



Factors Affecting Polyphenol Nutrient Retention in Food Preservation

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Description

In today's fast-paced world, food packaging and preservation have become indispensable techniques to extend the shelf life of perishable items, reduce food waste, and ensure that consumers have access to safe and nutritious food. However, while these methods help maintain the safety of our food supply, they can sometimes lead to the loss of essential nutrients. In this delicate balance between preservation and nutrient retention, polyphenols emerge as unsung heroes. This article explores the benefits of polyphenols in preserving nutrient content during food packaging and preservation processes.

Polyphenols: Nature's nutrient guardians

Polyphenols are a diverse group of naturally occurring compounds found in plants, including fruits, vegetables, tea, coffee, and red wine. They are renowned for their antioxidant properties, which help protect cells from oxidative stress and reduce the risk of chronic diseases. Beyond their antioxidant abilities, polyphenols play a pivotal role in safeguarding nutrients during food packaging and preservation.

Preservation of vitamin C: Vitamin C, an essential water-soluble nutrient, is highly susceptible to degradation when exposed to air, light, and heat. Polyphenols, particularly those found in citrus fruits, berries, and green tea, act as antioxidants that can help mitigate vitamin C loss during processing and storage.

Protection of phytonutrients: Many fruits and vegetables contain phytonutrients such as carotenoids and flavonoids, which contribute to their vibrant colors and health benefits. Polyphenols help maintain the stability of these phytonutrients by neutralizing harmful Reac-

tive Oxygen Species (ROS) that can cause their degradation.

Minimizing nutrient leaching: Certain polyphenols, like tannins, have the ability to form complexes with proteins in food. This interaction can reduce the leaching of essential nutrients like iron and calcium into the surrounding packaging material, thus preserving their content in the food product.

Nutrient loss during food packaging and preservation

While polyphenols play a crucial role in nutrient preservation, it is essential to acknowledge the potential challenges in maintaining nutrient content during food processing and storage:

Heat processing: Thermal processing methods like canning and pasteurization can cause the loss of water-soluble vitamins such as vitamin C and B-complex vitamins. Polyphenols can partially counteract this effect, but some nutrient loss is inevitable.

Oxygen exposure: Oxygen is a major contributor to nutrient degradation, as it can lead to oxidation. Polyphenols can act as scavengers of oxygen-free radicals, helping to reduce oxidative damage and nutrient loss.

Light sensitivity: Some nutrients, like riboflavin (vitamin B2), are sensitive to light exposure. Packaging materials with light-blocking properties, in combination with the antioxidant capabilities of polyphenols, can help mitigate this issue.

Freezing: Freezing can alter the texture and nutrient content of fruits and vegetables. While polyphenols may not prevent these changes entirely, they can slow down

the degradation process, preserving the overall quality and nutrient content.

Balancing act: Maximizing nutrient preservation

To strike a balance between food preservation and nutrient retention, it is crucial to adopt best practices in food packaging and processing.

Choose the right packaging: Select packaging materials that are appropriate for the specific food product. For instance, vacuum-sealed bags can help minimize oxygen exposure, while opaque containers can protect against light damage.

Choose for minimal processing: Whenever possible, choose processing methods that involve minimal heat and exposure to oxygen. Techniques like freeze-drying and vacuum-sealing are known to better retain nutrients.

Utilize polyphenol-rich ingredients: Incorporate foods rich in polyphenols into your diet to naturally boost the antioxidant defenses within your body.

Rotate stock: Consume products within their recommended shelf life to ensure optimal nutrient intake.

In the quest for prolonged shelf life and food safety, it's essential to consider the impact of packaging and preservation on the nutritional value of our food. Polyphenols, with their potent antioxidant properties, emerge as allies in preserving essential nutrients during these processes. By understanding the delicate balance between preservation and nutrient retention, we can make informed choices that promote both food safety and optimal nutrition, ensuring that we derive the maximum benefit from the foods we consume.