Original Research Article

Physicochemical properties of sweet potato chips *(Ipomoea batatas)*

.

ABSTRACT

Aims: The study aimed to produce and characterize sweet potato-based chips, focusing on pH, titratable acidity, moisture, ash, fat, protein, carbohydrates, and calorific value. Sensory quality was assessed using acceptance tests.

Study Design: The research followed an experimental design with four formulations of sweet potato chips.

Methodology: Four different formulations of sweet potato chips were prepared, varying in the addition of ingredients such as sodium chloride and spice seasoning. Various chemical analyses were conducted to determine the nutritional content of the chips, and sensory evaluations were performed.

Results: The study found differences in pH, moisture, carbohydrates, proteins, lipids, ash, titratable acidity, and calorific value among the different chip formulations. However, there were no significant differences in terms of moisture, protein, and titratable acidity. Formulations (B) and (C) achieved a 70 percent acceptance rate in sensory evaluations.

Conclusion: Sweet potato chips offer an alternative way to enjoy the nutritional benefits of sweet potatoes. The study provides insights into the composition and sensory acceptability of different chip formulations, which can guide future product development.

Keywords:Food diversification, food quality, sensory analysis.

1. INTRODUCTION

The consumption of industrialised food is directly related to the way of life that characterizes today's societies. The demand for quality food has been growing, from the raw material to the finished product, in order to reduce harm and guarantee its quality [26].

The group of processed foods includes sweet potato chips, which are currently well received by consumers, with low levels of cholesterol, trans fats, low sugar levels and are beneficial because they reduce the rate of diseases such as diabetes, high blood pressure, cancer and lower blood levels in the body [4].

Chips are a food produced from potatoes cut into thin slices, fried in vegetable oil or baked in the oven and salted. Various condiments and flavourings can be added at the end of production to improve their sensory and physicochemical characteristics [28].

The chips must have basic characteristics such as high dry matter content (minimum 18%), low reducing sugar content (maximum 0.5%), low fat absorption [39]

The production of chips using sweet potatoes has been gaining ground in an attempt to take advantage of their nutritional and medicinal quality. They contain levels of carbohydrates, vitamins, minerals, fibre and beta-carotene [6].

According to [24], sweet potatoes help strengthen the human immune system, act as antioxidants that reduce the onset of chronic diseases and help reduce premature ageing.

Given the post-harvest losses of sweet potatoes, the implication for producers and consumers is a major problem that contributes to the poor utilisation of this crop [50]. In this context, this research aimed to produce and evaluate the physicochemical and organoleptic qualities of sweet potato-based chips.

2. MATERIALS AND METHODS

2.1 Study area

The study was conducted at the laboratory of the Higher Polytechnic Institute of Gaza (ISPG), Lionde administrative post. According to [37], Chókwè district is located in the south of the Gaza province, in the middle of Limpopo River, bordered to the north by Limpopo River, on south by district of Bilene, Mazimuchope and Xai-Xai, to the east by districts of Bilene and Chibuto and to the west by districts of Magude and Massingir.
Chókwè district contributes around 27.6 percent of sweet potato production, 58 percent of maize, 27.6 percent of rice, 31 percent of cassava, 3 percent of tomatoes and 6.9 percent of beans, making it important and fertile in the context of developing new technologies for the conservation and use of this tuber [1].

2.2 Acquisition of raw materials

2kg of sweet potato samples, variety "Irene", absent of cracks, with a firm consistency, and no cuts on the surface of the peel, were purchased from the local market, along with sodium chloride (Impala), potato seasoning (spice and paprika), and vegetable oil (Dona), packed in high-density polythene bags and taken to the laboratory for production and analyses.

2.3 Production of sweet potato chips

2.3.1. Weighing and washing

The material with the characteristics described in point 2.2 was weighed using an analytical balance. The sweet potato was washed by immersing it in running water to remove impurities and the microbial load on the surface of the product.

2.3.2. Peeling, sanitising

Peeling was carried out manually using a stainless steel knife, eliminating any defects that affected the pulp. The material was sanitised by placing it in a solution of chlorinated water at 10 ppm active chlorine for 10 minutes.

2.3.3 Moulding and margining

Moulding was carried out using a potato peeler (Riastvy brand) with which uniform longitudinal cuts of ±2cm in thickness were made. 5kg of this material was then placed in 3 litres of brine previously prepared with citric acid and water in a ratio of 1:9 and left to marinate for 30 minutes. The material was then removed and left to rest on cotton cloths for 30 minutes.

2.3.4 Mixing the ingredients

The ingredients listed in Table 1 were mixed by hand and left to stand for 10 minutes. This was followed by frying using vegetable oil (Dona). To do this, 1.3kg of the moulds were fried in 250mL of vegetable oil placed in a stainless steel pan. The heat source used was an ANVIL COA3004 gas cooker with a temperature of 180ºC for ± 9 minutes, after which the chips were removed with the aid of a grid-shaped foamier.

Table 1. Sweet potato chip formulations.

	Formulations			
Ingredients (%)	**A**	**B**	**C**	**D**
Sweet potatoes	100	98	90	95
Salt	0	2	0	0
Spice Seasoning	0	0	10	0
Paprika powder	0	0	0	5

2.4 PHYSICOCHEMICAL ANALYSES

Based on [3], ph, total titratable acidity, carbohydrates, calorific value, proteins, lipids, ash and moisture were determined.

Moisture

Moisture was determined using the gravimetric method. For this purpose, 5g of chips were previously crushed in a mortar, added to a petri dish previously weighed on a 0.0001g precision adam analytical balance, dissected in an ecotherm oven with circulating air at 105ºc for 2 hours, then cooled to room temperature (±25º). Equation 1 was used to determine moisture.

$$\%\,moisture\ content = \frac{(Pi - Pf)}{Pi} * 100$$

Where:
Pi- Initial weight of the sample;
Pf- Final weight of the sample.

Fat determination

The fat content was determined using the Goldfish method. 5g of the sample was crushed in a *mortar* and subjected to direct extraction of fat with petroleum ether, extracting (55ºC) for 4 hours in a Goldfish apparatus. Expression 2 was used to determine the fat percentage.

$$\%\ \text{Fat} = \frac{(\text{capsule weight} + \text{fat}) - (\text{capsule weight})}{\text{capsule weight}} * 100$$

Determination of titratable total acidity (ATT)

In triplicate, 5g of sample was weighed using a 0.0001g ADAM analytical balance and diluted in a 200 mL beaker containing 95 mL of water, homogenising manually for 5 minutes. Subsequently, 0.3 mL of phenolphthalein solution was added and titrated with sodium hydroxide solution (0.1M NaOH), homogenising until the turning point was reached. Equation 3 was used to determine treatable acidity.

$$\% \text{ acidity} = \frac{(\mathrm{V} * \mathrm{F} * \mathrm{M})}{\mathrm{P}} * 100$$

Where:
V = number of ml of sodium hydroxide solution used in the titration;
F = correction factor for the sodium hydroxide solution;
p = sample mass in g or pipetted volume in mL;
M = molarity of the sodium hydroxide solution.

Ash

On an ADAM analytical balance with 0.0001g precision, 5g of sample was weighed into porcelain crucibles and placed in an OPTIL IVYMEN muffle furnace at 550°C until the incineration was verified. The crucibles were then transferred to an oven at 105^{o}C for 30 minutes with the emphasis on lowering the temperature, followed by weighing them with the incinerated sample in inorganic matter. The percentage of ash was determined using equation 4:

$$\% \, ash = \frac{(m2 - m)}{(m1 - m)} * 100$$

Where:
m - Crucible eight;
m1 - weight of crucible with wet sample;
m2 - weight of crucible with ash;

Carbohydrates

They were determined by difference. To do this, the percentages of moisture, fat, protein and ash in 100g of the sample were added and subtracted from the maximum percentage (100%). Equation 5 was used to determine the carbohydrate content.

Carbohydrates % = (% moisture + % ash + % protein + % fat) - 100 [5]

Calorific or energy value

The calorific or energy value of the samples was determined using the method of calculating the sum of macronutrients that supply energy to the human body, using the coefficients and based on the equation:

Calorific Value (Kcal) = ((% protein*4 + % carbohydrates*4) +% lipids*9) [6]

Determining pH

In triplicate, 10g of sample was weighed into an erlenmeyer flask and diluted in 90ml of water. The contents were shaken to remove the suspended particles from the sample, then the pH was read after emptying the electrode of the HANNA model pH meter (HI 2212 pH/ORPMeter), previously calibrated with buffer solutions 7 and 10.

Proteins

The protein content was determined using the Biuret method, where 300 µL of each extract (prepared in the ratio: 10g of Chips and 90 mL of water) was mixed with 2000 µL of Biuret reagent and left in a dark place for 30 minutes to give a purple complex colour, and then the absorbance was read at 540 nm on a brand spectrophotometer (YOKE) previously zeroed with distilled water. The protein content of samples was determined by extrapolation using a calibration curve made up of casein n in proportions of 0 to 10 mg/ml.

Sensory analysis

The analysis continued with the application of affective methods. The test was carried out by a panel made up of (50) untrained tasters of both sexes aged between 18 and 45, including teachers, students and staff selected at random. The following attributes were evaluated: appearance, colour, crunchiness, aroma, flavour, aftertaste and overall assessment, using a 9-point hedonic scale ranging from "1" extremely disliked to "9" extremely liked". The acceptance index (AI) was calculated using equation 7:

$$AI = \frac{(A * 100)}{B}$$

Where:
A - Represents the average score obtained for the product;
B - Maximum score given to the product.

Statistical analysis

The analysis of variance (ANOVA) was carried out using the general linear model (GLM) using the RStudio statistical package 4.2.1. A completely randomised design with 12 experimental units was used to analyse the physicochemical parameters and a randomised block design with 50 experimental units was used for the sensory analysis. In the event of significant effects, the difference between the means of experimental units was evaluated using Tukey test at 5% level.

Results and discussion

Physicochemical composition of sweet potato chips.

The centesimal composition of chip samples evaluated is shown in Table 2.

Table 2. Physicochemical composition of chips.

	Parameters	**Formulations**			
		A	**B**	**C**	**D**
Centesimal composition	Moisture (%)	2,6±0,0^{a}	2,5±0,8^{a}	2,2±0,3^{a}	2,4±1,0^{a}
	Carbohydrates (%)	77,3±0,5^{b}	82,1±3,4^{a}	81,2±0,8^{ab}	79,0±0,9^{ab}
	Protein (%)	8,0±1,8^{a}	5,9±1,9^{a}	6,3±0,7^{a}	4,8±2,1^{a}
	Lipids (%)	9,8±0,9^{ab}	7,9±1,2^{b}	8,7±0,7^{ab}	11,3±1,7^{a}
	Ash (%)	1,5±0,2^{ab}	1,6±0,0^{ab}	1,3±0,0^{b}	1,9±0,1^{a}
	Calorific value (Kcal)	430,8±1,8^{ab}	423,6±4,9^{b}	428,7±5,2^{ab}	447,0±4,4^{a}

Others	pH	5,5±0,1[a]	5,2±0,0[b]	5,1±0[b]	5,0±0,1[b]
	Acidity (%)	3,2±0,2[a]	2,9±0,1[a]	3,1±0,2[a]	3,2±0[a]

Means ± standard deviation followed by the same letter on the same line do not show significant differences at Tukey's 5% level. A, Sweet potato pulp; B, 98% sweet potato and 2% salt; C, 90% sweet potato and 10% chips spice seasoning; and D, 95% sweet potato and 5% paprika powder.

Moisture

The results showed that the formulations ranged from 2.2±0.3 to 2.6±0.0%. The highest moisture content (2.6%) was observed in formulation A. On the other hand, the lowest content (2.2%) was obtained in formulation C. This result is probably linked to the moulding, rinsing and frying stages which, according to [38] in their study on production of sweet potato chips with the replacement of sodium chloride by potassium chloride, provide partial dehydration of the moulds and evaporation of free water to the extent influenced by high temperatures (180°C). No significant differences were found between formulations.

Higher results than those obtained in the present study were reported by [40], when evaluating chips formulated with Discoreabulbífera, in which the moisture content was 49.70%, by [38], when producing sweet potato chips with sodium chloride substitution, who obtained moisture ranging from 7.3% to 8.3%, by [17], studying physicochemical and sensory characterization of sweet potato chips, mentioned moisture contents around 7% and 8%, and by [14], when evaluating jicama potato chips made by dehydration and drying, who obtained moisture contents of 8.0 to 10%. This difference in moisture content is possibly linked to the physical process each product was subjected to, considering that [77] related that quickly evaporation of volatile compounds is promoted by heating the vegetable oil, directly influencing the desorption of moisture.

Carbohydrates

There were significant differences (p <0.05) between formulations A (77.3± 0.5%) and B (82.1± 3.4%), and the high levels of carbohydrates may be associated with the Irene variety, which according to [69], is considered a complex carbohydrate with up to 90% sugars in its dry matter, being higher than the varieties (white and yellow).

Lower results were reported by [38], when evaluating the physicochemical characterization of sweet potato chips with sodium chloride substitution, indicating carbohydrates ranging from 73.9 to 76.7%, [75], in their research on the preparation of cassava-based chips, reported carbohydrates of 56%, and by [18], evaluating ipomoea batata chips, found carbohydrates of 56.24%. Unlike the authors mentioned above, the high level of carbohydrates found in this study can be explained by the characteristics of Irene variety which, according to [20], has a higher carbohydrate content around 80 to 81 percent for 100g. Similar results (81 and 82% carbohydrates) were reported by [21], when evaluating production of roasted D. bulbifera chips, who found 60% and 81% of carbohydrate content, and by [13], in their study about preparation and characterization of chips, who obtained 82.6% of carbohydrates.

Proteins

The samples evaluated showed protein values ranging from 4.8 to 8.0%, with no significant differences (p<0.05) between them.

Similar results to those obtained in this research were reported by [62] in his study about production of dehydrated potato chips, who found 11.4% of protein content. Results that were not in agreement were described by [23] with aim of developing cassava-based chips, reported protein content of 0.92%, [51] studying the centesimal composition of Soibamdioscorea spp. chips, obtained protein of 1.2%, and by [12], when developing dehydrated D. rotundatacv. chips, found a protein content of 2.1%. For their part, [70], when producing chip formulations with D. bulbífera, reveled protein content ranging from 3.7 to 4.1%, and [67] around 4.12% of protein, when developing baked chips, and [64], when studying the effect of osmo-convective dehydration on physical and physicochemical characteristics of chips, obtained protein content ranging from 1.95 to 2.04%, and [11] found protein content of 0.63% in fried cassava chips. The fact that the results of this study do not agree can be explained by [74], who mention the high lipoprotein content in soya oil, which possibly added greater protein value to the chips.

Lipids

Statistical differences were evident in formulations B and D, and this difference may be associated with the frying temperature and time, since it had an effect on the degradation of lipoproteins and fatty acids in the oil as a function of the time of use.

Different results were reported by [57] who, in their study on the characterization of cassava chips, obtained 34.8 to 44.2% of lipids and by [18] who, when studying the production and physicochemical and sensory evaluation of cassava chips subjected to pre-treatment, obtained of 36.5% lipids. The difference between the results of these authors and this study may be associated with the amount of oil used and the cooling stage, which may have led to the low levels of lipids.

Lower values than those obtained in this research were reported by [38], studying Dioscorea bulbífera chips as an innovative alternative for the technological processing of unconventional food plants from Amazon, who obtained lipid content ranging from 0.39% to 3.41%, and by [52] when developing chips based on Lupinusalbus L, who found 3.65% of protein. The difference in lipid content may be related to the cooking processes and/or the processing methods (frying and baking) used to produce the chips.

Reports by [69], in their study of production and centesimal characterization of chips based on Ipomeia batata, obtained levels of 6.75%, close to those found in this study.

Ashes

The results for fixed mineral residue ranged from 1.3 to 1.9%. The highest value (1.9%) was observed in formulation D, which is probably related to the properties of added potato spice, which contains a high mineral content and concentrated dry matter. Formulations A and B were not statistically different from each other. On the other hand, significant differences were seen in formulations C and D, possibly due to the concentration of dry matter and mineral content present in the potato spice compared to paprika powder.

In the assessment carried out by [38] in his characterization study physicochemical action of sweet potato chips with replacement of sodium chloride by potassium chloride, obtained ash around 3.1±0.1 to 3.9±0.2%. Higher results than those obtained in the present study, where the differentiation of the raw material and concentration of potassium ions may have influenced these results.

[23], developing moulded and fried cassava chips, obtained ash content of 2.83%, [16], working on sweet potato snacks, obtained ash content of 3.40%, [36], studying the stability of chips in different packaging systems, found ash content of 3.35%, [65] reported ash content of 2.41% when evaluating Dioscorea chips obtained by oven drying, [7] found 2.40% of fixed mineral residue in their study about production and sensory characterization of Arracaciaxanthorrhiza Bancroft chips. These results are above on levels found in this study, where the cooking time and type of raw material may have had an influence.

Calorific value

There was a statistical difference ($p < 0.05$) in formulations B and D with levels around 423.65±4.9 kcal and 447.02±4.4kcal, and these differences, according to [31] and [46], probably correlate with the variation of lipids concentration, glucose, dietary fibre and lipoproteins in the product.

In the study carried out by [38], with aim of producing chip formulations using potato, lupin and pea flour, they reported energy value ranging from 319.52 to 346.29 Kcal/100g, lower than the results found in this research, which may be directly linked to the constitution of the raw material used in chip production. Results reported by [39], analysingDioscóreabulbífera chips as an innovative alternative for the technological processing of unconventional food plants from Amazon, obtained values ranging from 284.84 kcal to 371.26Kcal/100g, which is lower than results of this research, and possibly the cooking method, time and temperature used contributed to these results.

Acidity

The highest level of acidity (3.2%) were observed in formulations A and D, with no significant differences. Lower results than those found in this study were reported by [54] studying physicochemical analysis of D. bulbifera chips, who obtained 0.25% of acidity, and by [70], 0.27%, in their study about production of Mussa spp. chips. According to [71] the differentiation of acidity levels in the application of multidimensional techniques and the nutritional composition of sweet potato chips may be linked to the type of raw material, as well as the cooking stage and, according to [76] the adhesion of the oil to the surface of the chips may have contributed to the increase in acid levels such as lauric and palmitic, considering the sweet potato genotype.

pH

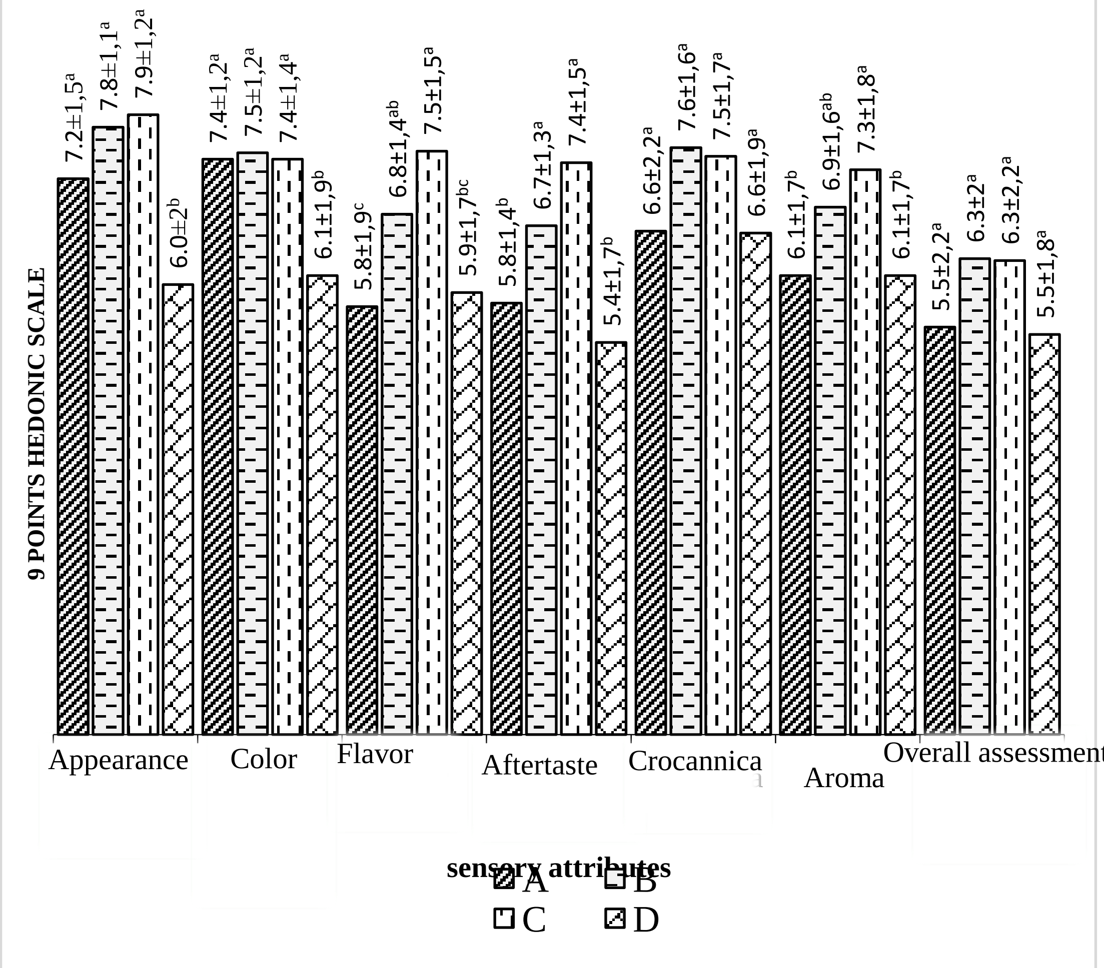
The pH values ranged from 5.0 to 5.5, where formulation A differed significantly from the others, which may be related to concentration of citric acid (90mL of bioactive) added and the ingredients (sodium chloride "salt", spice seasoning and paprika powder) used as seasonings in production. Values in line with those obtained in this study were revealed by [68], who produced sweet potato chips and obtained a pH of 5, within the levels found in this study.

Results close to those obtained in this research were described by [60] when evaluating Musa spp chips, which obtained a pH of 5.89. [30], when drying D. esculenta chips, obtained a pH of 6.56, which is higher than theresults obtained in this study, which may be linked to the drying stage.

Sensory analysis

Figure 1 shows the results of sensory analysis of sweet potato chip formulations.

Figure 1. Acceptance of sweet potato chips.



Means ± standard deviation followed by the same letter on the same line do not show significant differences at Tukey's 5% level. A, sweet potato pulp; B, 98% sweet potato and 2% salt; C, 90% sweet potato and 10% spice seasoning chips; and D, 95% sweet potato and 5% paprika powder.
Source: Authors.

Appearance

Formulation D (6.0±2) differed significantly ($p<0.05$) from the others, probably due to the brownish colour of the paprika which may have given it a different appearance. [64] studying sensory analysis of yacon chips, obtained a score of 6.5, a result in line with that found in formulation D of the present research, which is in line with that found by [55], making yacon chips, who reported value of 6.5 for the appearance attribute. Similarly, [38], studying the production of chips with partial replacement of sodium chloride with potassium chloride, obtained average of 7.5, which is also in line with the results of this research.

Colour

The averages ranged from 7.14 to 7.5, with statistical differences in the formulations produced. These differences were caused by the addition of spaice, the ingredient that affected the intensification of the colour and the caramelisationproces. Similar results to those obtained in this study were reported by [47] studying the frying temperature of chips and sensory acceptance, who obtained a score of 7, and by [19] in his study related with sensory analysis of chips stored at low temperatures, obtained a score of 7. Different values were described by [17] when carrying out a sensory analysis of potato chips with fish flavouringflavoured with lemon, obtaining 8.5, and by [55] when evaluating the quality of the colour of chips, who obtained a score on a scale of 6.

Flavour

The flavour attribute ranged from 5.8 to 7.5. The highest score (7.5) was given to formulation B, which was statistically different from the others. This variation may be linked to the different ingredients used to make the chips. Similar results (6, 7, 7.4 and 7.46) to those found in this research were obtained by [64] at around (7.4), when studying the dehydration of chips, [10] in the range of (6 to 7), seeking to evaluate the sensory analysis for launching a product on the market, and by [59] when carrying out their study about physical and sensory quality of dehydrated Yacon chips, they obtained values of 7.46 .

Aftertaste

The highest score was observed in formulation C (7.4), followed by sample B with (6.7). Significant differences ($p < 0.05$) were observed in formulations A and D compared to formulations B and C. This variation in aftertaste preference is possibly due to its acidic and spicy properties. [22], in his sensory analysis of chips, revealed aftertaste scored 6 on hedonic scale, while [44], seeking to study the sensory acceptance of chips made with yams, obtained scores ranging from 6.7 to 7.4, results in line with those obtained in the present study. Higher results than those obtained in this research were referenced by [39] studying on Dioscorea bulbífera chips as an innovative alternative for the technological processing of unconventional food plants from Amazon, who obtained a score on the scale of 8.1.

Crocannica

There were no significant differences ($p > 0.05$) between the formulations. This finding may be associated with the thickness of the chips, moisture content and frying temperature. [38] in his research seeking to produce chips with sodium chloride substitution, obtained average of 7.7, [28] producing cassava chips, who obtained a score of 7.6, results similar to those found in this research. Different results to those found in this research were reported by [17] evaluating the sensory quality of cassava chips, who obtained score in range of 6.5 to 8.3, and by [41] in the range of (5 to 8.45), when processing potatoes of different genotypes and frying them, taking into account [11], this finding may be linked to the dry matter of the food, inferring an increase in crispiness levels due to dehydration and removal of the sweet potato's moisture content.

Flavour

Flavour scores ranged from 5.5±2.2 to 7.3±1.8. The highest score (7.3) was found in formulation C, which was statistically different ($p < 0.05$) from the others. This variation is linked to composition of the spice seasoning. Similar results to those obtained in this research were obtained by [34] studying about sensory analysis of sweet potatoes subjected to different cooking methods, obtained score of 6.8, [5] seeking to develop cassava chips, who obtained score of 6.8, and by [44], around 6.8, evaluating chip consumers in relation to o [39] when carrying out their study on Dioscorea bulbífera chips as an innovative alternative for the technological processing of unconventional food plants from Amazon, obtained score of 7.8.

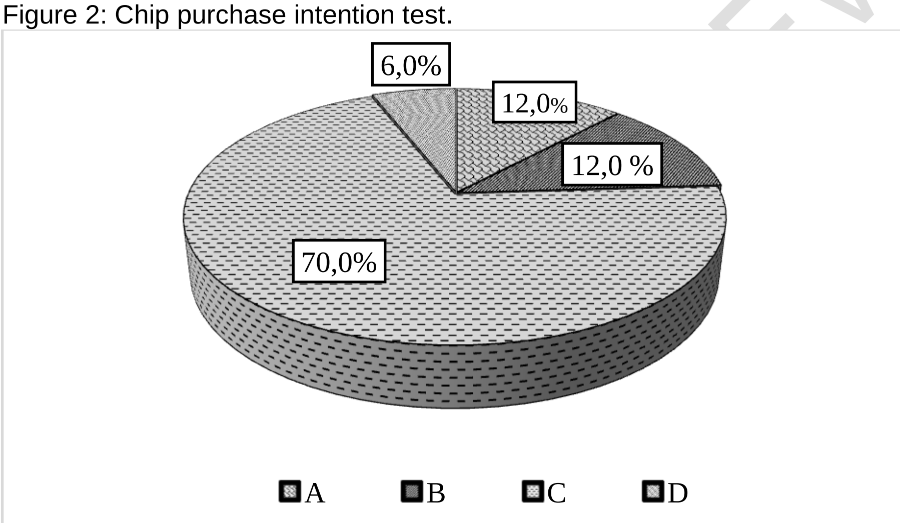
Overall assessment

No statistical differences were observed between the samples, with values ranging from 5.5±1.8 to 6.3±2.0. This variation was correlated to dietary habits and the conditions in which the analyses were carried out. [33] in their study about production and physicochemical characterization of crisps, found a score of 6.3, a result in agreement with the present study. Higher results were reported by Santos, [59], who analysed the sensory characteristics of sweet potato chips using different oils and obtained an overall score of 6.8, by [67] in their studies on chips, who obtained a score of 8.2, and also by [72] studying yam chips, who obtained a score of 8.

Purchase intention

The results of buy intention of Chips are shown in figure 2.

Figure 2: Chip purchase intention test.



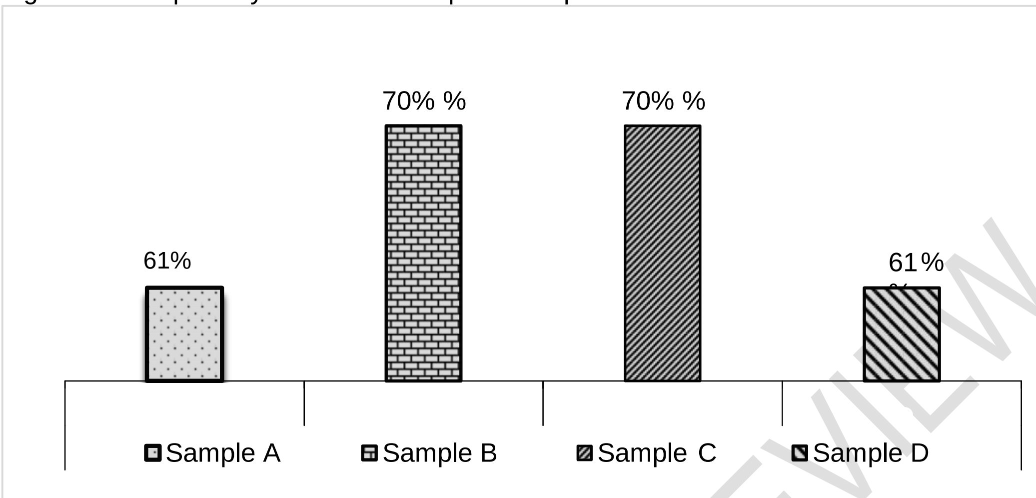
A, sweet potato pulp; B, 98% sweet potato and 2% salt; C, 90% sweet potato and 10% spice seasoning chips; and D, 95% sweet potato and 5% paprika powder.
Source: Authors.

Formulation C obtained the best purchase intention index (70%), which may be associated with eating habits and the composition of formulations, which tended towards commercial chips, and the taste and appearance of product were associated with these characteristics. [44], studying about production and sensory approval of sweet potato chips, revealed 70% of purchase intention, in agreement with the results obtained in the present study. [25], in his research aimed to study sensory quality of cassava chips of different genotypes and subjected to different frying temperatures, obtained 74.22% of purchase intention, [73], when carrying out sensory analysis of potato chips, obtained 44%, and [58] reported 38% in their studies evaluating the purchase intention of potato chips flavoured with fish.

Acceptability index

Figure 3 shows the results of the acceptability index for *(Ipomea batatas)* chips.

Figure 3: Acceptability index of sweet potato chip formulations.



A, sweet potato pulp; B, 98% sweet potato and 2% salt; C, 90% sweet potato and 10% spice seasoning chips; and D, 95% sweet potato and 5% paprika powder.

Source: Authors.

The acceptability index of the sweet potato chips showed that formulations B and C had the best with 70%.

Consistent results were reported by [49] in his study about sensory acceptance, who obtained results of 70% acceptability, [53], when evaluating the acceptability of banana chips from the tip of the bunch, in the range of 70% to 75%, and [2] when evaluating the development of potato chips, who obtained acceptance of 82%, which is within the recommendations for product acceptance. On the other hand, [58], when producing fish-flavoured chips, obtained 38% product acceptance, which is lower than the result observed in this study.

Conclusion

No significant differences were found in terms of moisture, protein and titratable acidity levels. Differences were found in lipid content, carbohydrates, ash, calorific value and pH. Sensorially, the chips in formulations A and B, with 97.5% sweet potato and 2.5% spice seasoning and 99.2% sweet potato and 0.8% salt, had satisfactory acceptance ratings around 70%. The sweet potato proved to be technologically viable for the production of chips, helping to guarantee food and nutritional security as well as reducing waste.

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