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## Quality Perception of PDO extra-virgin Olive Oil: Which attributes most influence Italian consumers?

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### **Abstract**

*Given the regional dimension has become an extremely widespread concern in recent investigations of agro-food economics, this study aims at detecting extra-virgin olive oil's main attributes through a qualitative analysis of consumer behaviour in Sicily and in some Italian metropolitan areas (Rome and Milan), in order to identify the main variables that affect local with respect to regional production. The paper's aim is to inform olive oil stakeholders about consumer preferences regarding extra-virgin olive oil attributes, that include area of origin, geographical designation (PDO and PGI), organic certification and price. The aforementioned attributes constitute an additional factor of overall perceived quality, and verify if the perception of quality varies among consumers in different geographic areas. Findings emphasise the leading role that price plays and highlights how Italian olive oil consumers are positively influenced by an organic method of production and PDO certification. Furthermore, consumers from traditional olive oil production areas tend to identify their local extra-virgin olive oil as superior to others. Consumers from areas not traditionally olive oil producers consider price to be an indicator of quality and often purchase more expensive extra-virgin olive oil.*

**Keyword:** *geographical origin, Italian consumers, conjoint analysis, olive oil attributes.*

**JEL Codes:** *Q13, L15.*

### **1. Introduction**

Over the previous two decades, the certification of agro-food products has gained importance within the European Union. However, not all consumers have reaped satisfactory benefits from it. In many cases consumers have revealed an inadequate level of knowledge in their ability to identify and recognise the specific characteristics which

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might be employed in distinguishing high quality goods from those of a lower quality (Vecchio and Annunziata, 2011; Cicia et al., 2012)

This is the reason for which the European Union decided to develop a reputation for high-quality European products, introducing a specific rule system in order to better regulate the origin and the certification of agro-food products.

Over the past 70 years, many definitions have been proposed for the expression “origin of a product”. One of these is: a typical product, regional or traditional, whose quality and characteristics are strongly linked to the geographical name of the area of production (country, region or locality), and the human and natural resources of that area. Nowadays PDO or PGI certifications ensure not only the origin of the product, but guarantee ties to particular agro-climatic conditions, production practices and “savoir-faire”, as well as ties to the “terroir” (Valceschini, 1993; D’Amico et al. 2011; Allaire et al., 2011).

Geographical Indications constitute an effective differentiation tool in food markets (Deselnicu et al. 2011) and, at the same time, origin is an important attribute for both consumer and industrial product evaluations (Nagashima, 1977; Obermiller and Spangenberg, 1989; Verlegh and Steenkamp, 1999; Di Vita et al., 2013), being perceived as a quality indicator (Malorgio et al., 2008).

Typical products receive more favorable consumer attitudes and stronger country of origin images than atypical ones (Tseng and Balabanis, 2011). However, other characteristics also influence consumer attitudes. According to previous studies on product attributes (Nelson, 1970; Caswell and Mojduszka, 1996) intrinsic and extrinsic characteristics have been observed and investigated for PDO products (Fandos and Flavián, 2006; Espejel et al., 2007; Cembalo et al. 2008). A significant “relationship between the extrinsic and intrinsic attributes of a traditional food product and loyalty expressed by consumers” has been detected and is perceived as an indication of the quality of a product. This allows consumers to differentiate the high-quality products from those of a lower quality (Jacoby and Olson, 1985; Steenkamp, 1987; Zeithaml, 1988) and shows a positive and significant influence on buying intentions (Fandos and Flavián, 2006; Josiassen et al., 2008).

In this context several studies have been carried out on olive oil consumers through the analysis of factors that affect the demand for extra-virgin olive oil (Van der Lans et al., 2001; Tsakiridou et al., 2006; Menapace et al, 2011). Some authors have analyzed the relationships among consumer satisfaction, loyalty and buying intention of PDO extra-virgin olive oil, highlighting the importance that consumer tribute to geographical region of origin and its predisposition to repeat the purchase of a traditional product again (Espejel et al., 2008).

Concerning the method of production, recent research has focused on organic olive oil consumption, often reporting contradictory results. In Greece, demand for organic olive oil is positively affected by the socio-economic characteristics of consumers, as well as high income and employment status (Tsakiridou et al., 2006). Spanish consumers, on the other hand, whose social profile is similar to that of Greece, seem to be less interested in organic certification but are highly concerned about the origin of product (D’Amico et al., 2002).

Other studies have aimed at detecting different consumer segments by the identification of the main qualitative characteristics of the product. Through the implementation

of conjoint analysis, research has been carried out with the aim of describing and analysing consumer preferences for extrinsic quality attributes of olive oil (van der Lans et al., 2001; Fotopoulos and Krystallis A., 2001; Krystallis and Ness, 2005, Caniglia et al., 2006).

Different methodological approaches have been used to assess the preferences of Italian consumers and WTP for extra virgin olive oil in Italy (Scarpa and Del Giudice, 2004; Menapace et al., 2011). Findings suggest that the origin of the product is of importance and that there is a bias in preferences towards local products. Specifically, they revealed that certified olive oil from the south of Italy is more frequently preferred in the south than in the north of Italy (Scarpa and Del Giudice, 2004).

Besides the region of origin, prompts have a direct effect on regional product preferences for some consumer segments, particularly those resident in the product's region of origin (Van Der Lans et al., 2001) and preferences for regional products vary widely depending on different geographic contexts (Scarpa and del Giudice, 2004).

Given that the regional dimension has become an extremely widespread concern in recent investigations of agro-food economics, this study aims at detecting extra-virgin olive oil's main attributes through a qualitative analysis of consumer behaviour in Sicily and in some Italian metropolitan areas (Rome and Milan), in order to identify the main variables that affect local consumers with respect to regional production. The paper's aim is to inform olive oil stakeholders about consumer preferences regarding extra-virgin olive oil attributes, that include area of origin, geographical designation (PDO and PGI), organic certification and price. The aforementioned attributes constitute an additional factor of overall perceived quality, and verify if the perception of quality varies among consumers in different geographic areas.

## **2. Data and methods**

A casual sample of 1000 Italian consumers was interviewed to acquire information about their behaviour while purchasing extra-virgin olive oil and their perception of its quality attributes. Research was carried out in two different areas of Italy: southern Italy (SI) and central-northern Italy (CNI), in order to identify the main behavioral features of consumers in distinct geographical areas when presented with the same product.

Data was collected from a series of direct interviews carried out in 4 Italian metropolitan areas: Milan, Rome, Palermo and Catania. The survey investigated a homogeneous sample of consumers with the aim to find a general trend in organic olive oil consumption.

A specific questionnaire, including questions requiring closed answers and multiple choice questions, was submitted to a random sample of people in order to collect socio-economic information and analyse the behaviour of extra-virgin olive oil consumers, including the frequency of purchase, perception of quality attributes linked to olive oil and preferences regarding the area of origin.

The first part of analysis was carried out by means of univariate statistical techniques, comparing the data collected in the two areas of Italy: central-northern and southern.

The second part of study focused on the consumer's perception of quality by use of conjoint analysis.

The conjoint model assumes that agro-food products can be defined by a series of specific attribute levels and that the total utility of the product to the consumer is determined by the partial utilities (part-worths) of each attribute level (Cicia and Perla, 2000; Krystallis and Ness, 2005). The interview technique used was full-profile and was executed using SPSS 12.0 software for Windows. This method of analysis resulted in an orthogonal array and allowed for the identification of combinations of the attributes in a product that would maximise its utility to the consumer.

Owing to the identification of the attributes and their levels, an orthogonalisation procedure was adopted in order to gain an orthogonal array. This is a subset of combinations that allow for the estimation of utility. Overall, nine different combinations were presented (Table 1).

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**Table 1:** Organic extra-virgin olive oil profiles

<b>Profiles</b>	<b>Price (€)</b>	<b>Method of production</b>	<b>PDO certification</b>	<b>Geographic origin</b>
1	10,50	Organic	Yes	Tuscany
2	10,50	Organic	No	Apulia
3	8,50	Organic	No	Sicily
4	8,50	Traditional	Yes	Apulia
5	8,50	Organic	Yes	Tuscany
6	6,50	Organic	Yes	Apulia
7	6,50	Organic	Yes	Sicily
8	10,50	Traditional	Yes	Sicily
9	6,50	Traditional	No	Tuscany

After collecting data and information in order to define the importance assigned by consumers to the utility of a single attribute and attribute level, hypotheses were developed concerning the relationship between the overall utility of the product and its particular characteristics.

In order to identify the choices of olive oil consumers during the decision-making process, the rule of additive linear composition was used. According to this rule, the total utility of a product is equal to the arithmetic sum of the utility that each consumer associates with its different features in the context of the pre-selected levels which are substitutable among each other.

$$U_i = \sum_{k=1}^n \sum_{j=1}^m u_{kj} x_{kj}$$

In the above-mentioned equation,  $U_i$  represents the utility established by the consumer with regards to the  $i$  set of characteristics;  $u_{kj}$  is the partial utility assigned to the  $j$  level of  $k$  characteristics;  $x_{kj}$  is a binary variable with a value of 0 in the absence of the

attribute, and 1 in its presence. Therefore, a good result in terms of utility, is equal to the arithmetic sum of the utility and its attributes.

### 3. Results of univariate analysis

Concerning extra-virgin olive oil consumption, 90.4% of the central-northern sample (452 people) habitually consumed this product and the prevalent provenance of purchased extra-virgin olive oil was a national one (66.6%); only 32.5% of those interviewed (147 people) admitted to buying olive oil originating from their region (table 2).

In the southern area, extra-virgin olive oil consumption was higher than in the central-northern sample, with 95.2% (476 people) asserting that they purchased it. Consumption of local olive oil was widespread (51.7%) with only 47.5% admitting to consuming or buying olive oil produced outside the region, from the national market (table 3).

This first result confirms the strong ties of the southern sample to their gastronomic traditions and territory of origin and demonstrates the loyalty of these consumers to local production. In both areas the purchase of foreign extra-virgin olive oil was not widespread

**Table 2:** Purchase and origin of olive oil in Centre-North area

<i>Sample</i>	<i>number</i>	<i>%</i>
Purchasers of olive oil		
Yes	452	90.4
No	48	9.6
<i>Total</i>	<i>500</i>	<i>100.0</i>
Origin of olive oil consumed		
Regional	147	32.5
National	301	66.6
Foreign origin	4	0.9
<i>Total</i>	<i>452</i>	<i>100.0</i>

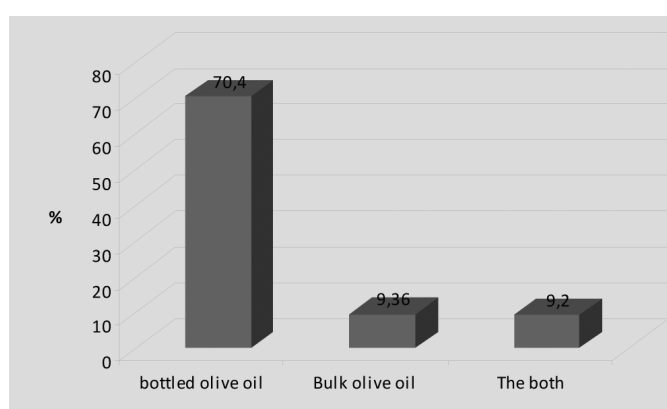
**Table 3:** Purchase and origin of olive oil in Southern area

<i>Sample</i>	<i>number</i>	<i>%</i>
Purchasers of olive oil		
Yes	476	95.2
No	24	4.8
<i>Total</i>	<i>500</i>	<i>100.0</i>
Origin of olive oil consumed		
Regional	246	51.7
National	226	47.5
Foreign origin	4	0.8
<i>Total</i>	<i>476</i>	<i>100.0</i>

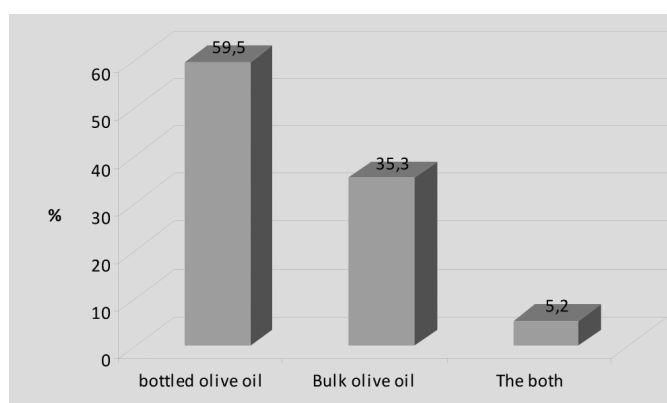
### a) Packaging

A specific question related to the packaging of purchased olive oil allowed to highlight the prevalence in the purchasing of bottled olive oil in the central-northern sample (70.4%) while olive oil bought in bulk was preferred by 20.4%<sup>5</sup>. The remaining part of sample (9.2%) admitted to buying both types (answers are shown in Fig. 1). For the southern Italian sample, the percentage of bottled olive oil consumption was around 59%, while the buying of olive oil in bulk was 35.3% (Figure 2).

This result is justified by the greater number of olive oil producers and by higher presence of oil mills in the southern regions of Italy. Consumers in the southern area are in direct proximity to the production market, thereby facilitating the purchase of local olive oil. Furthermore, in a context where small scale farming is widespread, the consumption of *self-produced* olive oil is relevant.



**Fig 1:** Packaging of purchased olive oil in Centre-Northern area



**Fig 2:** Packaging of purchased olive oil in Southern area

Concerning bottle size, the central-northern Italy sample showed a greater inclination to buy bottles of 0.75 and 0.50 cl. This trend could depend on household composition (a large number of single households were detected among the investigated sample) or the custom of buying high-priced olive oils which could influence consumers to buy smaller-sized bottle.

In the southern area, respondents preferred 1 litre-sized bottles (52.5%) and greater

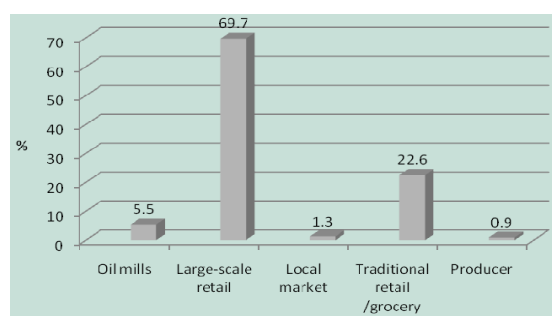
<sup>5</sup> Bulk olive oil actually refers to oil that's not yet packaged for retail sale.

or equal to 5 litre-sized bottles (38.0%). Consumption of 0.75 cl. bottles was moderately widespread (8.6%), while the purchasing of 0.50 cl. bottles was practically nonexistent.

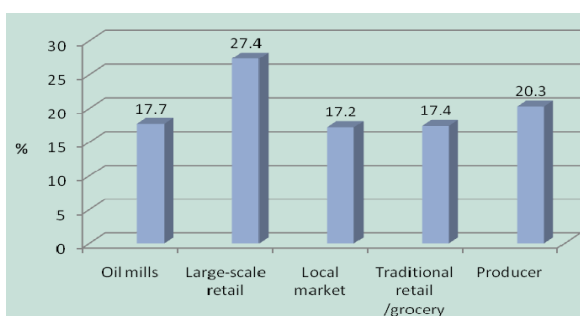
### **b) Places of purchase**

Consumers in the central-northern area mainly purchased extra-virgin olive oil at supermarkets or in large-scale retail stores (69.7%) because of their residence in predominantly metropolitan areas (Fig. 3).

A large amount of those interviewed (22.6%) admitted to purchasing olive oil directly from grocery stores (or traditional stores) particularly when they wanted to buy high-quality olive oil, while just 5.5 % of the sample bought the product at oil mills. Purchases of olive oil in other places, such as local markets, were not so common. These findings suggest that central-northern consumers prefer northern (Liguria) or central (Tuscany and Umbria) Italy's extra-virgin olive oil, while Sicilian olive oils are rarely consumed in this area and remain relatively unknown.



**Fig. 3:** Places of olive oil purchases in CN area



**Fig. 4:** Places of olive oil purchases in SI area

Consumer behaviour in southern Italy with regards to places of purchase was quite different (Fig. 4). The investigation demonstrates how only 27.4% of the sample admitted to purchasing olive oil in large-scale retail stores, whereas the percentage of people who bought directly from the producer was 20.3%, showing a completely different trend to that observed in the central-northern area.

The percentage of people who bought olive oil in other places of purchase was fairly equally distributed: traditional stores (17.4%), local markets (17.2%) and local oil mills (17.7%).

### **c) Sensory characteristics**

Due to the importance of sensory characteristics in the evaluation of high quality olive oil, interviewed samples were asked to express their opinion on 5 sensory characteristics related to olive oil: colour (yellow or green), transparency (clear or opaque), taste (herbaceous or fruity), spiciness (strong or mild) and flavour (delicate or intense). Figure 5 reports the main findings on the sensorial attributes of olive oil.

Green colour was preferred to a yellow one's in both geographic areas, even though the percentage of preference of green was much higher for the southern sample (71%) as opposed to the central-northern one (52.2%). However, yellow colour registered a high amount of preferences in the central-northern area.

Concerning transparency, both areas were more interested in buying clear olive oil. 72% preferred it in the central-northern area and 62.5% in the southern area sample.



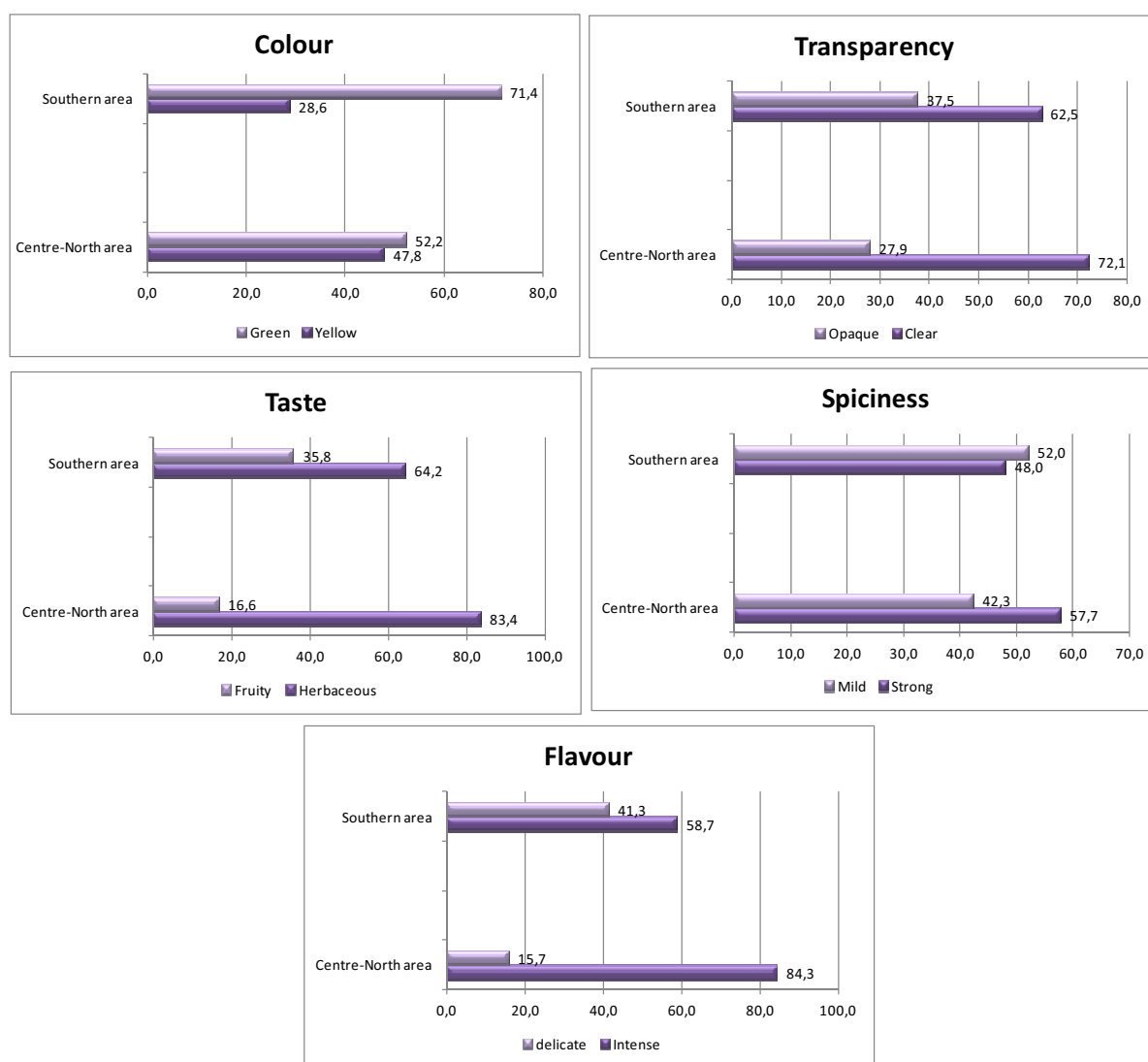
[Despite a high amount of people assigning importance to the transparency of olive oil, we believe that this attribute is not a true expression of quality, but is simply an expression of a specific technological process or cultivar.

In both samples consumers preferred olive oil with a fruity taste, rounding 84% in the CNI area and 64% in the SI area. Preferences for a herbaceous taste were expressed by 1 out of 3 people in the southern area (35.8%), while this characteristic was less appreciated in the central-northern area.

On the contrary spiciness was not widely appreciated on the whole. Strongly spicy olive oil was preferred by more people in the CNI area, while mildly spicy olive oil was preferred by the SI area's consumers.

An intense flavour rather than a delicate one was preferred by both samples, with percentages of 58.7% and 84.3% respectively.

These findings suggest important implication for producers and stakeholder furthermore they reveal the growing attention of consumers towards the physical attributes of olive oil. However, at the same time, they suggest a low level of recognition of common quality characteristics. This highlights the importance of consumer education in the



*Fig. 5: Sensory profile*

characteristics of the sensory attributes of olive oil. Producers could increase their sales if consumers were better informed about organoleptic attributes and the nutritional benefits of extra-virgin olive oil.

#### 4. Results of conjoint analysis

The Conjoint analysis has been widely used to identify the consumer's preferences for different agro-food productions, particularly toward fresh organic products such orange and tomato (D'Amico and La Via 2000, D'Amico and Pecorino 2001; D'Amico et al., 2002) or processed products such as wine, olive oil, etc. (Vastola, 1996, Loseby and Brinchi, 1996; Cicia and Perla, 2000, van der Lans et al., 2001; Fotopoulos and Krystallis, 2001; Cicia *et al*, 2002; Krystallis and Ness, 2005; Caniglia et al. 2006).

The objective of the conjoint analysis system is to identify the attributes of goods that generate maximum utility and to establish the influence of each attribute on the consumer, who is asked to classify the alternatives according its own preferences.

Findings obtained from the conjoint analysis highlight the importance of price and geographic origin both in the centre-north (Tab. 5) and in the south of Italy (Tab. 6). Both these attributes affect the consumers more than the method of production and PDO certification.

In central-northern areas, results indicate the leading role of price (38.90%), followed by the place of origin of the olive oil (24.50%), the certification of quality (19.22%) and the method of production (17.37%).

By analysing the individual items and the utility values of each level, it can be observed that the price preferred by the central-northern consumer was 6.50 € at its lowest.

Concerning the geographic area of origin of the olive oil, Puglia was the central-northern consumer's favourite region, followed by Tuscany and Sicily.

This result suggests that Sicilian olive oil hasn't a strong enough standing on a national level, probably because its market penetration is quite small and requires correct strategic choices by producers in order to acquire strength in competitive areas.

**Table 5:** Results from conjoint analysis in Central and North Italy

<i>Attributes</i>	<i>Levels</i>	<i>Averaged Importance %</i>	<i>Coefficient Values</i>
Price	6.50 euro	38.90	-0.7517
	8.50 euro		-1.5035
	10.50 euro		2.2552
Geographic origin	Apulia	24.50	0.3892
	Tuscany		-0.0590
	Sicily		-0.3302
PDO certification	Yes	19.22	0.8081
	No		-0.8081
Method of production	Organic	17.37	0.6889
	Traditional		-0.6889

Pearson's R = 0.919, Constant = 6.0050

As for the PDO quality certification, consumers indicated moderate interest towards it (0.8081), while the production method represented the least important attribute that influenced the consumer's choice/utility, even though consumers demonstrated interest in organic production (0.6889).

**Table 6:** Results from conjoint analysis in South Italy

<i>Attributes</i>	<i>Levels</i>	<i>Averaged Importance %</i>	<i>Coefficient Values</i>
Price	6.50 euro	31.42	1.0957
	8.50 euro		2.1913
	10.50 euro		-3.2870
Geographic origin	Sicily	25.30	0.6280
	Tuscany		-1.1014
	Apulia		-0.5275
PDO certification	Yes	24.09	1.0027
	No		-1.0027
Method of production	Organic	19.19	0.6435
	Traditional		-0.6435

Pearson's R = 0.999, Constant = 6.6310

In southern Italy, the price of olive oil was the attribute with the greatest importance (31.42%). Percentage of interest in the other attributes was as follows: geographic origin (25.30%), PDO certification (24.09%) and method of production (19.20%). Taking into account the utility values for each level, it is interesting to note that in this area the price preferred by consumers was 6.50 € at its lowest. Sicily was the preferred region of origin for olive oil as selected by the southern sample (0.6290), followed by Tuscany and Apulia. With regards to PDO labelling, consumers preferred PDO certified olive oil (1.0027), while organic production was the less important quality factor among all those considered.

Results were also confirmed by Pearson's R value, which provides an indication of the adaptation's degree of model to the observed data. Each sample's perception of quality, their preferred attributes and their level have been reported in Table 7.

**Table 7:** Ideal profile of sample

<i>Centre-Northern Italy</i>	<i>Attributes</i>	<i>Southern Italy</i>
<i>Levels</i>		<i>Levels</i>
10.50	price (€)	8.50
Apulia	Geographic origin	Sicily
yes	PDO certification	yes
organic	method of production	organic

## 6. Conclusions

The second half of the last millennium has been characterized by considerable changes in the lifestyle and eating habits of consumers. However, recent years have seen a new trend in dietary habits determined by the economic crisis and probably coinciding with the introduction of Euro, which has led to rising prices and has caused consumers to be more careful during the purchasing process.

In this context, the quality of agro-food products constitutes an essential prerequisite for the consumer. Local or regional products maintain their reputation as a means of continuing traditions and knowledge related to a particular region

A first objective of this paper was to investigate consumer behaviour and attitudes towards extra-virgin olive oil. A second objective was to identify the relevance of a set attributes or product characteristics, with particular attention towards the regional dimension of consumer preferences regarding the origin of extra-virgin olive oil.

As regards sensory characteristics, taste and flavour were more appreciated in CNI while green colour and pungency were more highly evaluated in SI. Bottled olive oil was mostly consumed by all two samples. However, consumption of olive oil bought in bulk was still fairly widespread on the southern market.

For both of the investigated areas, price was the most valued attribute and the southern origin of olive oil received the highest appreciation from both samples of consumers. Additionally, results show how consumers of traditional production areas, such as the southern Italian regions, tended to identify their local olive oil as better, while consumers from areas not traditionally olive oil producers considered a high price to be an indicator of quality, often purchasing the most expensive products on sale.

Findings also highlight that Italian olive oil consumers were positively influenced by an organic method of production and PDO certification.

The information derived from this study can be useful in providing policymakers and olive oil producers with a deeper knowledge of the behaviour of Italian consumers and may help them better understand future attitudes of consumers towards the quality attributes and origin of extra-virgin olive oil.

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