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The quality perception of fresh berries: an empirical survey in the German market

Domenico Farruggia^{a*}, Marina Crescimanno^a, Antonino Galati^a, Salvatore Tinervia^a

^a*Department of Agricultural and Forest Sciences, University of Palermo, Viale delle Scienze, Ed. 4, 90128 Palermo, Sicily, Italy*

Abstract

The present work aimed to investigate the main quality attributes that influence the purchase decisions of fresh berries. To this regard, an empirical survey has been conducted by interviewing 200 consumers of fresh berries at the exit of the main centers of the large scale retail trade in the city of Munich (Germany). An econometric model has been adopted to examine the relationship that single attributes has on the purchase frequency of fresh berries. Results showed that nutraceutical properties and health benefits of berries have a strong appeal to the consumers and confirmed that intrinsic attributes are determinants of consumer purchase decision

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Keywords: quality perception, fresh berries, food quality, consumer shopping behavior, german market

1. Introduction

In the food basket of the families, fruit and vegetables are an integral part of a healthy diet and the consumption of a sufficient amount of vegetables and fruit, containing vitamins, potassium, magnesium, fiber and other components, is, in fact, negatively correlated with obesity and the risk of various forms of cancer and cardiovascular diseases (Dauchet et al., 2006). In particular, among fruits, in recent years there has been a growing interest for small fruits - of genera *Ribes* (currants and gooseberries), *Rubus* (raspberry and blackberry) and *Vaccinium* (blueberry)- not only in food sector but also for pharmaceutical and cosmetic use (Crescimanno et al., 2013). Di Palma (2011), points out that among the factors that influence the growth of consumption of berries there is, on the one hand, the growing interest in food preparations by a large part of consumers, and on the other, the health

* Corresponding author. Tel. +39091 23896623.

E-mail address: domenico.farruggia@unipa.it

properties owned by such fruits. With regarding this latter aspect, the increased awareness of the important health properties and nutraceutical held by several species of small fruits, is one of the main levers that drive consumers into buying choice (Crescimanno et al., 2014). This kind of fruit brings considerable benefits to health and falls within the category of functional foods that are defined as part of the normal diet (Diplock et al., 1999). In effect, they are an important source of dietary fiber, minerals and essential vitamins (Schnettler et al., 2011) with significant antioxidant and anticarcinogenic properties, in particular contained in blueberries, (Rimando et al., 2004; Seeram et al., 2006). In this scenario, the aim of the present work is to analyze the consumers' behavior of fresh berries in Germany which is the main consumer market of the EU to identify key quality attributes (extrinsic and intrinsic) that influence purchase decisions. To Achieve the aim, we did an empirical survey (face-to-face) to 200 consumers of fresh berries at the exit of the main centers of the large scale retail trade in the city of Munich (Germany). Knowing the behavior and motivations of consumer purchasing is very important for the production and distribution companies; so they can establish effective marketing strategies by maintaining and even increasing share of domestic and international market. This paper after the introduction follows with the literature review on fruits and vegetables and fresh berries behavior consumption, with the methodologies of the work and the results of the analysis; the conclusions close the work.

2. Letterature review

In today's society, the consumption preferences are diversified and deeply changed than in the past; income, demographic variables and lifestyles, are no longer sufficient to categorize consumers (Fabris, 2003). In developed countries, in particular, consumers are increasingly looking for quality food, and food healthier, safer, tastier and obtained with environmentally care (Gao et al., 2010; Alfnes et al., 2004; Parlato et al., 2014). The concept of quality, assumes today, especially for agro-food products, a multidimensional nature linked to a plurality of attributes (Grunert, 1997). Some attributes of quality, are easily noticeable and appreciable by consumers before purchase (quality expectation), but others, can be perceived only after (quality experience) (Grunert, 1997). These attributes, are of fundamental importance because, together, define and characterize the product and give consumer's utility (Lancaster, 1966). An important contribute to the definition of the concept of quality for the consumer, has given by Steenkamp (1997) with the approach of the "perceived quality". Steenkamp, on the base of the distinction of quality attributes in "extrinsic" and "intrinsic" adopted by Olson and Jacoby (1972), defines quality as a subjective concept that depends on the perceptions, the needs and objectives of the individual consumer. Based on this assumption, the concept of quality is divided into categories, each characterized by a number of factors that represent the key elements for the formulation of the consumer judgment (Zeithaml, 1988; Oude Ophuis et al., 1995; Steenkamp, 1997). The first category of factors, relate the extrinsic attributes (brand, country of origin, price, etc.) which concerning the product but at the same time does not belong it physically (Erickson et al., 1984). Some of these are representing by price, brand, packaging, certifications or even physical store point (Cardello, 1995; Meiselman et al., 2000; Tuorila et al., 1994; Verbeke et al., 1999). The second category concerns, instead, the intrinsic attributes (taste, smell, color, freshness, nutraceutical properties, etc.) which, unlike the previous ones, are closely related to the physical characteristics of the product; in agreement with Olson and Jacoby (1972), these attributes cannot undergo any modification if not by varying the physical characteristics of the product itself (Bredahl et al., 1998; Bryhni et al., 2003; Hurling et al., 2003; Issanchou, 1996). Furthermore, intrinsic attributes can be distinguished, in accordance with Nelson (1974), Darby and Karni (1973), in search attributes, experience attributes and credence attributes, with reference to the moment when the consumer verifies the quality of the product (Grunert et al., 2004). The search attributes (size, color, defects, etc.) and experience attributes (taste, freshness, etc) can applied by the consumers, respectively, before purchase and after consumption. Instead, the credence attributes are impossible to be evaluated both after the purchase as after consumption (Migliore et al., 2015). Indeed, these linked to the characteristics of the product and the production process that cannot be known with certainty by consumers even after consumption.

In the economic literature that studies the behavior of the consumer, to this day, small attention is been paid to small fruits, while numerous empirical studies have focused fruits more common and more widespread. These studies founded on the analysis of the main attributes of fruit quality that can influence consumer preferences. Specifically, personal characteristics, experiences and lifestyles or the socio-demographic variables, all play a

crucial role (Guillaumie et al., 2010). Menozzi and Mora (2012) argue that there are differences in consumption, depending on the country of origin (in southern Europe, there is a higher consumption of fruits and vegetables than in Northern Europe), gender (women tend to consume more fruit than males) or by age (the elderly consume more fruit than younger). Stark Casagrande and Gary-Webb (2010) studied the trend of consumption of fruits and vegetables in the United States and they argued that the differences for these products can be attributed, first of all, to the cultural profile and the food preferences of the consumers, and second to the strong competition of snacks and unhealthy foods; these latter are easily available on the market at lower prices than fresh products. Even the smallest advertising of fruits and vegetables compared to foods nutritionally poor, plays an important role; in fact, communication is a valuable tool to reduce the information asymmetry, bringing benefits if the source is credible (Brunso et al., 2002). In the case of small fruits, as shows the study carried out in Italy by Crescimanno et al., (2014), the intrinsic characteristics play a decisive role in the choices of consumers and, in particular the health properties. Referring to the classification of the attributes of quality made by Nelson (1974), Darby and Karni (1973), health aspects are within the so-called credence attributes as they cannot be experienced directly by the consumer even after consumption.

Indeed, there isn't a direct relationship between consumption and effect; the latter is too long term and therefore not measurable by the consumer; however with reference to the healthy eating (Brunso et al., 2002), these attributes take on considerable importance. Also the attribute color plays an important role in the perception of the quality of consumer and it is in some way connected to health aspects, because, as argued by James et al. (2002), the intense colors, as in the case of the berries, are associated with the presence of substances with preventive value against

certain diseases (stroke, cancer, etc.). In addition, the color is also an important indicator of taste, which has mentioned in the literature as one of the main factors on which consumers base their choices (Mitchell et al., 1988; Koewn et al., 1995; Thompson et al., 1995). Koch and Koch (2003) found that red color is linked positively to the degree of sweetness and fruitiness, and negatively with the degree of bitterness, acidity, frothy and syrupy. In addition, on the base of color, you can judge the degree of maturity and freshness of many fruits and vegetables (Francis, 1995). As found by Péneau et al. (2006), in a study conducted in EU countries and AgV (1981) in a study carried out in Germany, the freshness is the attribute that most influences the food choices of consumers. This factor, can assume a considerable importance in the case of small fruits in consideration of the fact that berries has characterized by a low shelf life (about three days) which certainly represents a limit for the fresh market. With regard to extrinsic attributes, price is one of the main factors taken into account in purchasing decisions by consumers, because it can gain more influence consumer behavior belonging to low income groups (Williams et al., 2012).

Di Palma (2011), however, states that in the case of small fruits the price could not affect particularly on the demand; indeed, this category of fruits is comparable to luxury goods that are bought not so much out of necessity, as a evocative factor. Certification schemes (and labeling) that give visibility to the territorial origin of the product or, for example, methods of production with low environmental impact, have been by years widely used in the food market (eg. The Protected Designation of Origin, The Protected Geographical Indication, the indication of the country of origin, organic certification, etc.). Espejuel (2007) shows that the designations of origin play an important role in the perception of the quality of the consumer. Indeed, Papanagiotou et al. (2013) and Font et al. (2011), show that the origin of products is one of the attributes that have considerable influence on the choice of the consumer, for which is a guarantee of quality. Some studies highlight the growing attention paid by consumers both to issues of sustainable development and animal welfare (Schimmenti et al., 2013; Schimmenti et al., 2010; Font et al., 2011), both to ethical theme, for example, social acceptance or the intention to support local production (Cembalo et al., 2012). Several studies has been carried out about the ethnocentric behaviors through which the consumer expresses a priori, a preference to products originating in their country or region as driven by the belief that the purchase of domestic products is valuable to support the economy of their country (Bertoli et al., 2005). On this base, a picture emerges quite articulate about the different types of quality attributes, intrinsic and extrinsic, from which may depend on the perception of the quality of berries. The hypothesis of our study is that consumers are driven by intrinsic attributes mainly in their choice (in particular healthy properties).

3. Materials and Methods

3.1. Sampling scheme and survey

The analysis of consumer's perceptions regarding the quality of berries was carry out in Munich (Germany). The reference population take into account for the direct survey is represented by the residents of the 25 administrative districts in which the city of Munich is divided, equal to $N = 1,410,741$ (Statistisches Amt München, 2011). The calculated sample dimension is $n = 384$, with $\varepsilon = 0.05$, $p = 0.5$ and a confidence level of 95%. Of this sample, 200 consumers completed the questionnaire, while the remainder, 125 have affirmed that they is not consumers of small fruits. 59 questionnaires were discarded for the incompleteness of the information collected. A proportional stratified sampling method was used according to the organization into districts of the city and taking account of different demographic size of each district (layer). In order to collect the data, a survey questionnaire was constructed on the basis of the reference economic literature on the consumer behaviour. The questionnaire is divided into three sections. In particular, the first section includes a set of variables aimed at know the frequency of consumption of fresh fruits and frequency of reading the labels of food products. The second one, specific for the berries, includes a set of questions focused to collect information on the frequency of purchase, the main motivations that drive consumers in their choice (purchase and consumption), the purpose of purchase, place of purchase, the number of species of small fruits purchased, and identification of quality attributes (intrinsic and extrinsic) that drive more consumers in their choices. Finally, the third and final section of the questionnaire, includes the socio-demographic information such as: gender, age, household composition, education level, the family's average monthly income, and job. A pilot survey was carried out on a sample of consumers in order to test the questionnaire. The final version of the questionnaire has been used in the consumer survey conducted via face-to-face interviews lasting approximately 15 minutes. Selection of respondent from each point of sales was made by random procedures (Cicchitelli, 2012) putting the condition that each of them should be responsible for the purchase household. This aspect is crucial in relation to prior knowledge that the individual has about a particular product and, according to Celsi and Olson (1988), this is an important factor in the consumer's ability to process information and is expected to affect the use of quality cues. Interviews were conducted in the large supermarkets located in the 25 district that constitute Munich, as areas characterized by a high concentration of consumers. The retailers in question, belonging to the main group of German large scale retail trade in terms of sales (Mantova Export, 2008) and with a surface area included in a range between 400 and 2,500 square meters, typical of the category of supermarkets (Guatri et al., 1996), were divided by district and identified on the map through the site www.yelp.de (2014). Was obtained a sample reasoned choice that consists of 55 outlets (supermarkets, organic supermarkets and discount stores), of which 28 are located in the central area of the city and 27 in the outlying districts. Interviews were conducted during the period May-July 2014. Customers were interviewed after completing their purchase in each retailer, during all time periods and in all days of the week, except Saturday afternoon and Sunday in order to avoid distortions due to the recurrence of the choices in a given time slot, and so interviewing different consumer segments. The compiling of the questionnaire, was made independently by the customers but under the supervision of the interviewer, in order to ensure completeness of collected data and provide any instructions.

3.2. Ordered probit model

In order to identify the main quality attributes (extrinsic and intrinsic) of small fruits that drive the consumer choice an order probit model was used. This model is included within the category of the multiple response models that can be used in cases where there are multiple and ranked discrete dependent variables. More precisely, this category of models is used when the values assumed by the multinomial variable are the ranges within which there is the reference continuous variable unobservable (Cappuccio et al., 2011). In other words, the observable response variable is of ordinal type and is connected to a reference continuous latent variable. In our study, the ordered probit model adopted, has been defined as follows:

$$y_i^{FR} = x_i' \beta^{FR} + \varepsilon_i^{FR}$$

where y_i^{FR} , expresses the level of satisfaction that is not directly observable by the consumers i resulting from the

purchase frequency (FR) of berries. x_i is the vector of explanatory variables, while β^{FR} is the vector of coefficients to be estimated. Finally, ε_i is the random error e , in the case of the probit model, is assumed to follow the normal distribution with mean zero and standard deviation equal to one. The dependent variable used (y_i), is the frequency of purchase of small fruits. We suppose that there is a correlation with quality attributes of the same products. Specifically, we assume that consumers are driven in their purchasing decisions primarily by intrinsic attributes, and in particular by healthy properties that have a positive influence on the purchase of small fruits. The dependent variable was defined through the adoption of a four level scale response distinguished in: “rarely” ($y_i = 1$), “2-3 times per month” ($y_i = 2$), “1-3 times per week” ($y_i = 3$), “daily” ($y_i = 4$). The choice of the explanatory variables included in the model, is mainly based on a categorisation of quality attributes adopted by Olson and Jacoby (1972), and then enhanced by Steenkamp (1997), according to which, quality attributes are divided into “extrinsic” and “intrinsic” (Tab. 1). The model estimation was performed with the statistical software STATA 10 using the likelihood-ratio test, in order to decide whether accept or reject the model in favour of an alternative model.

4. Results

4.1. Descriptive analysis

Respondents are predominantly women (59.5%), have aged between 46 and 55 years (22.5% of the total), a family composed mainly of three components (34.5%), a high level of training (41.0% have a master’s degree and 21.5% a bachelor’s degree) and are mainly employees (36%). Finally, 41% of respondents declares an average monthly household income between 3,001 and 4,000 euros (Tab. 2). The survey found that 62.0% of respondents reads “often” or “always” the label of food and agricultural products. However, is modest the share of those who give attention to the label “occasionally” (32.5%) or “rarely” (5.0%). Specifically with reference to the fresh berries, 60.5% of respondents claimed to consume these types of fruit only in the seasons of production, 28.0% throughout the year and 11.5% only on special occasions. The species most appreciated by consumers are the blueberry, raspberries and blackberries. While the species purchased less frequently is the gooseberry. With regard to the place of purchase, 29.5% of respondents claimed to buy the berries mainly at supermarkets or hypermarkets, discounters and follow the local markets (23.5%, respectively). Considerable is the data for the purchase of berries at organic supermarkets which are preferred from 11.5% of respondents.

Table 1 – Variables included in the model

Variables	Type	Definition	Mean	Sd
Color	Cat	from 1 a 5	3.56	1.26
Freschness	Cat	from 1 to 5	4.61	0.75
Taste	Cat	from 1 to 5	4.98	0.14
Health aspects	Cat	from 1 to 5	4.44	0.94
Brand	Cat	from 1 to 5	1.08	0.44
Origin	Cat	from 1 to 5	3.95	1.00
Price	Cat	from 1 to 5	3.53	1.37
Label reading	Cat	from 1 to 5	3.73	0.80
Purchase frequency	Cat	from 1 to 4	2.54	0.50
Sweet preparation	Cat	from 1 to 5	3.09	1.32
Special occasion	Cat	from 1 to 5	2.37	1.36
Special retailer	D	1 if specialized reailer	0.07	0.26
Supermarkets	D	1 if supermarket	0.41	0.49
Discount	D	1 if discount	0.24	0.43
Age	I	Age of consumers in years	44.83	14.37
Gender	D	1 if female	0.60	0.49
Educational level	I	Years of educational	15.46	2.86
Income	C	Family’s average monthly income	3,018.75	1,103.03

Note: D = dummy; I = integer; C = continuos; Cat = categorial

Table 2 - Socio-demographic and economic characteristics of the sample (n=200)

		Frequency	%
Gender	Male	81	40.5
	Female	119	59.5
Age	18-25	25	12.5
	26-35	35	17.5
	36-45	39	19.5
	46-55	45	22.5
	56-65	41	20.5
	> 65	15	7.5
Household composition	1	34	17.0
	2	42	21.0
	3	69	34.5
	4	44	22.0
	5 and over	11	5.5
Education	Primary School	2	1.0
	Lower secondary school	8	4.0
	Upper secondary school	64	32.0
	Bachelor's Degree	43	21.5
	Master Degree	82	41.0
	PhD	1	0.5
Occupation	Housewife	8	4.0
	Manager	2	1.0
	Unemployed	4	2.0
	Employee	72	36.0
	Entrepreneur	25	12.5
	Freelancer	20	10.0
	Workman / Craftsman	27	13.5
	Retired	19	9.5
Student	23	11.5	
Family's average monthly income	< 1,000 €	15	7.5
	1,000 - 2,000 €	24	12.0
	2,001 - 3,000 €	43	21.5
	3,001 - 4,000 €	82	41.0
	4,001 - 5,000 €	34	17.0
	> 5,000 €	2	1.0
Total		200	100.0

Source: Our elaboration on survey data

4.2. Results of the econometrics analysis

The results of the model (Tab. 3) highlight, through the analysis of the values of the probability ($P > |z|$), high levels of statistical significance for a large number of variables. Specifically, among the intrinsic attributes that has the highest level of significance is the variable “healthy”. The positive sign of the coefficient indicates that the increase in frequency of purchase increases the consumer's attention to the healthy-nutraceuticals aspects that characterize berries. This result is in line with findings from studies of Crescimanno et al. (2014) and Di Palma (2011) according to which, just the increased awareness of the important nutraceutical properties of berries is one of the main determinants of the purchase decision. Another important factor is that taste, as evidenced by the high level of significance and the positive sign of the coefficient, is one of the main intrinsic attributes affecting the consumption of berries of consumers of Munich. Is also significant for the color attribute (5%). The latter, however, does not influence purchase decisions in particular, consumers who purchase a high frequency, as is clear from the negative sign of the coefficient.

Table 3 - Results of Ordered Probit model

Ordered probit regression						Number of obs = 200	
Log likelihood = -38.31025						LR chi2 (16) = 52.33	
						Pseudo R2 = 0.1647	
Dependent variable: Freq_purch						Prob > chi2 = 0.0000	
Variable	Coef.	SE	z	P> z	[Confidence Interval 95%]		
Healthy	0.3698164	0.1335164	2.77	0.006***	0.1081291	0.6315037	
Taste	2.262391	0.8731876	2.59	0.010***	0.5509746	3.973807	
Color	-0.2322083	0.1022302	-2.27	0.023**	-0.4325757	-.0318408	
Freshness	-0.4531042	0.1688438	-2.68	0.007***	-0.784032	-0.1221765	
Brand	-0.300332	0.2427071	-1.24	0.216	-0.7760292	0.1753653	
Origin	-0.0884481	0.1238171	-0.71	0.475	-0.3311252	0.154229	
Price	-0.2627866	0.1040139	-2.53	0.012**	-0.4666502	-0.058923	
Prep_sweets	0.1846113	0.0877282	2.10	0.035**	0.0126673	0.3565554	
Spec_Occ	0.107288	0.0800234	1.34	0.180	-0.049555	0.264131	
Spec_ret	-1.813066	0.4854842	-3.73	0.000***	-2.764597	-0.8615342	
Discount	0.7164443	0.2727646	2.63	0.009***	0.1818355	1.251053	
Sup_org_sup	0.0006253	0.221362	0.00	0.998	-0.4332364	0.4344869	
Age	0.0080443	0.0357701	0.22	0.822	-0.0620637	0.0781523	
Gender	0.3861244	0.1994535	1.94	0.053*	-0.0047973	0.7770461	
Education	1.152326	0.6697314	1.72	0.085*	-0.1603237	2.464975	
Income	0.0012322	0.0982766	0.01	0.990	-0.1913864	0.1938509	
/cut1	6.953018	4.586053			-2.03548	15.94152	
/cut2	10.21685	4.705265			0.9947007	19.439	
/cut3	12.80229	4.722781			3.545807	22.05877	

* $p < .10$; ** $p < .05$; *** $p < .01$.

The result could be justified by the increased attention of consumers buying less frequently berries, to quality attributes most easily identifiable such as just the color, as it emerges from the literature (Mitchell et al., 1988; Koewn et al., 1995; Thompson et al., 1995; James et al., 2002), stands out as an important indicator of taste and health properties. Even the attribute “freshness” is statistically significant (1%), but negatively correlated with the frequency of purchase, pointing out that in the investigated sample is more likely to use this attribute by consumers who buy berries less frequently. Among extrinsic attributes, only the price was statistically significant (5%). The negative sign of the coefficient points out, confirming the findings by other authors (Williams et al., 2012), as this is an important factor discriminating purchase of berries. With increasing frequency of purchase, as also says Di Palma (2011), are the aspects of evocative character to prevail. Even the variable use of berries to make desserts, special dishes, etc., is significant (5%) and positively affects the dependent variable. With regard to the place of purchase, by the results of the model, emerges the high significance (1%) of the variable linked purchase from specialist retailers (Spec_ret). In particular, the negative sign of the coefficient indicates that the consumer who buys less frequently tend to prefer buying berries at the specialist retailer. This is because, due to less knowledge of the characteristics of the product, is able to get much more information on quality through dialogue with the retailer with whom it is possible to establish a trust relationship. Conversely, the analysis of the results show a high significance of the variable related to the purchase of berries at discounters (1%) characterized by a positive sign of the coefficient indicates a greater likelihood of purchase from this form distribution by regular consumers of berries. This result may be related to the fact that this group of consumers, has a greater ability to recognize the quality of the berries and to identify in the offer of discount, also on the basis of possible previous experience, the right

compromise between the quality of the product and the price of the same. Finally, as regards the socio-demographic variables were significant the variable “Gender” and the “Level of education” (significant at 10%) that positively influence the dependent variable. This means that consumers who purchase with a higher frequency of purchase, are mainly female and with a highly educated.

5. Conclusion

The survey conducted has confirmed some trends that see a growing attention of consumers to the qualitative aspects and in particular the health-agriculture and food production which become key elements in guiding their purchasing decisions. In particular, the study made it possible to outline the profile of the consumers of fresh berries in the German market through the analysis of quality attributes (intrinsic and extrinsic) that guide their choices. Specifically, in accordance with forecasts, showed that health aspects that strongly characterize the berries, followed by taste, freshness and color, are among the main factors that influence consumer behavior. This confirms what was stated by Diplock et al. (1999) which considers berries of functional food. The latter, in fact, are gaining more and more interest from consumers who recognize today, more than ever, the ability to reduce the risk of onset of disease and protect their health through a healthy lifestyle characterized, first, from a balanced diet (EUFIC, 2014). The attention paid by consumers to quality attributes intrinsic significance of the attribute is shared by the color that, as pointed out by James et al. (2002), is often associated by the consumer to the contents of beneficial substances with preventive effects against many diseases. The survey conducted shows that this attribute affects especially consumers buying less frequently berries because, being probably less connoisseurs of quality attributes of the same intrinsic, give more attention to the color. Even the taste and the use of berries to make desserts, special dishes, etc., were important determinants for the purchasing decisions of Bavarian consumers.

The limited geographical area, in which the survey was conducted, while not allowing you to transfer the results obtained in other social, economic and cultural, contributes to increasing the knowledge on consumer behavior of berries shape as a push for further empirical analysis in different geographical contexts.

The results, however, offer valuable suggestions both for Italian producers and retailers of berries and, at the same time, for decision makers to define adequate measures of sectoral policies.

From the managerial perspective, communication strategies should be put in place in order to increase the level of knowledge about the nutraceutical properties and health benefits of berries taking into account the importance that these attributes play in driving purchase decisions and consumption.

However, the implementation of effective communication strategies requires, investments that very often small companies are not able to bear on the economic level. In this sense, the definition of sectoral policy measures to support entrepreneurial initiatives in the field of communication, including support and participation in trade fairs, the implementation of information and communication campaigns aimed at encouraging the consumption of fruit among children or other means (radio, internet, television, etc.), could help increase the knowledge of the qualitative characteristics of berries.

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