

Developing a healthy food based on concentrated must

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Abstract. Considering the characteristics and charitable qualities of the Grape Juice Concentrate (JUC) as a nutrient food, and the poor eating habits that our actual society suffers, it was thought for this work the application of simple tools and practices enabling of benefit to health through the use of regional and natural products. The objective of this research was to formulate and develop a health food of a stick type to JUC based. Two types of “stick” with different formulations, which were assessed by affective sensory tests regarding the acceptability and the degree of preference of these, were developed. For sensory evaluation, panel of untrained judges randomly selected was settled. From the evaluated, there were not significant differences between the sticks acceptance, this paper proposes to continue improving formulations JUC based product, so as to have in the future with a highly nutritious product that can be incorporated in the diet of an ordinary citizen and Food Assistance Programs developed at country level.

1. Introduction

In Argentina the production of “Grape Juice Concentrate” (JUC) plays an important role, because it is a net exporter regional economy of high international competitiveness. Their marketing focuses on the foreign market, exporting about 95% of the production, being its main buyer USA.

Currently the market JUC acts as a regulatory tool in the wine trade deal, allowing cushion the fall in the price of wine, promoting the performance of our winemaking.

In the last years, the global financial crisis has led to the Argentine wine sector in search of additional measures that promote JUC marketing in the domestic market [1].

Given the need to encourage the production of JUC in our country and strengthening its marketing, noting the domestic market as an alternative of significance to complement exports, it was thought to diversify its use as grape product, using it as a nutritional and healthy alternative for the Argentina population.

Nowadays, the low quality diet of Argentines is an issue of the agenda and concern at the country level. The diet is based on poor dietary practices, which remain essential nutrients such as iron, calcium, vitamins A and C mainly fiber, omegas 3 and 9, folic acid, among others; or, excess saturated fat, calories, sodium and sugars are added. These deficiencies in the nutritional quality translate into health problems linked into a poor growth and development or, in the other side overweight and obesity that affects one of the three children and one of two adults [2].

Considering on the one hand the features and beneficial qualities that the JUC as nutrient food and the need to

diversify their use, and the other hand the poor eating habits, it was thought in the application of simple tools and practices that allow provide the use of regional and natural products on benefit to health.

To do this, two products were developed based on concentrated grape type “stick”. For the formulation of the “stick” proper nutrition and orthomolecular holistic cooking techniques were applied. In this paper seeks to innovate, not just developing a different product, but also making maximum use of local produce, giving to the final product nutritional relevance.

1.1. Grape juice concentrate

The JUC is defined as the product obtained from grape must at various degrees of concentration by vacuum thermal processes or outdoors without suffering an appreciable browning [3].

This juice, commonly called “must” is very important because it works as an additive for most consumer products. Thanks to its natural qualities, high in sugars and neutral flavor, is used for the manufacture of baby products, candies, jellies, jams, pharmaceuticals, fruits in syrup, etc.

1.2. Orthomolecular nutrition and cooking

The orthomolecular concept is defined as “ortho” the task of correcting and / or dose and “molecular” linking the nutrients corrective properties to preserve health and treat disease. This task properly managed the optimum amount of molecules necessary for the body such as proteins, vitamins, minerals, fatty acids, etc. [4].

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Table 1. Formulations obtained for “bars”.

Ingredients	“stick A”	“stick B”
	g/25 stick	g/25 stick
chickpea	-	600
white corn	-	700
walnut	150	150
chia	35	35
sunflower	150	150
millet	50	50
raisins	150	150
birdseed	-	120
rice	600	-
lentils	600	-
JUC	400 cc.	400 cc

Orthomolecular kitchen is that which starts from the knowledge of the essential nutrient characteristics of plant and animal foods, ensures the preparation thereof, balanced conservation of its beneficial properties, preventing the loss of nutrients in the preparation and cooking.

2. Material and methods

2.1. Features food based on must concentrate

Before considering the ingredients and composition of the “stick”, a number of features that they should meet were defined: a) provide the necessary nutrients for a proper diet; b) contain as base at preparation the JUC, used to sweeten and to hydrate the other ingredients; c) selecting ingredients for easy acquisition, considering regional products, and relative low cost; d) simple and lowest cost processing; e) nice flavor to stimulate the consumption of “stick”; f) size of the “stick” should be practical for consumption as snack and finally g) consistency and attractive packaging that allow the proper conservation of “stick”.

2.1.1. Ingredient selection, composition and processing

To select the ingredients, relevant documents about the nutritional value [5,6] and the performance thereof is checked after processing and cooking [7,8]. Accordingly, it was decided to use seeds, legumes, cereals, and nuts together with the JUC, that in addition to its qualities as a nutrient food, can sweeten, highlighting and unifying flavor (Table 1).

The elaboration of the “stick” took place in a pastry that besides the traditional cuisine, develops own techniques of orthomolecular holistic cuisine. As for the ingredients, the “stick A” was prepared with rice and lentil basis, which were activated, that is hydrated to facilitate digestion and easily absorb vitamins and minerals present therein. Like bars of commercial size were then molded and led to the oven for final assembly. For the “stick B” was used gram and white corn as basis, both activated, but in contrast of the “stick A”, these ingredients were cooked previously molded and assembly. Both “sticks” in

Nombre: _____

Fecha: _____

Nombre del producto: _____

Frente a usted hay dos muestras, por favor pruebe cada una de ellas en la secuencia presentada de izquierda a derecha y marque con una X la frase que mejor describa su opinión sobre el aspecto general y el sabor de ambas muestras.

Muestra Nº	Aspecto General		Sabor	
Me gusta muchísimo				
Me gusta mucho				
Me gusta moderadamente				
Ni me disgusta ni me gusta				
Me disgusta				
Me disgusta bastante				
Me disgusta muchísimo				

Comentarios: _____

Figure 1. Tab used for acceptance testing.

their formulations lead millet, which was also activated before being incorporated into the preparation. The rest of the ingredients such as seeds, nuts and dehydrated, were incorporated directly.

The star ingredient of the developed formulations was the JUC. This additive was used to sweeten, amalgamate and hydrate the remaining constituents of the plant kingdom, which together deliver a nutrient mixture of excellent quality, to preserve their physiological state.

Once the “stick” molded were taken to the oven, then cooled outdoor and when they were free of moisture were wrapped and coded for analysis by the affective panel.

2.2. Sensory evaluation tests

To evaluate the acceptability and preference of developed “sticks” affective sensory tests were performed. These tests were applied not only to assess if there are differences in acceptance and preference among the two developed sticks, but also to consider the comments of the panelists that allow making decisions that optimize and improve the final product looking. For this, a panel of untrained judges randomly selected that could represent in the first instance, potential consumers of the “sticks” was formed.

The sessions were conducted at the Laboratory for Sensory Analysis in the Department of Winemaking and Sensory Studies, National Institute of Viticulture. Samples were presented to panelists according to a complete experimental design, randomly encoded [9].

2.2.1. Acceptability test

Acceptability was assessed using a rating scale with seven levels, evaluating two attributes: general appearance and flavor (Fig. 1).

2.2.2. Preference Test

The degree of preference was measured by a paired test, where each panelist was indicated to select which of the “sticks” preferred, evaluating each product in its entirety requested.

Table 2. Data and analysis test acceptability.

Panelists	General Appearance		Flavor	
	stick A	stick B	stick A	stick B
1	6	5	5	4
2	6	6	6	5
3	6	4	5	4
4	5	4	5	4
5	6	4	6	5
6	4	4	4	4
7	5	4	5	4
8	4	5	4	5
9	7	6	6	5
10	6	5	5	4
11	6	6	6	5
12	4	5	3	5
13	5	4	6	3
14	5	4	5	5
15	5	6	5	6
16	6	5	7	5
17	4	5	4	6
18	5	5	7	5
19	5	6	5	6
20	5	4	5	4
21	4	4	4	5
22	6	3	5	5
23	5	6	5	6
24	7	5	7	5
25	4	4	5	6
26	4	5	4	5
27	6	5	6	5
28	5	3	5	2
29	6	6	5	6
30	4	5	5	7
31	4	5	4	6
32	5	6	5	6
33	5	4	6	4
34	4	4	4	6
35	5	5	5	6
36	5	5	5	6
\bar{x}	5,11	4,78	5,11	5,00
S	0,89	0,87	0,92	1,01
N	36	36	36	36
Degree of freedom N-2	70		70	
critical value t	1,98		1,98	
value t	0,076		0,653	

3. Results and discussion

3.1. Acceptance test

The results of this testing, as assessed by 36 panelists, are shown in Table 2 to see if the “sticks” were accepting panelists (translated into numerical scale), medium was determined (\bar{x}) and standard deviation (S).

To verify the difference between the two, the value of t for an independent test, two-tailed, and a 5% probability (0.05) was calculated.

The average acceptability of the sticks was close to 5, value according to the hedonic scale, shows that both formulations like moderately.

Nombre:
Fecha:
Nombre del producto:

Frente a usted hay dos muestras, por favor pruebe cada una de ellas en la secuencia presentada de izquierda a derecha y marque con una X aquella que usted prefiere.

.....

Porqué la eligió?

Muchas Gracias!

Figure 2. Tab used for paired preference test.

The critical value of t, according to statistics table [10], for N = 70, two-tailed, and p = 0.05, is 1.98. The calculated value for both attributes to evaluate, was less than the critical t, therefore it is concluded that there are no significant differences in acceptance among both “sticks”. And evaluated at the end of this study, they should rethink formulations to achieve a greater degree of acceptance.

3.2. Preference test

The degree of preference was measured using a paired test, two-tailed [11], establishing the null hypothesis, Ho, that there is no statistically significant preference between the two “sticks” to a level of significance of 5%.

The results showed that 32 panelists from a total of 60, preferred the sample B. From statistical table [12], the probability of preferring B, 32/60, is 0.065 (6.5%). This probability is high, so the Ho is accepted. For this test, we conclude that there is no preference of the panelists regarding one of the two “stick” in the study.

The main observations made by the panelists were: lack of compaction, indicating that much shelled and lost consistency in the mouth; the moisture level, which suggests that it should be smaller to achieve a crisp feel and / or crispy and increase sweetness to mask some vegetable flavorings that disharmony the final taste.

4. Conclusions

From the evaluated, this work proposes to continue improving product formulations based on JUC with the possibility to have to future with a highly nutritious and distinctive product that can be accepted and incorporated into the diet of an ordinary citizen and Food Assistance Programs developed at country level.

Going forward, we will seek that the product being attractive from the sensory standpoint to the consumer, achieving its demand not only to know its nutritional benefits, also because they like and have a good reputation in massive group, evaluating it through the time. Moreover, the costs will be assessed to achieve the desired healthy food is acquired by any consumer that requires it.

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