

Title: Carrot Juice: The new preservative for Bissap?

Original title: *Examining the effects of carrot juice addition on the physicochemical properties, bioactive profile and sensory properties of bissap extract during storage*

Abstract (translated)

Hibiscus-based drinks like Bissap are popular in Ghana, but they spoil quickly during processing and storage, limiting their commercial use. This study explores the biochemical changes in bissap-carrot blends during storage and their impact on sensory properties, with the aim of enhancing the commercial viability of bissap-based beverages. Four different formulations were tested: 100% Bissap extract; Bissap + Carrot juice extract; Bissap + Carrot + preservative, Bissap + Blanched Carrot + preservative. These blends were stored in plastic bottles at room temperature for 21 days, and their chemical and sensory properties were measured throughout the storage period. Key metrics such as pH, antioxidant activity, colour stability, and anthocyanin content were monitored, along with sensory attributes like flavour, aroma, and appearance. Results indicated that the addition of carrot juice reduced the natural sourness of bissap and improved pH stability and preserved antioxidant properties, while fresh carrots helped retain the colour pigments of the bissap over time. These findings provide insights for beverage manufacturers looking to extend the shelf life of bissap-based products while maintaining quality and sensory appeal.

Key Takeaways:

1. **Improved Formulations:** Adding carrot juice and preservatives to Bissap enhances its shelf life and nutritional content.
2. **Commercial Potential:** Beverage producers can use these blends to create more stable and nutritious drinks.
3. **Further Research:** Exploring other preservation techniques and packaging options could help extend the shelf life even further.

This study offers a practical solution for enhancing Bissap drinks for the market.

Gap addressed

Bissap, despite its potential in the food and beverage industry due to its sour taste and rich colour, faces challenges related to its instability during storage and processing. Currently, there is limited research exploring how blending bissap with carrot juice can improve its stability and sensory properties. This study addresses this gap by investigating the biochemical interactions between bissap and carrot during storage, providing valuable information for manufacturers interested in developing bissap-based beverages with longer shelf lives and improved sensory characteristics.

Sector/industry focus

Food and beverage Industry: The primary focus of this research is on the food and beverage industry, specifically the development of non-alcoholic beverages that cater to consumers seeking natural, healthy, and sensory-appealing options. The findings are particularly relevant for beverage processors and producers who work with natural fruit and vegetable extracts and are looking to expand their product lines with longer shelf-life beverages that retain their nutritional value and sensory appeal over time.

The research also touches on the development of nutritionally enhanced beverages through blending with carrot juice, which provides beta-carotene and antioxidant benefits.

Potential uptake or practical application

The findings of this study have direct practical applications for beverage manufacturers. The addition of carrot juice to bissap not only enhances the flavour profile by reducing acidity but also improves the stability of key biochemical compounds, such as antioxidants and anthocyanins, during storage. This could allow producers to create a wider variety of stable, shelf-ready products using bissap, without the need for heavy preservative use, thus catering to health-conscious consumers. Moreover, the study's insight into the effect

of preservatives on colour degradation can guide manufacturers in selecting appropriate formulations for different target markets.

Key recommendations

1. **Blend Optimisation:** Beverage producers should consider using fresh carrots in bissap-based beverages to improve pH stability and enhance antioxidant properties.
2. **Controlled Use of Preservatives:** While preservatives extend the shelf life, their impact on sensory qualities such as colour degradation should be carefully managed. Fresh alternatives or reduced preservative levels could help maintain product quality.
3. **Targeting Health-Conscious Consumers:** By leveraging the antioxidant and nutritional benefits of bissap-carrot blends, manufacturers can market these beverages as healthier, natural alternatives, appealing to consumers who seek functional, nutrient-rich drinks.
4. **Product Innovation:** This research opens the door for new product development in the non-alcoholic beverage segment, offering opportunities for innovation in flavour profiles and shelf stability.
5. **Sensory Testing:** Regular sensory evaluations should be conducted as part of product development to ensure that the blends maintain desirable sensory properties (appearance, flavour, mouthfeel).
6. **Further Research on Packaging and Preservation:** Investigating alternative packaging solutions or preservatives could help extend shelf life further and prevent the significant biochemical degradation observed after 21 days.