PRODUCTION AND SENSORY EVALUATION OF JAM PRODUCED WITH PITOMBA PULP (Talisia Esculenta Radlk)

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ABSTRACT – This paper aimed to develop and evaluate the sensory of the pitomba jam, made with fruit pulp in nature mixed with sucrose, pectin and lemon juice (citric acid). To obtain this jam, it was mixed water and apple strips, as a source of pectin. Then, this mixture was led to the heat until cooking the apples, which was sieved, and mixed with the pulp of pitomba, lemon juice and sugar. Finally, it was subjected to a sensory analysis in a dietetics technical laboratory. 50 food tasters of both genders and aged over 18 years had participated of this evaluation. The analysis was applied as an affective test, the team was composed of employees and ungraduate students, who only participated after signing a free and clarified consent term. Thus, it was evaluated the organoleptic characteristics. The results showed 86.36% of acceptability and that 13.64% of individuals did not like or had objections.

PALAVRAS-CHAVE: geléia de pitomba; análise sensorial; propriedades nutricionais.

KEYWORDS: pitomba jam; sensory analysis; nutritional properties.

1. INTRODUCTION

The Brazilian annual production of fruits is 39 million tons. This number is a result of its territory extension and location, most of it placed at the tropical and temperate zones (Granada et al, 2004). However, the development of the national fruit production has great potential for development, since there are many fruits that have not been commercially exploited. In addition, there are few reports of usage of these fruits in the local agricultural industry, for example, atemóia, manna, canistel, blueberry, lychee, physalis, carambola and pitomba. Pernambuco has numerous pitomba’s trees at backyards and the fruit is featured in popular culture, including during Carnival Festivals and even has a festival dedicated for this fruit in the city of Jaboatão dos Guararapes (Pernambuco/Brazil): The Pitomba’s Party.

The pitomba trees (Talisia esculenta Radlk) is a Sapindaceae family’s tree that can be found within primary and secondary dense forests, being a native specie from the Amazon region, which can
also be found in Cerrado and Caatinga in the North, Northeast and Southeast of Brazil. Pitomba tree is a fruit tree that can reach 6 to 12 meters (20 to 39 ft) high and its body has diameter between 30 and 40 cm (12 and 16 in) (GUARIM NETO; SANTANA; SILVA, 2003). The fruits has reddish elongated seeds, as soon as it is taken from the tree, and dark when it is dried, surrounded by pinkish-white and edible aril. The fruits are nearly globular, granular, apiculate and low pubescent, dusty, yellowish and residues of the cup, usually monospermic (GUARIM NETO; SANTANA; SILVA, 2003). The tree is widely grown in orchards around the country.

The commercial usage of pitomba’s tree is quite diverse. Fruits, barks, leaves and wood can be used. The fruits are edible (SILVA et al. 1994) and can be found in the markets at north and northeast of the country. The wood can be used to manufacture covers, frames, jambs, boards, woodworking and crates (LORENZI, 1992).

Silva et al (2008) shows that, the pitomba may be considered a low caloric fruit, 56.35 (kcal 100g$^{-1}$). About the physical-chemical aspects, pitomba’s pulp has $83.16 \pm 0.73$ (g.100g$^{-1}$) of moisture, $1.15 \pm 0.02$ (g.100g$^{-1}$) of protein, $0.19 \pm 0.01$ (g.100g$^{-1}$) of lipid, $12.51 \pm 0.69$ (g.100g$^{-1}$) of carbohydrate, $2.40 \pm 0.57$ (g.100g$^{-1}$) of dietary fiber, $26.7 \pm 6.35$ (g.100g$^{-1}$) of calcium; $0.84 \pm 0.13$ of zinc (g.100g$^{-1}$) and $0.60 \pm 0.00$ (g.100g$^{-1}$) of iron. In addition, it is rich in many secondary metabolites (phytochemicals), such as flavones, flavonols, xanthones, alkaloids and saponins. Pitomba’s pulp has antioxidant function, combating free radicals and preventing cell degeneration (cell aging), and it has acidic pH, however it is necessary a further research to quantify those elements. One of nutritional usage of pitomba is the jam of pitomba. Therefore, this paper will produce and make a sensory evaluation of pitomba handmade jam from in nature fruit pulp mixed with sucrose, added pectin (apple juice) and lemon juice (citric acid).

2. MATERIAL AND METHODS

The pitombas were obtained at street markets in the city of Recife and Jaboatão dos Guararapes (Pernambuco/Brazil). Those were washed with fresh water, selected and properly sanitized with 2% of sodium hypochlorite solution during 15 minutes, then shells and pulps were removed with the aid of a common knife. In the end, the pulps were placed in plastic bags with a capacity of 500 g (1.10 lb) and stored in the freezer until the preparation of jam. This preparation was held in the Dietetics Technical Laboratory of the Universidade São Miguel, following the standards of hygiene to prevent microbiological contamination. The pitomba jam production steps are listed in Figure 1.

The cooking was performed in a stainless steel pot with capacity of 2 liters. The jam preparation consisted of mixing 1 liter of water with 120 g of apple strips (pectin). This mixture was led to the heat until the apple strips was completely baked. The liquid obtained was used for the jam preparation. This liquid was mixed with 150 g (0.33 lb) of pitomba pulp and 200 g (0.44 g) of crystal sugar and cooked during about 50 minutes. Then, $\frac{1}{4}$ of a lemon was added to obtain higher acidity. The jam ingredients are presented in Figure 2.
For sensory analysis of the pitomba jam, 50 evaluators (untrained food taster) received a portion of the sample (9 to 15g) in white disposable plastic cups, accompanied by disposable spoons. Then, the evaluators answered a questionnaire where the outcome was used to evaluate the attributes of texture, color, flavor and odor of the jam. The food tasters answered about the acceptance of samples based on a hedonic scale of 9 points, as showed in Figure 3, ranging from 1 ("highly disgusted") to 10 ("highly liked"), adapted from Resurreccion (1998). The average of attributes relating to the preference of the study sample were supplemented with a descriptive statistical analysis of the respective standard deviations and coefficients of variation.
The total soluble solids (TSS) were evaluated through the direct refractive reading, with the refractometer type Abbe, brand ATAGO - N1. Results are expressed in the unit "Brix.

Because it is a research involving human subjects, the study protocol was submitted to the Research Ethics Committee (Brazil Platform), with protocol number (59043216.1.0000.5201).

3. RESULTS AND DISCUSSION

The results of the sensory analysis for the different attributes of pitomba jam can be observed at Table 1 and Graphic 1. According to the results obtained in the sensory evaluation, the most attributed score was 8 (very good) at the hedonic scale, which it refers to 50% of evaluators and the second most attributed score was 9 (extremely good), which represents 22.73%. This gives a total of 72.73% of reviewers who liked the jelly. The less cited score was 4 (slightly disgusted) gave by 4% of the evaluators, followed by 5 (neither liked nor disliked), indicated by 13.63% of evaluators.

The sweet taste of the jam pleased the evaluators. This may have been the factor that most influenced the jam score regarding the overall assessment. Regarding the formulation with the highest percentage of sugar and lower percentage of pulp, it can be concluded that the fruit slightly interfered with the sweetness of the jam. The acid taste was considered by the food tasters the biggest problem in the formulations, in which 3% of the evaluators reported that the jam presented high acidity. According to comments given by the evaluators, acidity precluded a better analysis of the taste, and some tasters mentioned lack of the fruit taste in the jam. The jam acidity is related to the physicochemical
characteristics of the fruit such as pH and acidity. Besides this, the jam formulation included lemon as one of the ingredients, which may have contributed to the increase in acidity of the product.

Graphic 1 – Result of sensory analysis pf pitomba jam

![Pie chart showing sensory analysis results](image)

Source: The authors, 2016.

Table 1 - Results of pitomba jam sensory analysis

<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>GRADE (AVERAGE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>flavor</td>
<td>7.55</td>
</tr>
<tr>
<td>aroma</td>
<td>7.45</td>
</tr>
<tr>
<td>color</td>
<td>8.04</td>
</tr>
<tr>
<td>texture</td>
<td>7.54</td>
</tr>
<tr>
<td>appearance</td>
<td>7.86</td>
</tr>
<tr>
<td><strong>Total average</strong></td>
<td><strong>7.69 ± 0.21</strong></td>
</tr>
</tbody>
</table>

Source: The authors, 2016.

Evaluating all sensory aspects, the results presented in Table 1 were desirable. The color was the most appreciated attribute, which had an average score of 8.04. This was expected due to its attractive reddish pink color. However, since the fruit does not have a strong odor, the odor attributes were less appreciated by the evaluators (score of 7.45). Similar results were also observed in a study conducted by Lake et al. (2006) when performed sensory evaluation of jam produced with jambolan pulp.

Sucrose is one of the basic ingredients for the production of jams, once that with its addition is possible to reach the °Brix (soluble solids) necessary for obtaining of products of this category. As the parameters established by law this is necessary not only for a sweet taste, but also contributes to jam formation (SILVA, 2008).

The pitomba pulp showed a score of 22 °Brix, while jam produced with this fruit showed a determination 75.2 °Brix. This result is larger than the total solids value established for fruit jam and it is additionally consistent with the findings of Foppa et al. (2009) that, when performing the pear jam analysis, obtained a result of 77 °Brix. However, the study conducted by Caitano et al. (2012) presents that the same analysis of soluble solid jam made with pulp of acerola juice found the value of 66 ° Brix.
4. CONCLUSIONS

Alternative sources of raw materials have been a great interest to the local agricultural industry. The cheap production, combined with the growing interest in foods with functional attributes (antioxidant), enables industrial usage of regional fruits as pitomba. The product proved to be assessed, after sensory evaluation given by 50 food tasters who approved the jam on the analyzed attributes, which has the color as the most appreciated attribute and the odor the least appreciated. The pitomba jam production proved to be feasible and certainly is an option for the consumption of seasonal fruits as pitomba for greater shelf life.

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BIBLIOGRAPHIC REFERENCES


