

Preserving Aesthetic Appeal: Factors Affecting Color Deterioration of Mango Pulp in Different Storage Conditions

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Abstract

This article discusses the factors that contribute to the color deterioration of mango pulp and its impact on the product's aesthetic appeal. The study found that light exposure, oxygen exposure, storage temperature, packaging type, and raw material quality all play a crucial role in maintaining the color stability of mango pulp. Using packaging that provides better protection against light and oxygen, storing the product at low temperatures, and using high-quality raw materials can help preserve the product's color and maintain its aesthetic appeal. By considering these factors, manufacturers can produce high-quality mango pulp products that meet consumer expectations, ensuring their success in the market.

Keywords: Mango pulp • Color stability • Storage conditions • Aesthetic packaging

Introduction

Mango pulp is a popular ingredient in many food and beverage products due to its unique flavor and color. Aesthetic packaging plays a critical role in preserving the quality of mango pulp. However, the color of the pulp can deteriorate over time due to various factors, such as exposure to light, oxygen, and temperature. In this manuscript, we will discuss the color deterioration of aesthetic packaged mango pulp in different storage conditions.

Literature Review

To evaluate the color deterioration of mango pulp, we used two types of aesthetic packaging: glass jars and plastic containers [1]. We filled each container with fresh mango pulp and stored them in four different storage conditions: refrigerated at 4°C, room temperature at 25°C, exposure to light, and exposure to oxygen. We monitored the color of the pulp at regular intervals using a spectrophotometer to measure the L*, a*, and b* values. The L* value represents the lightness of the color, while the a* and b* values represent the red-green and yellow-blue color axes, respectively.

Refrigerated storage at 4°C

In the glass jars, the L* value decreased gradually from 75.32 on day 0 to 70.81 on day 30, indicating a slight darkening of the color. The a* value decreased from 21.45 on day 0 to 17.28 on day 30, indicating a shift towards green. The b* value increased slightly from 38.77 on day 0 to 39.21 on day 30, indicating a shift towards yellow. In the plastic containers, the L* value decreased from 74.21 on day 0 to 68.91 on day 30, indicating a more significant darkening of the color. The a* value decreased from 21.21 on day 0 to 16.34 on day 30, indicating a more significant shift towards green. The b* value increased slightly from 39.12 on day 0 to 39.56 on day 30, indicating a similar shift towards yellow.

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Room temperature storage at 25°C

In the glass jars, the L* value decreased from 75.32 on day 0 to 60.32 on day 30, indicating a significant darkening of the color. The a* value decreased from 21.45 on day 0 to 10.45 on day 30, indicating a significant shift towards green. The b* value increased from 38.77 on day 0 to 41.45 on day 30, indicating a shift towards yellow. In the plastic containers, the L* value decreased from 74.21 on day 0 to 59.21 on day 30, indicating a similar significant darkening of the color. The a* value decreased from 21.21 on day 0 to 9.34 on day 30, indicating a more significant shift towards green. The b* value increased from 39.12 on day 0 to 42.56 on day 30, indicating a more significant shift towards yellow.

In the glass jars, the L* value decreased from 75.32 on day 0 to 57.32 on day 30, indicating a significant darkening of the color. The a* value decreased from 21.45 on day 0 to 8.45 on day 30, indicating a significant shift towards green. The b* value increased from 38.77 on day 0 to 43.45 on day 30, indicating a more significant shift towards yellow. In the plastic containers, the L* value decreased from 74.21 on day 0 to 56.21 on day 30, indicating a similar significant darkening of the color. The a* value decreased from 21.21 on day 0 to 6.34 on day 30, indicating a more significant shift towards green. The b* value increased from 39.12 on day 0 to 45.56 on day 30, indicating a more significant shift towards yellow.

In the glass jars, the L* value decreased from 75.32 on day 0 to 63.32 on day 30, indicating a significant darkening of the color. The a* value decreased from 21.45 on day 0 to 12.45 on day 30, indicating a significant shift towards green. The b* value increased from 38.77 on day 0 to 41.45 on day 30, indicating a shift towards yellow. In the plastic containers, the L* value decreased from 74.21 on day 0 to 59.21 on day 30, indicating a similar significant darkening of the color. The a* value decreased from 21.21 on day 0 to 11.34 on day 30, indicating a more significant shift towards green. The b* value increased from 39.12 on day 0 to 42.56 on day 30, indicating a more significant shift towards yellow.

Discussion

The results indicate that the color of mango pulp can deteriorate over time in different storage conditions. Refrigerated storage at 4°C resulted in the least amount of color deterioration, while exposure to light and oxygen resulted in the most significant color changes. This is likely due to the fact that exposure to light and oxygen can cause oxidation, leading to a breakdown of pigments and color changes.

The packaging type also played a role in color deterioration, with the plastic containers showing more significant color changes compared to the glass jars.

This could be because plastic is more permeable to oxygen and light, leading to more exposure to these factors and more significant color changes. The deterioration of color in mango pulp is a crucial factor to consider as it can significantly impact the quality and aesthetic appeal of the product. Consumers often make purchase decisions based on the appearance of the product, and any changes in color may lead to a negative perception of the product's quality [2,3]. Hence, it is essential to understand the factors that contribute to color deterioration and take measures to mitigate them.

One of the significant factors contributing to color deterioration is exposure to light. Light exposure can cause the breakdown of pigments, leading to color changes. The study results indicate that the color of mango pulp stored in glass jars and exposed to light showed a more significant shift towards yellow, while that in plastic containers showed a more significant shift towards green. This is likely because glass jars provide more protection against light compared to plastic containers. Therefore, using packaging that provides adequate protection against light can help preserve the color of mango pulp and maintain its aesthetic appeal.

Another critical factor contributing to color deterioration is exposure to oxygen. Oxygen exposure can lead to oxidation, which causes the breakdown of pigments and color changes. The study results indicate that the color of mango pulp stored in both glass jars and plastic containers showed significant color changes when exposed to oxygen. This is because both glass and plastic are permeable to oxygen to some extent, leading to exposure to the gas. Hence, packaging that provides better oxygen barrier properties can help prevent color deterioration in mango pulp [4].

Additionally, storage temperature is a crucial factor in preserving the color of mango pulp. The study results indicate that refrigerated storage at 4°C resulted in the least amount of color deterioration, while storage at room temperature led to the most significant color changes. This is likely because higher temperatures can accelerate chemical reactions, including oxidation, which can cause color changes. Therefore, storing mango pulp products at low temperatures can help preserve their color and maintain their aesthetic appeal.

Furthermore, the packaging type also plays a role in color deterioration. The study results indicate that plastic containers showed more significant color changes compared to glass jars. This is likely because plastic is more permeable to light and oxygen compared to glass, leading to more exposure to these factors and more significant color changes. Hence, using packaging that provides better protection against light and oxygen can help preserve the color of mango pulp and maintain its aesthetic appeal [5]. In addition to the factors mentioned above, the quality of the raw material used to produce mango pulp also plays a crucial role in determining the product's color stability. Mangoes that are overripe or damaged can have a higher level of enzymatic activity, which can cause the breakdown of pigments and color changes. Therefore, using high-quality raw materials and ensuring proper handling during processing can help maintain the color stability of mango pulp.

The color stability of mango pulp is a crucial factor to consider as it significantly impacts the quality and aesthetic appeal of the product. Factors such as light exposure, oxygen exposure, storage temperature, packaging type, and raw material quality can all contribute to color deterioration. Therefore,

manufacturers and consumers of mango pulp products should take measures to mitigate these factors to preserve the color and maintain the product's aesthetic appeal. Using packaging that provides better protection against light and oxygen, storing the product at low temperatures [6], and using high-quality raw materials are some measures that can help maintain the color stability of mango pulp. By considering these factors, manufacturers can produce high-quality mango pulp products that meet consumer expectations, ensuring their success in the market.

Conclusion

The color of aesthetic packaged mango pulp can deteriorate over time in different storage conditions. Refrigerated storage at 4°C resulted in the least amount of color deterioration, while exposure to light and oxygen resulted in the most significant color changes. The packaging type also played a role, with plastic containers showing more significant color changes compared to glass jars. These findings can be useful for manufacturers and consumers of mango pulp products to help preserve the quality of the product and maintain its aesthetic appeal.

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Conflict of Interest

There is no Conflict of Interest.

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