in several directions.

With relevance to consumer research and sustainability, there are several opportunities for developing new research questions, frameworks, and models to contribute to consumer theory development aligned with the sustainability agenda. New research questions could be developed on several topics, hereby listed:

- Synergies and oppositions between different sustainability labels
- Consumer perceptions of geographical indications transition towards the inclusion of environmental aspects
- Cross-cultural analysis including different territorial context, for olive oil particularly including North/South Mediterranean and producer/non-producer countries
- Consumer behavior in the context of circular economy agenda, acceptance of products issued from waste and by-products

Perito et al. [98] emphasize the complexity of the consumer decision-making process with various attributes, yet only several studies [11,19,60,99] examine multiple sustainability attributes jointly. Such studies would require more complex methodologies but would also provide more relevant insight into the real consumer intentions towards sustainability labeling.

The joint analysis of several sustainability attributes is relevant for future research on geographical indications and consumers. Geographical indications recent research agenda is including sustainability aspects, in particular those of environmental sustainability [21,131,132], however more evidence is needed from the consumer aspects. Given that consumer research on sustainability rarely provides insights from two or more different territorial and cultural realities, there is a considerable gap in comparative studies on consumer behavior towards sustainability when different territorial, cultural, socio-economic context is provided.

Finally, aligned with the circular economy research agenda, questions could be developed towards consumers' perceptions about products issued from the circular economy,

about eventual circular economy labeling, about existing labeling with added value of the circular economy.

6. Conclusions

This study demonstrates insights on consumer attitudes and behavior towards olive oils carrying sustainability labels. 42 articles were attributed to the topic. Different types of labels were distinguished: origin labels (country-of-origin, region, local), environmental labels (organic and eco-labels), and social-cultural labels (fair trade). The analysis of 42 articles has highlighted the following key insights into consumers' attitudes and behavior towards sustainability regarding olive oil consumption.

First, the economic dimension of sustainability was the most evident aspect. Indeed, various studies have investigated consumers' preferences and willingness to pay (WTP) for sustainability labels and revealed that consumers are willing to pay premium prices for most of those labels, which contribute to farmers' income guarantee, market remuneration, producers' minimization of risks and position with respect to the market.

Second, concerning the social dimension, consumers from olive oil producing countries have shown a tendency to purchase their domestic product. Researchers have explained this tendency by 'ethnocentricity' that strengthens in this case the preservation of local knowledge, traditions and culture, the optimization of working conditions and the intergenerational continuity in agriculture avoiding the risk of its abandonment.

Third, for the environmental dimension, the most valuable sustainability label according to consumers was the 'organic' label that imposes a production without pesticides, herbicides, inorganic fertilizers, antibiotics and growth hormones. Most consumers, independently of their locations, valorize olive oil carrying an organic label and are willing to pay more for this attribute. In addition, preference for local olive oil can also reduce the environmental impact by the consumption of a product from a nearby region.

Regardless of the type of label, consumers' preferences for sustainability aspects regarding olive oil is mostly present but still not that obvious, which suggests that more clarifications in the information delivered by the label and more in-depth investigations about the drivers of consumer behavior towards olive oil carrying sustainability labels are needed.

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