

Are there Regional Differences in the Quality Perception of Fresh Citruses? A Preliminary Study on Italian Consumers

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Abstract

Citrus fruits are among the most important crops for Italy both in terms of production and the area invested but their consumption appears to be slightly down and an in-depth study of their potential in the market becomes necessary in view of a relaunch in commercial terms.

The aim of this survey was to investigate the main aspects of consumption, through the analysis of the dynamics related to the process of buying fresh citrus fruits, looking at a sample of consumers from northern Italy and a sample of consumers from southern Italy.

In order to comply with the lines of research, the surveys were conducted in two different areas: the first located in northern Italy, particularly in the metropolitan areas of Milan (MI) and Turin (TO), and the second in the Calabria region, in the five different provinces. A total of 846 face-to-face surveys were carried out: 346 units in northern Italy and 500 in southern Italy.

Citrus fruits confirm their 'health function' as they are strongly associated with nutritional and health benefits. Oranges and clementines have almost similar levels of appreciation in both areas, even for mandarins there are no particular differences, although perhaps in northern Italy there is a slightly higher appreciation. Among other citrus fruits only lemons show a certain degree of appreciation, while minor citrus fruits such as grapefruits, citrons, bergamots, and limes do not seem to significantly attract the sample considered in any of the areas examined.

Keywords: citrus fruits; fresh; consumption; quality perception; health function.

1. Introduction

Citrus fruits are among the most important crops for Italy both in terms of production and the area invested, constituting 9% of the gross marketable production and about 12% of the area invested compared to the total of the national fruit and vegetable sector (Ismea, 2017; Nicolò et al., 2017).

In Italy, the consumption of citrus fruits appears to be fairly consolidated and homogeneous, both in the southern regions, where citrus fruits are grown and produced, and in the areas of central and northern Italy where citrus fruits, although not cultivated, are highly appreciated by consumers (Scuderi and Pecorino, 2015). Despite their economic importance, in terms of sales and employees in the sector, the consumption of citrus fruits appears to be slightly down and an in-depth study of their potential in the market becomes necessary in view of a relaunch in commercial terms (Iofrida et al., 2018).

Analysing the reference literature reveals that recent studies on citrus consumption have been focussed only on certain types of citrus fruits. In 2004, a study was conducted on the product characteristics and attributes that could influence consumer choice for satsumas and mandarins (Campbell et al., 2004;

Campbell et al., 2006). In addition, consumer preferences for fresh citrus were investigated by Gao et al. (2011) the authors found that freshness, flavour, and appearance were the most relevant attributes for fresh citrus consumers.

Although citrus fruits are among the most consumed fruit in the world, both fresh and as processed products (juices, extracts, etc.) and numerous studies have highlighted their importance in terms of the environment and landscape (Di Vita et al., 2015; 2018), limited scientific contributions appear on the consumption of these products.

The aim of this survey was to investigate the main aspects of consumption, through the analysis of the dynamics related to the process of buying fresh citrus fruits, looking at a sample of consumers from northern Italy and a sample of consumers from southern Italy.

Previous studies have in fact shown how consumption follows different dynamics, i.e. preferences segment differently in relation to the different regional identity of consumers (Panzone et al., 2016). Therefore, starting from consumption habits and places of purchase, preference levels for the following citrus fruits were analysed: oranges, clementines, mandarins, lemons, grapefruits, citrons, bergamots, and limes,

as well as the health-nutritional moments and motivations related to citrus consumption. The analysis was carried out in two different Italian regional contexts, the southern and the northern, in order to outline more precisely the characteristics and consumption patterns of citrus fruits and any differences in terms of consumer perception of quality.

2. Data collection and Method

This survey on the consumption of fresh citrus fruit in Italy was carried out between October and December 2016. In order to comply with the lines of research, the surveys were conducted in two different areas: the first located in northern Italy, particularly in the metropolitan areas of Milan (MI) and Turin (TO), and the second in the Calabria region, in the five different provinces.

With regard to the northern areas of Italy, the questionnaires administered totalled 346 units (180 in Milan, 166 in Turin), while the surveys in Calabria were carried out on a sample of 500 individuals. Both were carried out through the use of the same questionnaire card completed on the spot and administered by favouring the face-to-face method.

The questionnaire card made it possible to acquire various pieces of information on the socio-economic and cultural aspects of the subjects interviewed, on their behaviour in the purchasing phases in relation to the characteristics of the commercial distribution, on their perception of the quality and price of these products, as well as on opinions linked to consumption. The questionnaires were administered in some supermarkets of the large-scale retail trade in areas representative of the consumption of agricultural and food products in the cities of Turin and Milan and in the five provincial capitals of the Calabria region.

The questions contained in the questionnaire aimed to obtain qualitative and quantitative information on the various aspects that the survey aimed to explore. The questions asked were either closed (or bound) or multiple-choice, offering the respondent a series of options from which they were asked to choose the one closest to their opinion or behaviour. Moreover, almost all questions were articulated through specific Likert scales.

The questionnaire was divided into five parts and information on the different types of citrus fruits most consumed was gathered. The questionnaire on the consumption of fresh citrus fruit was divided into four sections. The first part of the questionnaire was aimed at measuring the frequency of purchase and consumption of the following citrus fruits: oranges, clementines, mandarins, lemons, grapefruits, citrons, bergamots and limes. The second part required consumers to express their perceptions of any health aspects related to citrus fruit consumption in general. The third section of the questionnaire was aimed at detecting the significance and the level of importance assigned to the intrinsic and extrinsic attributes of oranges and clementines. The last part of the questionnaire concerned the socio-economic characteristics and some physical characteristics of the consumers interviewed.

The data were aggregated into two different blocks, the first containing the information from the north and the second containing the information from the south of Italy. A variety of statistical analyses were undertaken, carried out through the calculation of mean, mode, and medians. The characteristics of the sample in the two areas examined are shown below (Table 1).

Subsequently, a qualitative analysis was carried out by developing perceptual maps as in a previous study (Di Vita et al., 2017). Perceptual maps are a marketing technique that allow for the visualisation of consumer preferences or perceptions (Garber et al., 2003). In this paper, maps allowed us to visualise the characteristics of the citrus fruits considered the most important by respondents. The perceptual maps we developed had two dimensions and they were used to identify any

attributes linked to citrus fruits such as sensory and nutritional parameters and ease of use.

Calabria

Category	Variable	Number	Percentage
Gender	Women	254	50.8
	Men	246	49.2
Age	18-30	137	39.6
	31-45	142	41.0
	46-60	155	44.8
	> 60	66	19.1
Education	Primary – middle school	101	20.2
	High school	234	46.8
	University	130	26.0
	Post graduate	35	7.0
Average monthly income euro	< 1000	60	17.3
	1,000-2,000	188	54.3
	2,000-4,000	111	32.1
	>4,000	45	13.0
	Did not answer	96	27.7
Total		500	100

Torino-Milano

Category	Variable	Number	Percentage
Gender	Women	205	59.2
	Men	141	40.8
Age	18-30	73	21.1
	31-45	104	30.1
	46-60	134	38.7
	> 60	35	10.1
Education	Primary – middle school	41	11.8
	High school	111	32.0
	University	164	47.3
	Post graduate	31	8.9
Average monthly income	< 1.000	24	6.9
	1,000-2,000	128	37.0
	2,000-4,000	84	24.3
	> 4,000	20	5.8
	Did not answer	90	26.0
Total		346	100

Table 1. Socio-economic characteristics of the sample

1. Results

Below are the main results obtained from an initial processing carried out through simple descriptive statistical analysis (mean, mode, median). In order to outline more precisely the characteristics and consumption patterns of citrus fruits, the analyses were conducted in parallel in the two geographical areas of investigation.

The first block of questions focused on the dynamics related to the process of buying fresh citrus fruits. With regard to the frequency of purchase, there is a first, albeit slight difference between the areas examined, in fact, in the south the purchase of citrus fruits occurs more frequently, usually twice a week, while in northern Italy the purchase is generally made on a weekly basis (Table 2).

	CALABRIA	TO-MI
	%	%
Frequency of purchases		
Once a month	15.0	6.1
Once a week	36.0	52.6
Several times a week	38.4	38.2
Daily	10.6	3.2

With regard to the places of acquisition, the survey reveals some similarities between the two samples. In both areas the

habit of buying mainly from traditional retailers still remains. At the same time, however, there are significant differences with regard to purchases made at large-scale retail outlets.

Citrus fruit purchases at the hypermarket and supermarket are more frequent in northern Italy, while in Calabria citrus fruit

purchases at discount stores are more prevalent.

Finally, as was to be expected, purchases from producers and purchasing groups are more important in the south, although purchases from producers also represent a trend with a certain degree of diffusion in the north.

Table 3.
Place of purchase

	Supermarket %	Fruit and vegetables shop %	Discount %	Producer %	Purchase groups %	Hypermarket %
CALABRIA	21.8	24.2	14.3	16.1	9.1	14.5
TO-MI	30.8	23.9	7.9	12.9	3.3	21.1

It is interesting to analyse the degree of preference that individual consumers give to different types of citrus fruit. In this sense, the levels of appreciation for oranges and clementines appear almost similar in both areas; even for mandarins there are no particular differences, although perhaps in the area of northern Italy there is a slightly higher appreciation.

As far as the other types of production are concerned, only lemons show a certain degree of appreciation, while grapefruit, citrons, bergamots, and limes do not seem to significantly attract the sample considered. The latter result is almost certainly due to the lower availability and variety of production as well as the lower consumption of these citrus fruits.

	Oranges	Clementines	Mandarins	Lemons	Grapefruits	Citrons	Bergamots	Limes
CALABRIA								
Mean	4.6	4.7	4.6	3.8	2.9	2.8	2.9	2.6
Median	5	5	5	4	2	2	2	2
Mode	6	7	6	4	1	1	1	1
TO-MI								
Mean	5.6	5.7	5.0	4.6	2.8	1.9	1.7	2.1
Median	6	6	5	5	2	1	1	1
Mode	7	7	7	5	1	1	1	1

Table 4.
Preference levels
for individual citrus fruit

On the basis of the surveys carried out, the moment of greatest consumption of citrus fruit is mainly concentrated during meals, in particular the sample analysed has peaks of consumption during lunch and dinner.

As far as the times of the day are concerned, these do not

appear to be as significant. Therefore, citrus fruits seem to follow a fairly widespread custom among Italians, which sees the consumption of fruit concentrated mainly during meals while they are poorly consumed as a snack, or aperitif.

Table 5.
Consumption times
during the day

	Breakfast	Mid-morning snack	Lunch	Afternoon break	Aperitif	Dinner
CALABRIA						
Mean	3.2	3.5	4.4	3.8	2.8	3.9
Median	3	3	5	4	2	4
Mode	1	1	6	1	1	1
TO-MI						
Mean	3.1	3.5	4.3	3.9	2.2	4.5
Median	2	3	5	4	1	5
Mode	1	1	7	1	1	7

Citrus fruits fully confirm their "healthy identity" when consumers express the reasons that lead them to consume these products. The reasons given by the interviewees are strongly linked to the nutritional and health aspects in general. This perception is slightly higher in the northern sample. Taste is also considered a highly significant factor in both areas.

On the other hand, citrus fruits are perceived as capable of providing only low energy and as such are perceived as poor dietetically. Finally, economic factors also appear to be irrelevant, given that the price does not seem to significantly influence the consumption of these products.

	Nutritional	Health	Energy	Taste	Money saving	Dietary
CALABRIA						
Mean	4.7	5.0	4.3	4.8	4.0	3.7
Median	5	5	4	5	4	4
Mode	7	7	5	7	2	1
TO-MI						
Mean	5.4	5.7	4.0	5.6	3.0	3.0
Median	6	6	4	6	3	2
Mode	7	7	4	7	1	1

Table 6.
Consumption motivations

Since recent literature highlighted the antioxidant properties of citrus fruit, arguing that their high intake seems to be responsible for degenerative diseases risk reduction (Silalahi, 2002), and given the importance of the perception of health the consumers have towards specific agro-food products (Di Vita et al., 2016), the second part of the survey sought to deepen the level of knowledge and perception that consumers have about the possible health properties of citrus fruits. Consumers were asked to indicate which components, contained in citrus fruits,

they considered important from a health and nutritional point of view.

The overall perception of citrus as a health product is higher among consumers in northern Italy (98%) but is also strongly significant in the Calabrian sample (85.6%). This outcome is in line with a recent paper on raspberry and blueberry consumption, where the health-related aspects are considered an important issue in quality assessing of fresh fruit product (Girgenti et al., 2016; Blanc et al., 2018).

The survey then analysed the relevance attributed by the interviewees to the main health and nutritional components of citrus fruits.

As a first result, the prominent role of citrus fruit as a "vitamin source" emerges in both areas, although this perception is slightly greater in northern Italy. The presence of mineral salts and, especially in the north, the presence of beta-carotene, are

also quite important components.

From the first results, therefore, a fair level of knowledge of the first three components emerges, while the presence of folic acid and flavonoids are poorly perceived, probably due to the lack of knowledge on the part of consumers, and therefore appear to be of little relevance.

Table 7.
Relevance of health
and nutritional components

	Mineral salts	Vitamins	Fibre	Beta-carotene	Flavonoids	Folic acid
CALABRIA						
Mean	4.3	5.1	4.0	4.4	4.0	4.0
Median	5	6	4	5	4	4
Mode	6	7	4	5	4	5
TO-MI						
Mean	4.8	6.2	4.3	4.4	3.2	3.2
Median	5	7	4	5	3	3
Mode	6	7	4	6	1	1

Subsequently, the analysis was aimed at assessing whether there is consumer interest in citrus fruits richer in antioxidants and vitamins. In both areas a high interest was observed, equal to 66.8% in Calabria and 68.7% in northern Italy.

The consumers were asked to express their willingness to pay a price differential for citrus fruits with a higher content of antioxidants. Based on the average prices for oranges (1.1 euro in the south and 1.8 euro in the north) and mandarins (1.2 euro in the south and 1.9 euro in the north), Table 8 shows the main results on the willingness to pay for oranges richer in antioxidants expressed by respondents.

In both areas, about a third of respondents do not appear willing to pay a price differential for citrus fruits richer in antioxidants. Nevertheless, there is a high acceptance for price differentials increased by 10%, again about one third of respondents for both areas examined. To a lesser extent, even the price range increased by 10-20% shows a certain acceptance; however, the acceptance of increased price decreases significantly after that, about 20% in Calabria and 15% in northern Italy.

	Null	Up to 10%	10-20%	20-30%	Up to 50%
CALABRIA	32.5	30.7	22.2	9.4	5.2
TO-MI	37.9	36.4	15.6	7.2	2.9

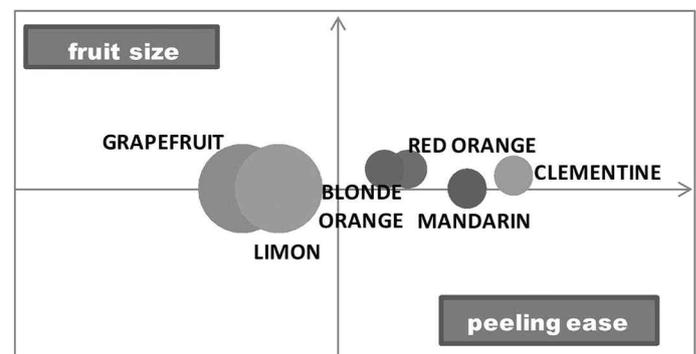
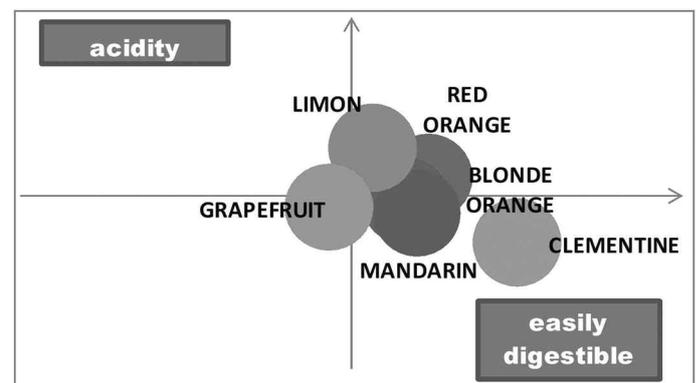
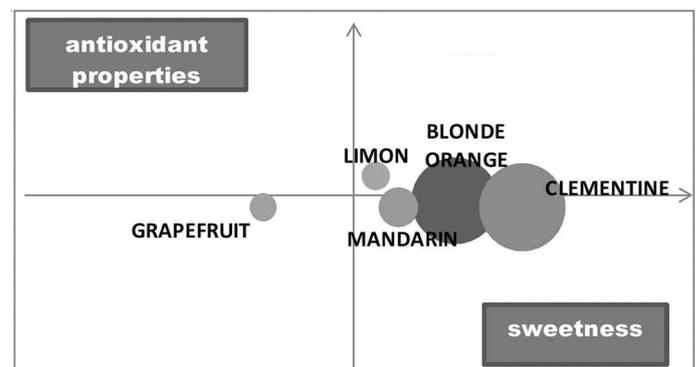
Table 8. Willingness to pay for a citrus richer in oxidising substances (%)

In the final part, perceptual maps were made on the basis of certain sensory, nutritional, and user-friendliness parameters in order to compare the different levels of perception that the consumer sample has about the quality of the main citrus fruits examined. Figures 1, 2, and 3 show the results obtained from the analysis of the consumers interviewed in Calabria.

The first graph shows the relationship between antioxidant properties and sweetness perceived by consumers. The ability of citrus fruits to have an antioxidant power is recognised by consumers across all citrus fruits, with the exception of grapefruit, in which is considered the least important. On the other hand, mandarins and clementines are considered among the sweetest citrus fruits.

The second graph relates the acid content and digestibility of citrus fruits. As far as the acid content is concerned, the sample interviewed consider the lemon and, to a slightly lesser extent, the red orange as the most acidic citrus fruit. Clementine is considered the most digestible citrus fruit, while the consumer perceives the digestibility of red orange and mandarin as high.

Finally, Figure 3 shows the interrelationship between 'ease of peeling' and the size of the fruit. With regard to the parameter 'ease of peeling', the following citrus fruits are considered the most suitable: clementines, mandarins and red oranges. While there are no significant differences in fruit size, the most appreciated size is medium-large.

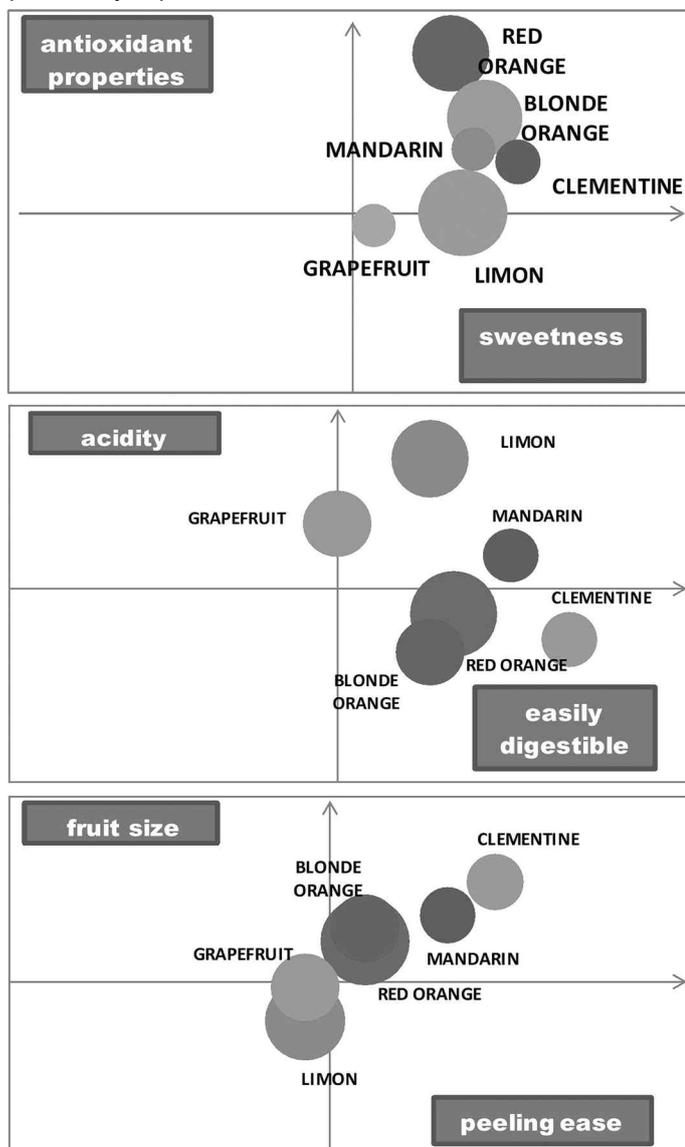


Figures 1, 2, and 3. Perceptual maps of Southern consumers

Perceptual maps were also created for the data collected in northern Italy, as shown in Figures 4, 5, and 6. In this area the results differ for some types of citrus fruit. There is, in fact, a different perception in the case of the antioxidant properties of citrus fruits; the red orange, first of all, and the blond orange are considered as the citrus fruits richer in oxidizing substances, while sweetness is considered an attribute more present in clementines and to a lesser extent in the same blond oranges.

As far as the acid content is concerned, the interviewees place lemon in first place, as one might expect, followed in descending order by grapefruit and mandarin. While clementines and mandarins are considered by the sample as the most easily digestible citrus fruits.

The ease of peeling is considered higher for clementines and mandarins, unlike in the southern area, and the size of the fruit (size) is among the quality parameters of importance, it is particularly important for clementines and mandarins.



Figures 4, 5, and 6. Perceptual maps of Northern consumers

4. Conclusions

The general objective of this study on the consumption of fresh citrus fruit was to investigate the interest shown by consumers in these products and to identify ideas and indications for the strengthening and development of the Calabrian citrus fruit sector in the national market.

The results largely confirm the findings of the current economic literature on citrus fruit consumption, although further and more in-depth analyses are deemed necessary in order to better define the degrees of correlation between the different variables examined.

Citrus fruits confirm their 'health function' as they are strongly associated with nutritional and health benefits; consumers perceive as positive the high presence of vitamins, minerals and, especially in the north, the presence of beta-carotene. In both areas, about a third of the respondents are willing to pay a price

differential increased by 10%, to have citrus fruits richer in antioxidants.

Going back to the analysis of individual citrus fruits, it was found that oranges and clementines have almost similar levels of appreciation in both areas, even for mandarins there are no particular differences, although perhaps in northern Italy there is a slightly higher appreciation. Moreover, with regard to the production of Calabrian citrus fruits, clementines and blond oranges are quite well known and appreciated by consumers in northern Italy.

As far as other types of production are concerned, only lemons show a certain degree of appreciation, while minor citrus fruits such as grapefruits, citrons, bergamots, and limes do not seem to significantly attract the sample considered in any of the areas examined.

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