International Journal of **Health Science**

CATA QUESTIONNAIRE TO ASSESS THE SENSORY ATTRIBUTES OF IDEAL WHOLE GRAPE JUICE

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Abstract: The consumption of whole/natural juice has increased significantly, as a result of the increase in demand caused by consumers who are more adept at a more natural diet. For the food industry it is important to understand how consumers perceive and appreciate products. The aim of this study was to investigate ideal sensory attributes of whole grape juice, comparing the results obtained in the sensory laboratory and through an online form. A CATA questionnaire was applied in a sensory laboratory, with three commercial brands of whole grape juice and at the end of the evaluation, the attributes for the ideal juice were evaluated. An online form was also applied, using the same attributes, on what an ideal whole grape juice must look like. The most important attributes for the ideal wholegrain are "characteristic color", "characteristic smell", "very strong smell", "tasty", "characteristic taste" and "good consistency". It is concluded that the online form may have potential as a preliminary and/or exploratory analysis, combined with laboratory analyses.

Keywords: Sensory analysis, ideal product, Grape juice.

INTRODUCTION

Grapes are one of the biggest fruit crops in the world. In the year 2016, the world production was about 75.8 million tons, of which about 21 million tons for table grapes. The Brazilian market presents growth both in the supply and in the demand of grape derivatives, however the commercialization of national products has a different behavior. The consumption of whole/natural juice grows significantly, due to the increase in demand caused by consumers who are more adept at a more natural diet (COSTA, 2018). According to Carmo, Dantas and Ribeiro (2014), among the various flavors of juices offered in the market, grape juice is one of the most consumed.

There are basically five types of juices on the market: natural juices, powder, concentrates, ready-to-drink juices and pulp juices (DA ROSA, COSENZA; LEÃO, 2006). In Brazil, whole grape juice in natural concentration is sold; partially dehydrated concentrated grape juice; grape nectar, obtained by diluting concentrated juice in water and with added sugars (BRASIL, 2000). Despite the interest in the product and the consumption of grape juice having increased, little is known about sensory aspects of the production offered commercially in Brazil.

The method *check-all-that-apply* (CATA) is a quick descriptive methodology, consisting of a list of terms, attributes or phrases, from which the judges (consumers) are asked to mark all the alternatives they consider appropriate to describe a given sample, being able to mark as many alternatives as necessary (ARES et al. al., 2015). The terms used in the CATA lists can be: sensory (sweet, bitter, crunchy), emotional (fresh, energizing) and/or functional (good for breakfast, energy) (MINIM; SILVA, 2016).

For the food industry, it is important to understand how products are perceived and appreciated by consumers (WORCH, CRINE, GRUEL, MAS, 2014). However, one of the main challenges of sensory science with consumers is not only to be able to describe the product, but to provide processable knowledge to make specific changes in the product formulation (MOSKOWITZ; HARTMANN, 2008).

In view of this and considering the nutritional and functional benefits of grape juices, this work aimed to investigate ideal sensory attributes of whole grape juice, comparing the results obtained in the sensory laboratory and through an online form.

MATERIAL AND METHODS

This project was submitted to the Research

Ethics Committee (CEP), of the Federal University of Goiás - UFG, and approved by the opinion number: 3,238, meeting the legal requirements recommended by Operational Norm nº 001/2013 CONEP/CNS that approves the regulatory standards for research involving human beings (BRASIL, 2013).

SENSORY CHARACTERIZATION

The attributes of the CATA questionnaire were raised in a study previously carried out by the authors, using the free listing methodology, with consumers who had the habit of consuming whole grape juice at least once a week, as proposed by Ares and Deliza (2010).

A study was carried out at the Sensory Analysis Laboratory - LASA-UFG, of the Food Engineering Sector of the School, of Agronomy, Federal University of Goiás, between April and June 2019, with the CATA questionnaire with 21 representative attributes for four categories of sensorial attributes: appearance, smell, flavor and consistency, structured hedonic scale of 9 points, in which three commercial brands of whole grape juice were evaluated and at the end of the monodic evaluation of the samples, the attributes for the ideal juice. The data presented in the current work are just the ideal juice data. An online form was also prepared, using the same attributes, on how an ideal whole grape juice must be, disseminated on social networks (Facebook® and Intagran®) and e-mail (direct mail).

DATA ANALYSIS

To characterize the population, frequency distribution was performed. The ideal product characterization data were evaluated through the proportion of consumers who selected each term.

RESULTS AND DISCUSSION

CHARACTERIZATION OF THE POPULATION

Table 1 presents the results of the characterization of the population that participated in the laboratory test and in the online questionnaire. The sensory test carried out in the laboratory was carried out with 150 people, more than 95% of the population was composed of undergraduate students from the Federal University of Goiás, the others were professors and laboratory technicians.

The online form was answered by 135 people, after filtering, 30 people had consumption at least once a week, most were also students and about 67% were from the Midwest region.

Between the two groups the majority were aged between 18 and 32 years. The differences presented between the groups were regarding the declared preferred brands and the frequency of consumption, most people who answered the online questionnaire had the habit of consumption at least once a week, while people who participated in the test in sensory laboratory, had the habit of consumption twice a week.

SENSORY CHARACTERIZATION OF THE IDEAL PRODUCT

Table 2 shows the proportions of consumers who selected the descriptors to describe the ideal juice in the laboratory test and the online questionnaire.

It is known that the whole juice must present remarkable organoleptic characteristics of the fruit that generated it. It must present a predominant sweet taste, but not excessive in relation to its acidity, one of the most desired qualities is the balance between sweet and sour taste. In the mouth, it must not taste like cooking, mold or other unpleasant strange taste (RIZZON; MENEGUZZO, 2007).

3

		Test in sensory laboratory	online questionnaire
Age	18 ⊢ 25 years	85%	34%
	25 ⊢ 32 years	11%	40%
	32 ⊢ 39 years	1%	6%
	39 ⊢ 46 years	2%	10%
	46 ⊢ 53 years	1%	10%
Frequency of consumption Grape juice weekly	1 x week	9%	70%
	2 x week	76%	0%
	3 x week	11%	26%
	4 x week	5%	4%
Favorite Grape Juice brands	Aliança®	9%	20%
	Aurora®	18%	20%
	Del valle®	59%	7%
	La fruit®	43%	7%
	Outros	23%	46%

Table 1- Characterization of the population that performed the sensory analyzes

Source: From the authors 2020.

Descriptors/ Products	Test in sensory laboratory	Online questionnaire
Characteristic color	0,843	0,833
Very light color	0,013	0,00
Very transparent	0,00	0,00
Very dark color	0,497	0,467
Characteristic smell	0,830	0,800
Very weak smell	0,00	0,033
Very strong smell	0,706	0,400
Bad savor	0,00	0,000
Very sweet	0,065	0,067
Delicious	0,882	0,600
Characteristic Flavor	0,850	0,667
Weak flavor	0,033	0,000
Acid	0,144	0,067
Little sweet	0,392	0,467
Little acid	0,386	0,233
It reminds wine	0,405	0,400
Astringent	0,052	0,100
Bitter	0,052	0,000
Good consistency	0,765	0,533
Watered down	0,00	0,00
Concentrated	0,562	0,667

Table 2. Proportion of consumers who selected those described in the question to describe the ideal juice in the laboratory test and the online questionnaire.

Source: Authors 2020.

It is observed in Table 2 that the most important attributes for the ideal whole grape juice are "characteristic color" and "characteristic smell", for both methods applied, with more than 80% mentions by consumers. In addition to these, the attributes "very strong smell", "tasty", "characteristic flavor" and "good consistency" were also mentioned by more than 70% of consumers for the ideal product, for the test applied in the laboratory and it was observed that in the online questionnaire the frequency of mentions was a little lower, as well as for the attribute "very strong smell", in the laboratory test it was also significant in the ideal product, with more than 70% of mentions, with less than 40% of the consumers marked this characteristic in the online questionnaire. This difference may have occurred due to the fact that in the online form, consumers evaluated a fictitious ideal product, while in the laboratory, consumers had a reference of the product, that is, consumers were first presented with three commercial samples of whole grape juice. and only at the end, they answered about the ideal juice.

In the online form it was found that the attribute "concentrated" was marked by 67% of consumers, while in the test applied in the laboratory it was only 56%. Marcon (2013) found that consumers appreciate grape products, whose sensory attributes are perceived in high intensity and are balanced.

It is also noted that for the ideal product, nine attributes were marked by less than 15% of consumers, for both methods, that is, consumers do not expect to find these characteristics in real products, being the attributes "very light color", "very transparent", "very weak smell", "bad taste", "very sweet", "weak taste", "astringent", "bitter" and "watery".

As observed in the present study, consumers who participated in the research do not expect the ideal grape juice to be sweet.

Corroborating the findings by Pontes et al. (2010) who observed that although consumers like more sweetened juices, they prefer to buy whole juice.

It is observed that the differences between the two methods were not very different, and the online form may have potential as a preliminary and/or exploratory analysis, combined with laboratory analyses.

CONCLUSION

The ideal whole grape juice can be characterized with the attributes "characteristic color", "characteristic smell", "very strong smell", "tasty", "characteristic taste" and "good consistency".

It is concluded that the online form may have potential as a preliminary and/or exploratory analysis, combined with laboratory analyses. New studies are suggested, with new food matrices and a greater number of people to answer the online form.

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