International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

Vol. 36 No. 1 December 2022, pp. 235-244

Formulation Of Artisanal Drink Based On Amaranthus Hypochondriacus L. Seeds

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Abstract – In this work, we sought to obtain a drink based on Amaranthus hypochondriacus L. seeds, highlighting the bromatological/nutritional and organoleptic properties (taste, aroma and appearance). Thus, develop a drink that combines the benefits this seeds with a liquid medium, resulting a naturally free gluten and lactose drink, inexpensive, easy to prepare, without synthetic additives aiming to contribute to food security, in terms of the provision of quality food, while causing a positive impact on the adult population, therefore, improving their quality of life from the nutritional, economic and social point of view.

The nutritional composition, stability (pH and titratable acidity were evaluated using A.O.A.C Methodologies of. The acceptability of the product was carried out by means of an adapted panel (50 untrained judges). Data on organoleptic characteristics were collected. The established acceptance criteria were equal to or greater than 80%. The results showed a nutritional value of 8.5g of carbohydrates, 3.1g of protein, 0.4g of fat, and 0.25g of fiber for a daily serving of 200ml. Regarding storage stability (10 days, 5 ° C), the pH values varied 5.70 - 4.05, the titratable acidity showed increases from its initial value between 1.10 - 1.61 g citric acid / l of drink.

We can conclude that the amaranth-based drink presented a good nutritional contribution, good stability at refrigeration temperature, a pleasant taste and a slightly vegetal smell, reflecting a positive appreciation of 92%.

The appropriate sensory attributes reflecting a positive appreciation of this beverage by consumers.

Keywords – nutrition, stability, acceptability, hydration.

I. INTRODUCTION

Pseudocereals are used in a variety of preparations, including buckwheat, quinoa and amaranth. They are commercially available and are nutritionally complete foods. A different way to incorporate them into the daily diet would be through craft drinks. In recent years there has been an increase in interest in amaranth seed given its exceptional nutritional characteristics, higher concentration and quality of proteins compared to cereals. ([1], [2], [3], [4]).

In recent years there has been an increase in interest in amaranth seed given its exceptional nutritional characteristics, higher concentration and quality of proteins compared to cereals, as this is a pseudocereal, its seeds are rich in flour materials, but belongs to the dicotyledons. Because dicotyledons do not produce gluten, they are easily digestible, which has caused a boom in the use of this seed and can be consumed in various ways.

Amaranth grains rich in lysine (essential amino acid absent in traditional cereals), with a high level of protein and excellent amino acid profile, as well as a gluten-free grain, with a good supply of vitamins and minerals, especially iron and provitamin A make amaranth a crop of great food potential.

The nutritional benefits of pseudocereals (amaranth, quinoa and buckwheat) could be better used, if new forms of

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preparation would allow them to be incorporated into the usual diet, making them a novel resource applicable to malnutrition.

Makinen et al. (2016) describe a wide variety of traditional plant-based beverages around the world. Like the Horchata produced in Spain, which is called "tigernut milk"; Sikhye consumed in Korea, made from cooked rice, malt extract and sugar; Boza consumed in Bulgaria, Albania, Turkey and Romania is a fermented drink made from wheat, rye, millet and corn; Bushera made in Uganda, based on fermented sorghum or millet malt, and traditional soy milk from China. From this legume, the drink has been widely consumed in the world, however, its market share has decreased due to the increase in other options and due to concerns about being transgenic (GMO) and about its allergenicity [5].

Since 2008, precedents for the production of vegetable drinks have been reported using the most diverse seeds and fruits. In Mexico, members of the Institute of Chemistry of the National Autonomous University of Mexico (UNAM) prepared a highly nutritious amaranth drink with a good balance of amino acids in its composition, its proteins rich in lysine, tryptophan and sulfur-containing amino acids, essential for health, complying with the requirements recommended by the Food and Agriculture Organization of the United Nations (FAO) for optimal human nutrition [6].

Subsequently, research has been carried out in a sustained manner in obtaining vegetable drinks based on fruits and seeds in various countries, achieving very attractive drinks for the current consumer. The main use of these drinks, commercially called vegetable “milks”, is as highly nutritious drinks, and, moreover, easy to digest (even for sensitive people or the elderly). They can be used for breakfast, snacks or between meals; being an ideal drink for athletes and intellectuals ([5], [6], [7], [8]).

In the international market there are several vegetable drinks and are the second group among the fastest growing foods worldwide [9].

Pseudocereal seed-based beverages have begun to become popular around the world, due to the growing number of people trying to consume nutritious, low-calorie, quick to prepare and consume, easily digestible and readily available foods, thus helping to counteract the effects of modern life while also promoting healthy hydration.

The sensory evaluation of food is a technique in food science that studies the organoleptic characteristics of food through the responses of a group of people, panel of people or consumers, and thus provide objectivity to these perceptions. Statistically studies the data provided by consumers. The Institute of Food Technologists (IFT) in 1975 defined sensory evaluation as: "a scientific discipline used to evoke, measure, analyze and interpret reactions of those characteristics of foods and materials as perceived by the visual senses. smell, taste, touch and hearing. It consists of two parts: sensory analysis and statistical analysis. The first is intended to correctly collect the perceptions of a jury or panel of evaluators (subjective part) and the second transforms and analyzes the data (objective part). Sensory evaluation is multidisciplinary, it uses different branches such as: psychology, chemistry, physiology, statistics. For this reason, its application is receiving more recognition and has matured considerably in recent years. It is used in the food industry, perfumery, pharmaceuticals, paints and dyes, among others. The foundation of sensory analysis is that the sensory quality of a product is perceived by man as the result of various stimuli as shown in the following figure. From there derives the need to break down and study this behavior or response ([10], [11], [12], [13]).

Sensory properties are the attributes of food that are perceived by our senses. The most common sensory properties related to each sense are:

a) Color: It is the perception of light of a certain wavelength reflected by an object. The

White bodies reflect light of all wavelengths, black bodies absorb all wavelengths. Color measurement can be done using color scales visually or by using a colorimeter. Color can influence the perception of another sense, for example: an unpleasant color can be associated with an unpleasant taste.

b) Appearance or visual impression: It is the external appearance that food shows, such as the resulting expression of the color, size, shape and state of the food.

c) Smell: It is the perception by smell of volatile substances released by objects. There is a special relationship between smell and perception time. After having removed an odorous substance, the sense of smell is still capable of perceiving the odor for some time. This is why, in food sensory tests, environments must be ventilated.

d) Taste: Refers to the perception of a food with volatile substances after being placed in the mouth. The sample is dissolved in the mucosa of the palate and pharynx and reaches the olfactory sensory centers, that is, the taste is the combination of taste and smell. It can be influenced by sensations of pain, heat, cold, and tactile sensations.

Various receptors are involved in taste perception, such as gustatory (taste buds), olfactory, tactile (tactile), thermal (heating and cooling), and pain receptors. Taste is one of the most important properties of food.

e) Taste: It can be sour (sour), sweet, salty or bitter or a combination of all four. This property is perceived by the organ of the tongue and the oral cavity. The ability of the people to detect any type of taste will serve to participate in taste tests. The actual perception of flavor is also affected by psychological factors.

f) Texture: It is the sensory property of food that is detected by the senses of touch, sight or hearing, and is manifested when the food undergoes a deformation. The touch will perceive if a food is soft or hard, the sight will perceive its deformation, the ear will tell us if it is crunchy or juicy and the tongue if it is fibrous, floury or rough. Liquid foods also have texture, in which case the term “fluid viscosity” is used.

The sensory tests are the procedure that is carried out in the sensory evaluation of food through which information from human observations or perceptions is collected in an orderly and systematic manner within a panel of evaluators. These types tests are used to determine the quality of a food, its shelf life, potential contamination, adjustment, and reformulation of the product.

Acceptance tests are used to evaluate the degree of satisfaction or acceptability of the product, in order to determine in a series of products which is the most acceptable or preferred.

Consumer panels are generally large, so that their use to evaluate products has become the responsibility of market studies rather than analysts, the sensory analyst can sometimes apply acceptance tests in a limited way, in order to obtain an indication about the acceptability of the product and may be required to carry out these consumer orientation tests during the development of the product before being subject to market studies.

The sensory evaluation for characterization and analysis for food acceptance or rejection by the taster or consumer, according to the sensations experienced from the moment he observes it and after he consumes it. These procedures are used to determine in the products, the degree of difference in taste, smell, texture, appearance and other attributes that exist between them. In the sensory evaluation of food, the senses play an important role since it allows us to give a subjective and objective response of the food that is being tasted or is being tasted ([14], [15], [16]).

II. Hedonic Classification

In this test, the judge is asked to report how satisfied they are with a product, generally by selecting a category on a “hedonic or satisfaction” scale ranging from “dislike very much” to “like very much”. Different scales have been used, one of the most used in this type of test is the 9-point scale ([17], [18], [19],20]).

This ordinal scale is often assigned values from 1 to 9, and the data can then be summarized by recording mean "scores" of degrees of satisfaction.

This work presents the elaboration an artisanal drink based on amaranth seeds (Amaranthus hipochondriacus L.) and highlighting the bromatological/nutritional organoleptic properties (taste, aroma and appearance) in the adult population.

Thus, it is proposed to develop a drink that combines the benefits of the biophysiological compounds of amaranth seed, aiming to contribute to food security, in terms of the provision of quality food, while causing a positive impact on the adult population, therefore, improving their quality of life from the nutritional point of view, economic and social.

This artisanal drink could be offered to consumers in general and to a fraction of the population with gluten allergy and lactose intolerance, as a food with direct health benefits. On the other hand, it would mean a boost for the cultivation of amaranth in our country, encouraging and adding value to this incipient crop in the Argentine.

Knowing that the correct diet is a key factor to achieve adequate well-being, and an optimal state of health both physical and mental, and sometimes liquid food is underestimated by ignorance of its importance or by tastes and cultural preferences according to populations, and is common the majority consumption of juices, soft drinks, powders to prepare beverages and

beverages with mostly non-carbonated flavor (flavored waters), and in a very small proportion water as such, being vegetable water drinks, the most suitable products for an adequate state of health and well-being not only to replenish liquid, as part of good hydration, but also essential nutrients for the vital functions of the body [21].

III. Materials And Methods

3.1. Elaboration of amaranth seed drink

Ingredients: Amaranth seeds, drinking water, vanilla essence, Stevia rebaudiana powder, salt.

Preparation: before starting the process of elaboration of the drink, the different ingredients will be weighed and measured.

1. Washing: the amaranth grains will be placed in a container with water, stirring and changing the water to eliminate the impurities. This process will be repeated 3 times.

2. Soaker: the amaranth grains will be left to soak in water for 2 hours. Then the water poured in.

3. Cooking: The amaranth will be cooked with drinking water for 10 minutes.

4. Smoothie: place the cooked amaranth with the excess water in the glass of the blender and add drinking water, vanilla essence, salt and Stevia rebaudiana powder.

5. Sifting: the preparation will be passed through a sieving cloth to separate the pulp from the drink itself.

6. Refrigeration: the drink should be placed in the refrigerator, in sterile containers with lids at a temperature between 2° to 5° C for maintenance and conservation.

3.2. Physicochemical characterization

Determinations were made using Official AOAC methods for food analysis in triplicate [22]. When another method was used, the reference source is indicated.

3.3. Total fat

Fat determination was performed by extraction with toluene using the Soxhlet method.

5 g of sample were weighed and placed in a closed filter paper cartridge and inserted into the extraction chamber. The extraction was carried out using at 95 °C petroleum ether as solvent for 6 to 8h. Once the extraction was complete, the solvent was recovered by distillation under vacuum. Finally, the fat content of the sample was determined by weight difference. Total fat percentage determination, equation 1 was used. (Eq. 1). [22].

(Eq. 1) $\%\ \text{Crude fat} = ((m2 - m1)/m) \times 100$

m= sample weight m1=matrix tare weight only m2=weight of flask with fat

3.4. Ash determination

The sample was weighed in tared dry porcelain crucibles. It was carbonized with a lighter and placed in a muffle at 540 °C for 4 hours. The ash content was obtained by weight difference. [22].

(Ec 2) $\%\ \text{ash} = ((P - p) \times 100) / M$

P = crucible mass with ashes in grams. p = Empty crucible mass in grams. M = Mass of the sample in grams.

3.5. Moisture determination

The samples were weighed in previously tared and dried porcelain crucibles. They were heated in an oven at 105 ºC every 2 hours, taken to a desiccator and weighed in this way until constant weight. Moisture was determined by weight difference. [22].

(Ec 3) $\%\ \text{Moisture} = (\text{gr. Residue} \times 100) / M$

3.6. Fiber

The fiber determination was carried out by the method based on the acid and alkaline digestion of the sample, obtaining a residue of crude fiber and salts. A subsequent calcination was carried out in a muffle, which allowed the removal of organic matter [22]. 2.0 g of fat-free sample was weighed, placed in a flask and 200 ml of boiling 0.255 N sulfuric acid was added. It was boiled for 30 minutes, the sample was filtered, washed with boiling distilled water several times (with 50 ml portions each time). The residue retained on the filter was carefully returned to the original container, then 200 ml of boiling 0.313 N sodium hydroxide was placed and boiled for 30 minutes.

Immediately removed from the heating mantle and filtered through a crucible, the residue was washed with boiling water until the sodium hydroxide was removed. The residue was placed in an oven at 130 ºC for two hours and weighed. Finally, the residue was placed in the muffle for one hour at 500-600 ºC until white ash was obtained and the weight was recorded again. The percentage of fibers was obtained by weight difference. (Ec 4).

(Ec 4) 100 ((A -B) /C) = %

A= weight of the crucible with the dry residue (gr) B= weight of the crucible with the ash (gr) C= weight of the sample (gr)

3.7. Total protein

The protein percentage was obtained by the Kjeldahl method, using 5.85 as a conversion factor from nitrogen to protein. The sample was weighed and placed in a Kjeldahl digestion flask. 10 g of Na2SO4 and 1 g of CuSO4 (catalysts) and 25 ml of concentrated H2SO4 were added. Everything was digested for several hours, until the liquid took on a translucent green color. It was allowed to cool and was neutralized with 35% NaOH. Then it was distilled by bubbling the distillate in 50 ml of 0.1 N sulfuric acid, previously titrated, with drops of methyl red as indicator. Finally, it was titrated by return with 0.1 N NaOH titrated. The percentage of total proteins is expressed, taking into account the conversion factor (FC) of nitrogen to protein nitrogen (Eq5) [22].

(Eq 5) Ng%=(VxN)(SO4H2) x meq Nx100/(Gm)meq N=(P(at)N/1000

Protein N%=N% x 5.85

3.8. Carbohydrates

The carbohydrate content was determined by difference the values obtained (in g/100 g) of moisture, ash, protein, total fat, by the following equation: (Ec 6) [22].

(Ec 6) *Ct=100%- (moisture + proteins + fats + fiber)*

3.9. Total caloric value

The energy value will be based on its proximal composition (percentage of proteins, fats and carbohydrates) using the Atwater factors (Proteins: 4 Kcal/g – Fats: 9 Kcal/g – Carbohydrates: 4 Kcal/g).

3.10. pH determination

The stability over time of the suspensions was analyzed through the determination of pH and the acid index by titration.

10 ml of sample were taken with a double volume pipette and placed in separate 100 ml flasks. Distilled water was added to make up to 100 mL. After this dilution, 10 ml aliquots were taken and the pH of the samples was measured using a pH-meter (Hanna Brand). The sample and electrodes were placed in a beaker and the pH was read directly on the digital display. [23].

3.11. Determination of Total Titratable Acidity

Total Titratable Acidity was determined by direct titration with 0.1 N sodium hydroxide and phenolphthalein indicator (pH 8.3 – 10).

From the previously separated 10 mL aliquots, an exact volume of 5 mL was taken with a double volume pipette to which the indicator was added (2 to 3 drops) and the titration was carried out with a base (NaOH) until the color of the indicator

changed. The cost was taken as data to determine the percentage of acidity. (Ec 7) [23].

(Ec 7) % Acidity= g of citric acid /100mL of sample

IV. Sensory Analysis-Acceptability Test

For the evaluation of the acceptability variable, the observational technique was used by survey with a hedonic scale, which has the purpose of obtaining information on objective facts, opinions, ideas, attitudes or suggestions, collected through a self-administered survey in a sample of the population The consumer must evaluate each sample on a scale that can be structured, semi-structured or unstructured The tests were carried out with a structured type scale and to establish the level of acceptability the following organoleptic characters were evaluated: appearance, color, smell, flavor and texture. They were carried out with 50 panelists as untrained judges who were informed about the procedures and objectives of the study to be carried out. The instrument used to collect the data provided by the judges was a survey made on the basis of a 7-point hedonic scale (dislike very much, dislike, slightly dislike, don't like or dislike, like slighlty, moderately like, really like). This survey consisted of a table containing the categories to be evaluated (organoleptic characteristics) and the possible scores that the interviewer assigned them, according to the degree of acceptability and satisfaction in each of the categories. Each sample was divided into fractions of approximately 30 ml and distributed to the judges at random. Most of the people who participated in this evaluation did not have sensory training. ([15], [24]). (Anexo 3, 4).

V. Statistical Analysis

Statistical analysis of the results will be performed using the statistical software InfoStat. Assays were performed at least in duplicate and the means with their standard deviations were reported. All the analyses were performed in triplicate; the values reported are presented as average values along with their standard deviations [25].

VI. Results

For the *Amaranthus hypochondriacus* L. seeds, drink preparation was used commercial seeds from Grandiet shop, city of San Luis. The first procedure was to subject the Amaranth seeds to a mechanical sieving operation to remove impurities. Then they were rinsed applying sanitary hygienic washing operation with a repeat three times with drinking water to remove the foam generated by the saponins. Then 50 gr of amaranth seeds were weighed, soaked for two hours in a ceramic container, in order to hydrate the layers of fiber that covers the seed and thus shorten the cooking time, to benefit the conservation of nutrients and save caloric energy in its preparation. Then the mechanical casting operation was performed, they drained. To the soaked seeds were added 250 ml of water, and then subjected to physical convection operation for 10 minutes over medium heat reaching boiling temperature. It was allowed to cool for eight minutes at room temperature. The cooking water was discarded by performing the mechanical casting operation, and the cooked amaranth seeds were taken to a Philips HR2030/10 600w blender 2L. 500 ml of drinking water was added, along with 1/2 teaspoon of salt (2.5 g), 1 tablespoon of vanilla essence (15 ml), *Stevia rebaudiana* powder (2.5 g) and the mechanical operation of liquefaction was carried out for four minutes until a heterogeneous liquid food system was obtained. Subsequently, the mechanical filtering operation was carried out, three times, with cloths sieves, thus obtaining the amaranth vegetable drink. It was packaged in previously sterilized glass containers of 25 ml, with screw cap and then perform the physical operation of heat subtraction, refrigerated to a T° of between 2-5 ° C.

6.1. Analysis of the chemical-nutritional composition

Table 1 shows the values obtained in reference to the nutritional characteristics of the amaranth-based drink in relation to a daily portion of 200 mL of the drink and the Daily Value (%DV). Carbohydrates stand out as the nutrient that contributes the most to this drink, 8.5g; followed by proteins, whose contribution was 3.1gr, fats, 0.14gr, fibers, 0.25%, moisture 95%. With a coverage of 4 % DV for carbohydrates and a coverage of 3 % DV for proteins. Not producing a contribution in the % DV for fats, fibers. As for the energy value, the 200 mL portion provides 50 kcal. Using laboratory analysis with regard to nutritional chemistry, the results were as follows:

6.2. Stability

The pH and titratable acidity were evaluated as indicative parameters of the possible deterioration of the packaged beverage, over a period of 10 consecutive days, stored at a temperature cooling constant (5°C). Temperature and weather are factors that influence growth of some microorganisms.

The pH and titratable acidity values of the beverage showed no significant variations during storage as shown in Table 2 and 3, these range from 5.70 - 4.05 and 1.10-1.61 g citric acid/l for titratable acidity. No alteration being observed apparent in the beverage stored at the constant refrigeration temperature. Whereas the drink has a good stability in the period of time studied.

VII. Sensory Analysis-Acceptability Test Of Amaranth-Based Drink

7.1. Sex

Of the total respondents (N = 50), 60% belonged to the male sex reflecting 30 participants and 40% female indicating 20 participants. (Graph 1).

7.2. Age

Taking the data of the total number of participants (N = 50), respondents were classified into 6 ranges. 44% of the participants surveyed were between 19 and 25 years old, 40% between 26 and 32 years old, 14% between 33 and 39 years old, 2% between 47 and 52 years old, and finally the age ranges between 40 and 46 together with those between 53 and 59 were 0% (Graph 2).

7.3. Acceptability test

The panel was adapted according to the current circumstances (SARSCovid Pandemic 19) with intervals of isolation and mandatory social distancing, and was carried out in the form of delivery (to each home) from the inexperienced jury panel for tasting of the drink, conducting the survey easily and individually, then was collected, digitized to constitute the processing of the data. The panel was integrated by thirty male and twenty female, aged between 19 and 59 years of age, of the city of San Luis. (Annex 5).

The results with regard to sensory evaluation: the drink can be described as a semi-viscous liquid, which obtained a positive appreciation in 92 % (N=50). The essence of vanilla enhanced the smell (soft vegetable) along with the other ingredients that contributed to the slightly sweet taste, cataloging these two attributes, as the most acceptable organoleptic characteristics. The main limiting factor of acceptability was the slightly brown color, not very striking. The descriptive sensory analysis for this drink was favorable, with characteristics similar to commercial soy milk (soy food) and consistent with the vegetable drink formulated by Soteras 2011 [26].

7.4. Smell

This attribute thanks to the essence of vanilla, which influenced this character organoleptic, made it very well accepted, making 48% (N° = 50) of the respondents will rate it as " moderately like ", 22% (N° = 50) as "really like", 14% (N° = 50) "like slightly " with another 14% (N° = 50) "don't like or dislike" since they referred to the fact that it was not a very strong smell.

And finally, 2% (N° = 50) reflected that they did not like it so much, while there was no rating for the "dislike" and "dislike" option. (Graph 3).

7.5. Color

With respect to color, the highest score was the category "like slightly" with a value of 30% (N = 50), followed by the category "really like " with a value of 28 % (N = 50), next was the category "don't like or dislike" with 22% (N = 50). The "really like" category reflected a value of 12% (N = 50) and finally the category " slightly dislike" with a value of 8% (N = 50); without registering values for the option "dislike" and "dislike very much". (Graph 4).

7.6. Texture

When evaluating the acceptability of the texture, we found that at 40% (N = 50) the rated "moderately like", 36% (N = 50) "really like." Following this, 12% (N = 50) rated it as "slightly like ", 10% (N = 50) "don't like or dislike" and 2% (N = 50) as "dislike very much", while, there was no rating on the "sightly dislike" or "dislike very much" options. (Graph 5).

7.7. Taste

When analyzing the acceptability of the flavor, we determined that 36% (N = 50), rated the drink like " really like ", 32% (N = 50) like " moderately like ", 22% (N = 50) such as " like slightly ", while 6% (N = 50) made a rating of " slightly dislike "

and 4% (N = 50) " don't like or dislike."There was no rating on the "slightly dislike" or "dislike very much options". (Graph 6).

7.8. Global Assessment

Finally, data were collected on the acceptability of the organoleptic characteristics as a whole, and thus qualify the drink globally. The data obtained were as follows; 56% (N = 50) of respondents rated the drink as " moderately like ", 22% (N = 50) as " really like ", 14% (N = 50) rated it as " like slightly " and 8% (N = 50) as " don't like or dislike ". For the " slightly like", "dislike" and dislike very much " options, there was no qualification) (Graph 7).

VIII. Discusión

In this work we sought to obtain a drink based on seeds of *Amaranthus hypochondriacus* L., the basis of this research was established from previous studies about contributing to food security, with regard to the provision of quality food, while causing a positive impact on the adult population, therefore, improve their quality of life from the nutritional, economic and social point of view. To take a position on the results obtained in this work, different investigations were taken into account. An investigation carried out in Santa Fe, Argentine, in 2011 by Soteras. allowed to know the chemical composition of a drink based on Amaranth whose values obtained in 200 ml of drink 8 gr of carbohydrates, 1.36 gr of proteins and 0.6 gr de lipids, with a caloric value of 20.3 calories, having found favorable difference with the elaborated drink in terms of protein content, similar value of carbohydrates and fats somewhat higher in Soteras drink that were elaborated by different methodologies [26]. In a study carried out in Guayaquil, Ecuador, in 2015 by Hidalgo F. where a rice-based drink was made, studies of its chemical composition were carried out in which a value of 28 g of carbohydrates, 1.54 gr of protein and 0.18 gr of fat in 200 ml of drink and a caloric value of 59.67 calories were obtained, having a higher caloric value than the amaranth drink studied, due to its high carbohydrate content, a lower protein content and the amount of similar fat, in accordance with vegetable drinks [27]. A study conducted in Santiago de Chile in 2012 by Hurtado Verdugo on a quinoa drink-gel established chemical composition values for 200 ml of this drink of 18 g of carbohydrates, 4.6 g of proteins and 0.14 g of fats. Compared to the drink produced in this research, which was 8.5 g, 3.1 g and 0.14 g respectively, it can be seen that the drink gel has a higher value in carbohydrates and proteins, which could be due to its higher viscosity in the product [28].

In reference to the values of titratable acidity and pH, average values were found that corresponded to the ideal for vegetable beverage products, similar to that indicated in the beverage formulated with yam (pH: 6.48) by Pacheco, 2010 and to that specified for drinks based on cereals and vanilla flavor (pH: 6.2) reported by Vera, 2009 ([29], [30]). Comparing the present work with others carried out in Ecuador, one in 2011 of a barley-based drink and in 2013 of a drink based on red corn and barley, the drink developed in this study showed a similar degree of acceptability. However, it could be noted that the drink developed in this research has advantages in terms of how its elaboration was thought, the natural flavor of the pseudocereal since it is barely sweetened with *Stevia rebaudiana* B., gently flavored with vanilla and have the addition of a minimum amount of salt to enhance the flavor, and in the studies named, extra flavorings have been added (jams, extracts of fruit, fresh fruit and sugar) to improve the taste in terms of acceptability. The proposed drink is free of extra additives to improve acceptability ([31], [32]). When comparing the present study with others of similar ones, it can be observed that the beverages obtained have similar nutritional profiles. Despite not having sufficient scientific research to compare all the values in all beverages, the work provided evidence for the scarce information on products of the same nature in the Argentine Republic.

IX. Conclusions

It was possible to meet the objective of developing a drink based on amaranth seeds (*Amaranthus hypochondriacus* L.) as liquid food, gluten and lactose-free, with good nutritional intake drink with adequate stability at constant refrigeration temperature, with a sensory acceptability of 92% taking into account that the main limiting factor of this was color, not too attractive, in terms of taste and slightly vegetable smell were attributes of great acceptability in the adult's population. Easy to prepare, with few cheap ingredients that contribute to nutrition and the correct selection of adequate intakes and could be included as a food for daily consumption within a varied and balanced diet. Since the amaranth-based drink is not regularly consumed and known by the population, the incorporation of the habit of consuming this liquid vegetable food can be promoted.

Otherwise, it would mean a boost for the cultivation of amaranth in our country, encouraging and adding value to this crop in Argentine.

The importance of the present study lies in the feasibility of future research, providing background for the development of

healthy and innovative foods.

This research finally concludes that the amaranth-based drink could be included as a food for daily consumption within a varied and balanced diet, as well as in people with lactose intolerance and people with gluten intolerance.

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