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GLUTEN-FREE COOKIES WITH PRODUCTS OF CASSAVA (Manihot esculenta Crantz) ROOTS AND LEAVES: TECHNOLOGICAL QUALITY AND SHELF LIFE

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Abstract

This study investigated gluten-free cookies (GFC) made with cassava roots and leaves products. The GFCs were produced with addition of 0% (control), 10% (M1), 15% (M2), and 20% (M3) of cooked cassava leaves (flour basis), and evaluated for stability for 28 days. The results were subjected to analysis of variance (ANOVA), using the Scott Knott test, SISVAR, at a significance level of 5%. The cookies made with 1.55% (d.b.) cooked leaves (M2) showed higher stability during storage in relation to the moisture, water activity and hardness parameters.

Key words:
Cookie, cassava flour, maniva.

Introduction

The production of gluten-free cookies (GFC) is a major technological challenge, once the replacement of wheat flour by other gluten-free ingredients, generally starch-rich and protein-poor, can affect the characteristics of the end product. Cassava derivatives, rich in starch, have the potential to replace wheat flour, and the use of cassava leaves containing high protein levels can improve the amino acid profile of the cookies. The aim of this study was to elaborate and characterize gluten-free cookies made with produtcs of cassava (*Manihot esculenta* Crantz) roots and leaves.

Results and Discussion

The results of the shelf-life evaluation of GFC made with products of cassava roots and cooked leaves are shown in Figures 1 and 2, and Table 1.

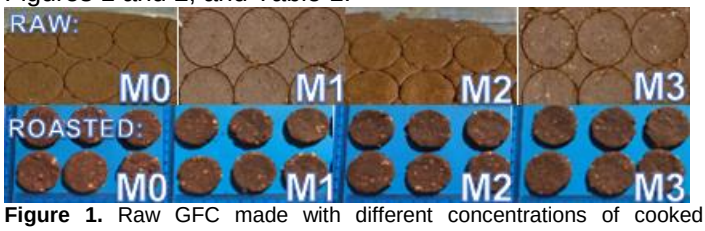

Figure 1. Raw GFC made with different concentrations of cooked cassava leaves (M0, M1, M2, M3); Roasted GFC (M0) 0%; (M1) 1.03%; (M2) 1.55%; (M3) 2.07% of cooked leaves (d.b.)

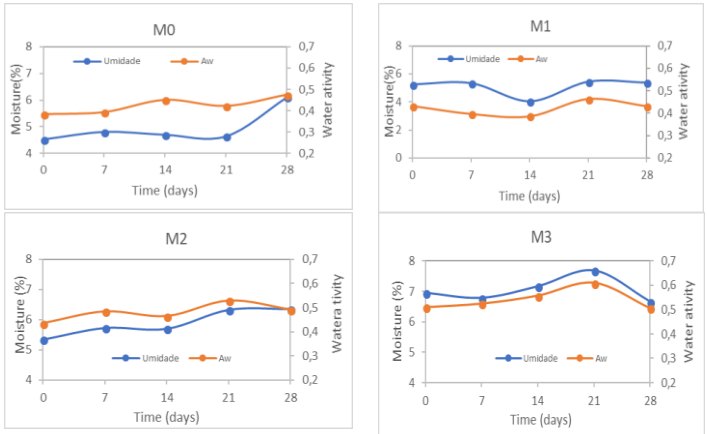

Figure 2. Moisture content (%) and water activity of the cookies (M0 to M3).

Table 1. Physicochemical parameters of gluten-free cookies made with different concentrations of cooked cassava leaves at time 0 (day 1) [1]

Parameters	M0	M1	M2
Weight loss (%)	11.4±4.28^{ns}	10.93±8.06^{ns}	7.23±3.78^{ns}
Horizontal growth (%)	4.00±0.00^{a}	2.00±0.00^{b}	2.00±0.00^{b}
Vertical growth (%)	5.63±1.65^{a}	5.97±2.44^{a}	5.52±2.62^{a}
Specific volume (mL/g)	3.87±0.36^{a}	3.02±0.49^{a}	2.16±0.39^{b}
Moisture (%)	4.52±0.02^{c}	5.26±0.04^{b}	5.34±0.18^{b}
Water activity	0.38±0.01^{c}	0.43±0.00^{b}	0.43±0.00^{b}
Hardness (N)	26.67±5.24^{a}	45.17±9.64^{a}	37.79±4.72^{b}
Color parameters			
L*	26.93±0.13^{d}	30.37±0.34^{c}	31.65±0.16^{a}
a*	9.76±0.17^{b}	10.43±0.38^{a}	9.33±0.10^{c}
b*	11.51±0.14^{c}	14.49±0.3^{a}	13.35±0.43^{b}
ΔE*	0	4.60	5.08

[1] Different lowercase letters on the same row differ from each other by the Scott-Knott test (p <0.05). ns = not significant. Formulations M0- 0% cooked leaves; M1- 10% cooked leaves; M2-15% cooked leaves; M3-20% cooked leaves (flour basis).

The GFCs made with 1.55% cassava leaves (d.b) (M2) presented the best technological characteristics, with greater storage stability in relation to moisture, water activity and hardness parameters.

Conclusions

The cooked cassava leaves and cassava root products have proven to be a viable alternative for the production of gluten-free cookies, and can be used as new ingredients, increasing the added value and demand for these products, and promoting the valorization of family farming.

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AACCI. AMERICAN ASSOCIATION OF CEREAL CHEMISTS INTERNATIONAL**. Approved Methods of Analysis**. St. Paul: American Association of Cereal Chemists International, 2011.