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Physical properties of fruit pulp industry waste and its utilization in the production of jelly candy

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Abstract

Brazil presents a major role in fruit production, which processing leads to a great amount of waste. The use of these by-products and its application in products for human nutrition is a point of great interest. The present work intended to characterize *uvaia*, *cambuci* and *grumixama* by-products dried in conventional air drying oven using different temperatures and conditions as to its physical properties (apparent density, specific volume, bulk density, emulsifying activity and emulsion stability). Furthermore, jelly candies were developed with different gelling agents (agar, pectin, gelatin and acacia gum), using fruit pulp and the by-product in powder form. The candies were evaluated for pH, total acidity, water activity, humidity, instrumental texture and content of total phenolic compounds. All obtained candies were sensory evaluated by a test of acceptability with 120 consumers. Physical properties, especially emulsifying activity and emulsion stability, were influenced by drying conditions. Phenolic compounds concentration ranged from 0.413 to 5.637 mg of gallic acid/g, and global impression ranged from 4.4 to 7 in a 9-point structured scale.

Key words: confectionery, fruit by-products, native fruits

Introduction

Brazil is a major producer of fruit species, including those considered native fruits. The latter usually feature exotic appearance and taste and are unknown for most of the public, arousing their curiosity and presenting a large exploitation potential. Much of these fruits are used to produce frozen pulp, which processing creates a large amount of waste composed of peel, bagasse, seeds or stones and fruit residues. There is a growing interest in the use of these by-products in human nutrition destined products because they may contain compounds of interest such as fiber, vitamins and minerals. This work aimed to physically characterize previously dried by-products of *uvaia, cambuci* and *grumixama.* Different formulations of jelly candy were also developed for each fruit, with pulp and by-product in powder form, using different gelling agents. The candies were evaluated to their physical and chemical characteristics, with emphasis to the determination of total phenolic compounds, and their acceptation was evaluated through sensory tests, with the products previously submitted to microbiological analysis to ensure tasters' safety.

Results and Discussion

Physical properties were influenced by drying conditions. For example, the average emulsion stability for *cambuci* ranged between 0% (by-products dried at 80 ºC, centrifuged or not) and 36,63% (60 ºC, centrifuged)

For each fruit were developed 10 formulations of jelly candy, half of them with pulp and half with waste. The gelling agents used were acacia gum and gelatin, agar, pectin, gelatin and agar and pectin. The most accepted candies made with pulp were, for all fruits, those made with pectin. The *grumixama*-flavored candy achieved 6.5 points on a 9-point structured scale of global impression, and *uvaia* and *cambuci* graded 7.0 and 6.9, respectively. The most accepted candies made with waste and each fruit were *grumixama* and acacia gum (5.3), *uvaia* and pectin (5.3) and *cambuci* and agar (4.4). The content of phenolic compounds varied between 0.413 (candy with agar and *uvaia* pulp) and 5.637 mg of gallic acid/g (candy with agar and *grumixama* waste).

Conclusions

This work showed that the use of by-products and non-conventional fruit pulp for the production of confectionery was technologically viable. These candies, besides featuring good acceptation by the potential consumers, have bioactive compounds from the fruit and great concentration of fiber, in the case of the formulations containing waste. Candies containing fruit pulp were better accepted than those made from by-products. Future studies can be conducted in order to improve sensory acceptance of this kind of product.

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