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Use of mango by-products in the development of functional confectionery

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INTRODUCTION

The mango (*Mangifera indica* L.) is one of the most cultivated tropical fruits in the world. However, due to its high demand, its processing generates high amounts of waste, which have a negative impact on the environment [1]. Among these residues, the bone or seed, the peel and the mango bagasse stand out, which are considered as by-products and have a potential industrial use [2]. It has been reported that these by-products contain high concentrations of fiber and phenolic compounds, related to a reduction in the risk of presenting chronic non-communicable diseases [3]. Thus, a way has been sought to increase the consumption of foods that contain compounds with nutraceutical potential, with functional confectionery being a booming alternative [4], which represents a vehicle for taking advantage of the benefits of agro-industrial by-products.

OBJECTIVE

Develop and evaluate the effect of confectionery product (gummy) enriched with different concentrations of bagasse and mango peel on the texture profile characteristics, selecting the most similar mix to the commercial product for its subsequent proximal characterization.

MATERIALS AND METHODS

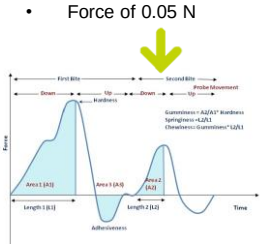
Mixture Designs » Simplex Lattice Design

Table 1. Matrix design

Peel	Bagasse	Pectin
0.56	0.42	0.02
0.32	0.64	0.04
0.64	0.32	0.04
0.51	0.46	0.03

- 2 compression cycles 50
- Speed of 30 mm/min
- Force of 0.05 N

Proximal characterization



RESULTS AND DISCUSSION

Table 2. Texture parameters of each mix

Mix	Hardness (N)	Cohesiveness (dimensionless)	Adhesiveness (J)	Springiness (mm)	Guminess (N)	Chewiness (J)
GC	13.01±0.01^{a}	1.11±0.01^{a}	0.97±0.89^{ab}	0.95±0.07^{a}	14.44±0.27^{a}	13.68±0.81^{a}
1	9.50±0.09^{b}	0.90±0.01^{a}	3.66±1.38^{b}	0.84±0.08^{a}	8.52±0.13^{b}	7.10±0.77^{b}
2	10.40±0.44^{b}	1.05±0.13^{a}	1.29±0.03^{ab}	1.00±0.00^{a}	10.89±0.92^{ab}	10.90±0.95^{ab}
3	6.63±0.01^{d}	1.02±0.06^{a}	0.29±0.25^{a}	1.00±0.00^{a}	6.73±0.37^{c}	6.74±0.40^{b}
4	7.95±0.64^{c}	1.02±0.14^{a}	0.30±0.04^{a}	0.94±0.09^{a}	8.19±1.79^{bc}	7.75±2.40^{b}

Mixture 2 has a higher solids content in general, compared to the mixtures that have more peel, in addition, this mixture is the one that has a higher percentage of pectin in its formulation, which is considered soluble fiber, so it could also have an impact on the parameters of the gummy due the addition of these compounds can allow us to increase physical stability [5].

Table 3. Proximal analysis of bagasse, peel and mixture 2

	Bagasse	Peel	Gummy
Humidity	5.87±0.05	5.43±0.11	48.00±0.48
Total carbohydrates	92.21	89.57	89.12
Total dietary fiber	22.48±0.64	58.52±12.33	27.44±0.25
Soluble fiber	3.60±0.55	15.89±2.25	12.02±1.72
Insoluble fiber	18.88±0.14	42.64±7.57	15.42±0.42
Protein	4.24±0.31	3.96±0.13	9.70±0.30
Lipids	1.09±0.40	2.98±0.03	0.07±0.01
Ashes	2.46±0.18	3.50±0.01	1.11±0.02

The gummies presented a more amount of SF tan previously reported, having a ratio of approximately 1:1 of SF and IF, which is recommended in foods for beneficial physiological effects [6].

CONCLUSIONS

These results suggest that it is possible to incorporate these agro-industrial by-products into food and that it is comparable with that already marketed. In addition, with its high percentage of fiber, it could be considered a potentially prebiotic food.

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