

EVALUATION OF A NATURAL EXTRACT AS A PRESERVATIVE IN A BANANA FILLINGS FOR PASTRY: A CLEAN LABEL ALTERNATIVE

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INTRODUCTION

The growing consumer demand for more natural food products has driven the development of clean label alternatives that exclude synthetic preservatives. In this context, natural alternatives have gained attention as potential substitutes for synthetic preservatives traditionally used in the food industry. Fruit fillings, widely used in bakery and pastry products, are characterized by low acidity, low water activity, and high sugar content, making them particularly susceptible to fungal contamination



OBJECTIVE

This study evaluates the efficacy of a group of berry extract and tapioca starch rich in sorbic acid, applied at two concentrations (0.5% and 1%), as a preservative in an industrially produced banana filling. Product stability was monitored over a 70-day storage period at 22 °C and 62% relative humidity and compared to a control sample containing potassium sorbate.



METHOD

To evaluate the impact of replacing potassium sorbate with natural preservatives, the following prototypes were developed (Fig. 1). Microbiological analyses, total viable counts, molds and yeasts, aerobic and anaerobic spore forming bacilli were performed, throughout the storage period, along with physicochemical and rheological tests (Figures 1 and 2)

Prototype	Preservative Used	Purpose
A	Potassium Sorbate	Reference
B	None	NEGATIVE CONTROL
C	1% Red Fruits Extract	NATURAL REPLACEMENT
D	0.5% Red Fruits Extract	NATURAL REPLACEMENT

Figure 1

TEST TYPE	PARAMETERS
MICROBIOLOGICAL CHARACTERIZATION	Total viable counts Molds and yeasts Spore-forming bacilli
PHYSICOCHEMICAL TESTS	pH Water Activity
PHYSICAL ANALYSES	Color Refractometry
RHEOLOGICAL EVALUATIONS	Texture Viscosity

Figure 2

RESULTS & DISCUSSION

- By the end of the storage period, mold and yeasts counts were minimal. No growth of aerobic or anaerobic spore-forming bacilli was detected. Total viable counts increased after 49 days in samples containing 0.5% of the natural preservative.
- pH and water activity remained stable across all prototypes with no significant differences compared to the samples with and without potassium sorbate.
- A shift toward more reddish and yellowish tones was observed in the banana fillings over time, possibly associated with chemical reactions that may affect product quality.
- A slight increase in Brix was observed during storage, possibly due to texture changes and crystal formation, which may affect product smoothness.
- From a rheological perspective, all prototypes exhibited pseudoplastic behavior, a desirable property in pastry fillings as it facilitates spreadability. Both clean label preservative formulations and those with potassium sorbate showed decreased viscosity with increasing shear rate (Figure 3)

a_w 0.95

pH 3.8-4.0

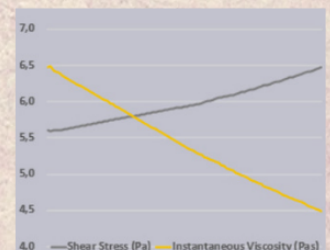


Figure 3

CONCLUSIONS

Natural extract treatments controlled microbial growth and preserved product stability. Results support their potential as sustainable alternatives to synthetic preservatives in bakery fillings, aligning with clean label consumer preferences

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