AVALIAÇÃO MICROBIOLOGÍCA E SENSORIAL DE JAMBU (ACMELLA OLERACEA L.) DESIDRATADO POR CIRCULAÇÃO DE AR FRIO

MICROBIOLOGICAL AND SENSORY EVALUATION OF JAMBU (ACMELLA OLERACEA L.) DRIED BY COLD AIR CIRCULATION

Apresentação: Pôster

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Introduction

Acmella oleracea L., popularly known as Jambu, is a native plant of the Amazon region. It is often used as flavoring in dishes from Northern Brazil, such as Tacacá and Pato-no-tucupi. Also, it is used in the traditional medicine to treat stomatitis, influenza and as an analgesic product (NASCIMENTO et al., 2013).

Cold drying is a simplified lyophilization process, under atmospheric conditions, which eliminates the freezing stage. Water removal occurs at low temperatures and relative humidity, and the food sample is kept in the liquid state through all the drying process (KUBOTA & CAL-VIDAL, 1987).

The RDC Resolution No. 12 from Agência Nacional de Vigilância Sanitária (BRASIL, 2001), regulates the microbiological standards for vegetables in natura and dried vegetables. This resolution has established the absence of Salmonella spp for both products and sets the maximum values for coliforms (10³ MPN/g) and coagulase-positive Staphylococcus (10² CFU/g), for the dry vegetables.

Sensory tests are used for many purposes, such as quality control, process and product development and optimization, and for the understanding of consumer reaction to the product.
The sensory analysis is used to achieve good food quality, with minimal chances of error or uncertainty (TEIXEIRA, 2009). Thus, the aim of this study was to evaluate the microbiological and sensory quality of the Jambu *in natura* and dried by cold air.

**Theoretical foundation**

Important chemical property of the Jambu has aroused the interest of the pharmaceutical industry, due to the presence of the active ingredient known as spilanthol (BORGES et al., 2012).

Jambu is a herbaceous species presenting high moisture content and short shelf life. Thus, it requires post-harvest technology to preserve its long-term quality, given the transport and trading in more markets that are distant. Drying could be the possible preservation technique. It means that removing part of moisture can reduce the water activity and affect microbial growth, enzymatic reactions and other physical and chemical reactions. The drying results can increase the shelf life of food, reducing weight and volume, and decreasing the costs of transportation and storage. Also, can facilitate the use and the offer diversification of new foods.

The effective methods represent the consumer opinion, based on the evaluation how much the consumers like or dislike the product (ISAAC et al., 2012). There are several scales to measure the acceptance, and the hedonic scale is one of the most used. Many forms of hedonic scales are commonly used to measure quantitatively the consumer acceptances of food products (LIM, 2011).

**Methodology**

Jambu (whole plant: leaves, fine stems and inflorescences) was sampled in the Municipality of Igarapé-Açu, belonging to the Meso and Micro Northeast Pará, Bragantina Region, Pará state, Brazil. The plant (MG205534) was identified as *Acmella oleracea* L. (Asteraceae), and a voucher sample was deposited in the herbarium of Emílio Goeldi Museum, Belém city, Pará state, Brazil.

The Jambu was sanitized before drying. The plant water washed before its microbiological analysis. The cold drying process was carried out in a climatized room of 4.0 m², with air-conditioning (Midea, model MS2E-18CR, Brazil), at 25 °C. Also, a dehumidifier
(Arsec, model 160, Brazil) was used, and the room remained closed during the drying procedure.

For Jambu in natura and dried were conducted microbiological analysis with *Salmonella* spp, coagulase-positive *Staphylococcus*, and coliforms, at 45 °C, as described by APHA (American Public Health Association, 2001). These analysis were performed before the sensory analysis to verify that the samples were by the standards of legislation (BRASIL, 2001), causing no risk to consumer health.

The acceptance test of Tacacá with Jambu in natura and dried was conducted and its marketing potential was evaluated. The study was approved by the Ethics Committee in Research of the Universidade Federal Rural do Rio de Janeiro (COMEPI/UFRRJ), Protocol 23083010094/201208, August 9, 2013. Thirty evaluators participated in the sensory analysis. The analyzes were performed according to Meilgaard et al. (2006).

For the attribute “purchase intent”, a 5-point structured scale was applied to 30 untrained evaluators, in which 1 represents the minimum score “I would definitely not buy” and 5 represents the highest score “I would certainly buy”. To calculate the acceptability rate of the product was adopted the expression \( IA(\%) = \frac{x}{100} \frac{A}{B} \), where \( A \) = average score obtained for the product and \( B \) = maximum score given to the product (DUTCOSKY, 2013).

The forms for sensory acceptability and intent purchase tests were collected, and the answers were converted into scores (1 to 9 and 1 to 5, respectively). The arithmetic averages of the scores obtained for each product were calculated and subjected to Student t-test at 5% level of significance (\( p>0.05 \)), using BioStat 5.0 (AYRES et al., 2007). The results were presented as the mean and standard deviation.

**Results and Discussion**

The presence of *Salmonella* spp was not detected in all the Jambu samples. The coagulase-positive *Staphylococcus* counting was \(<1\times10^1\) CFU/g in the dried Jambu, meeting the legislation standards (RDC No. 12/2001), which calls for the maximum score of \(10^2\) (BRASIL, 2001). Similarly, the dried Jambu has presented a coliform enumeration \(<3\) MPN/g, at 45 °C, meeting the legislation standards, which accepts a maximum enumeration \(10^3\) MPN/g (BRASIL, 2001).

The importance of these results can be seen in the work of Sant’Ana et al. (2011) who have evaluated 512 packages of minimally processed vegetables and observed that four of them
showed positive for *Salmonella* spp result. *Salmonella* spp was detected in a packet of lettuce and arugula, and there were *Salmonella Typhimurium* and *Salmonella enterica* subsp. *enterica* O:47:z4, z23 serovars, respectively. Organic lettuce and a mix of vegetables (escarole and chicory) presented counts of microorganisms (8.8 × 10² CFU/g, and 2.4 × 10² CFU/g, respectively) in the study on enumerations, and the isolates belonged to serovar *S. Typhimurium*, in both samples.

The acceptance test was applied to 30 consumers, aged 18-65 years, where 70% were women. Differences in color between Tacacá samples prepared with Jambu *in natura* and dried was not observed. Scores have indicated the ranges of acceptance between “I enjoyed it” (8.27) and “I liked it very much” (8.00). The aroma scores were 7.97 and 7.60, respectively, with no statistically significant difference (p<0.05). Therefore, the smell of Tacacá was not changed in depending on the used raw material, the Jambu *in natura* or dried. For the flavor of the two treatments, a statistical difference was not observed. However, there was a better acceptance of the Tacacá prepared with the *in natura* Jambu (8.43). Thus, it indicated the acceptance range between “I enjoyed it” and “I liked it very much”. In the global acceptance, there was a significant difference (t-test, 5%) between the samples of Tacacá prepared with *in natura* Jambu and those with dried Jambu. The Tacacá with *in natura* Jambu has showed better acceptance in this attribute.

Although there was no significant difference between samples of Tacacá prepared with fresh and dried Jambu, with regard the aroma and flavor attributed to the Tacacá prepared with Jambu *in natura* it has showed greater acceptance by the consumers. The highest mean score of *in natura* Jambu may have occurred during the drying process, due to the loss of volatile substances. Such loss decreases the sensory quality of the product. Ding et al. (2012) evaluated the effect of four drying methods applied to ginger volatiles and observed some losses in its appearance, as well as in the emergence of other substances. These authors concluded that drying through microwaves was the favorite method for losing volatility, followed by drying through hot air circulation (60 °C), vacuum drying, freeze-drying and hot air drying at 50-70 °C.

76.67% of the tasters said “I liked it very much” for the tacacá prepared with Jambu *in natura*, and 50% of the tasters said also “I liked it very much” for the Tacacá with dried Jambu. The two samples of Tacacá showed acceptability rate above 84% in all evaluated attributes (global acceptance, color, aroma, texture, and flavor). According to Teixeira et al. (1987), the
product is accepted by sensory properties if it shows acceptability rate of at least 70%. Thus, the sensory evaluation performed in the current study showed that the two samples of Tacacá, prepared with Jambu in natura and dried, were well accepted, and they have a good commercial potential.

The average purchase intent was 4.70 ± 0.65 for Tacacá with Jambu in natura and 4.37 ± 1.13 for Tacacá with dried Jambu. There was no significant difference (t-test, 5%) regarding the purchase intention of Tacacá with Jambu in natura or dried. Therefore, both samples of Tacacá caused the same expectation towards the evaluators. The average purchase intent was 4.70 ± 0.65 for Tacacá with in natura Jambu and 4.37 ± 1.13 for Tacacá with dried Jambu. There was no significant difference (t-test, 5%) regarding the purchase intention of Tacacá with Jambu in natura or dried. Therefore, both samples of Tacacá caused the same expectation towards the evaluators.

Conclusions

The Jambu in natura and dried by cold air is according the current Brazilian Legislation regarding microbiological aspects. The Tacacá samples prepared with Jambu in natura and dried showed good acceptance by consumers. Thus, by taking into account the health and sensory aspects, it is possible stating that the dried Jambu commercialization is viable, since it facilitates its transportation and handling, as well as reduces its vegetable mass.

References


