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A Comprehensive Review of Nutritional and Medicinal Properties: Exploring the Health Benefits of Cinnamon and Stevia

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ABSTRACT

Cinnamon: Origins and Health Benefits

The cinnamon tree originates from Sri Lanka (formerly known as Ceylon) and various parts of Southeast Asia. Initially harvested from wild trees in these regions, cinnamon has been highly valued since ancient times for its aromatic and medicinal qualities. Cinnamon, derived from the inner bark of several species of trees in the genus Cinnamomum, is also known as dalchini. It has been widely used in traditional medicine for its potential health benefits, believed to include antioxidant, anti-inflammatory, antimicrobial, and antidiabetic properties. Research indicates that cinnamon may help in lowering blood sugar levels, improving insulin sensitivity, reducing cholesterol levels, and promoting overall health.

KEYWORDS: Antioxidant, Anti-inflammatory, Blood sugar control, Heart health, Antimicrobial properties, Neuroprotective effects, Alzheimer's and Parkinson's disease, Diabetic.

INTRODUCTION

Cinnamon: A Versatile Spice

Cinnamon, scientifically known as Cinnamomum zeylanicum and Cinnamomum cassia, belongs to the Lauraceae family and is globally renowned as a fundamental spice. This spice primarily consists of essential oils and compounds such as cinnamaldehyde, cinnamic acid, and cinnamate. Known for its antioxidant, anti-inflammatory, antidiabetic, antimicrobial, and potential anticancer properties, cinnamon also helps lower lipid levels and reduce cardiovascular risks. It has shown promise in addressing neurological disorders like Parkinson's and Alzheimer's diseases [1].

The name "cinnamon," derived from a Latin term meaning "sweet wood," specifically refers to the inner bark of evergreen cinnamon trees, considered the most valuable part of these plants within the Lauraceae family. There are two main varieties of cinnamon (Gruenwald, Freder, and Armbruester 2010)[2].

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Varieties and Benefits of Cinnamon

Cassia cinnamon is cultivated in Vietnam and Indonesia, while Ceylon cinnamon is grown in India and Sri Lanka. The delightful sweet flavor of cinnamon comes from the inner brown bark of Cinnamomum trees, which dries into tubular sticks known as "quills." This herb is rich in nutrients, including essential minerals such as iron, crucial for red blood cell production; potassium, vital for body fluids, cell function, and regulating blood pressure and heart health; as well as magnesium and copper, which support enzyme activity like superoxide dismutase. Cinnamon also provides a wealth of vitamins such as pyridoxine, pantothenic acid, niacin, and vitamin A[3].

Consuming as little as half a teaspoon daily can positively impact digestion, glucose levels, and immune system function. Larger doses may potentially improve conditions related to heart disease risk, tumors, and type 2 diabetes. Additionally, cinnamon offers benefits for alleviating toothaches, treating oral infections, and supporting gastrointestinal and colon health [4]. These numerous advantages contribute to cinnamon's widespread use as an everyday herb worldwide.

Stevia: A Global Cultivar with Sweet Properties

Stevia rebaudiana, a plant indigenous to South America, is increasingly cultivated worldwide for its abundance of sweet compounds. The sweetness of stevia primarily originates from steviol glycosides, which are approximately 250-300 times sweeter than sugar. Research highlights the advantages of using stevia extract over traditional sugar and artificial sweeteners, though its adoption as a sugar substitute remains limited. This review synthesizes current data on the biological effects of stevia extract and its individual glycosides, showcasing benefits such as anti-hypertensive, anti-obesity, anti-diabetic, antioxidant, anti-cancer, anti-inflammatory, and antimicrobial properties, along with positive impacts on kidney function[5].

Stevia rebaudiana: A Natural Sweetener

The leaves of Stevia rebaudiana contain diterpene glycosides, which impart a sweet taste without adding calories when incorporated into food products. Native Guarani Indians in South America have historically used stevia as a natural sweetener to balance the bitterness of various medicines and beverages[6]. These glycosides are sweeter than sucrose and are now widely used as substitutes for sugar in foods. They exhibit stability across different temperatures and pH levels during food processing and have no shelf life limitations.

Crucially, steviol glycosides do not provoke a glycemic response upon consumption, making them suitable for individuals with diabetes or obesity. In India, there is substantial potential demand for this natural sweetener due to the increasing prevalence of diabetes and obesity. This article aims to provide an overview of the plant's characteristics, basic cultivation, harvesting, drying, and extraction techniques for steviol glycosides. It also summarizes safety considerations and regulatory approvals for the global use of steviol glycosides in food products.

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Historical Origins of Cinnamon and Stevia

Cinnamon has a long history dating back to around 2800 BC, when it was originally referred to as "Kwai" in Chinese culture. It was notably used in the anointing oil for sanctification, as mentioned in the Bible during Moses' time. The Romans valued cinnamon for its medicinal properties, particularly in treating digestive and respiratory ailments, and they also utilized it during funerals to mask the odor of deceased bodies. In ancient Egypt, cinnamon was employed in the embalming process of mummies and appreciated for its aromatic scent and flavoring attributes.

Historical Significance of Cinnamon

The high cost and value of cinnamon drove world exploration during the 15th century. It played a pivotal role in motivating Christopher Columbus's voyage, leading to the discovery of the New World, and Vasco da Gama's exploration of South India and Sri Lanka. True cinnamon, also known as Ceylon cinnamon, was primarily found in Sri Lanka (formerly Ceylon). Control over this region meant dominance in the global cinnamon trade and significant economic benefits. Initially, the Portuguese held sway, later supplanted by the Dutch, and finally, the British took control in 1815. Today, cinnamon continues to be cultivated in Sri Lanka along the coastal belt stretching from Negombo to Matara.

Botanical and Cultural Insights into Stevia rebaudiana

Stevia rebaudiana is a small perennial plant that typically grows to heights of 65-80 cm, featuring sessile leaves arranged oppositely. While various species of Stevia offer potential sweetening compounds, S. rebaudiana is renowned for its sweetness. This semi-humid subtropical plant can be cultivated similarly to vegetable crops, including in home gardens, provided the soil pH ranges from 6.5 to 7.5 and is well-drained, avoiding saline conditions. In recent years, Stevia has been successfully grown in Indian states such as Rajasthan, Maharashtra, Kerala, and Odisha due to increasing demand for natural sweeteners.

Diterpene glycosides extracted from Stevia, including dulcoside, rebaudioside C, rebaudioside A, and stevioside, serve as natural sweetening agents. Stevia, a member of the Asteraceae family, is a woody shrub that can reach heights of up to 80 cm at maturity. It encompasses at least 110 species, potentially up to 300, and thrives in habitats ranging from the southwestern United States to the Brazilian highlands.

While S. rebaudiana stands out for its sweetness, Stevia is utilized as a sweetener across various regions. Native to Central and South America, where it is extensively cultivated, Stevia is also prominent in Japan. Japanese cuisine incorporates Stevia into products like seafood, soft drinks, and candies. Moreover, in Brazil and Paraguay, the plant has been traditionally used as a natural treatment for diabetes.

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LEAVES

Figure 1: Cinnamon Leaves

Utilization of Cinnamon Tree Leaves

The leaves of the cinnamon tree (Cinnamomum verum and Cinnamomum cassia) are also utilized, although to a lesser extent than the bark, in various culinary and medicinal applications.

Cinnamon leaves are elliptical or lance-shaped, possessing a glossy green color. They typically range from 7 to 18 centimeters in length and 2 to 7 centimeters in width, arranged alternately along the tree's branches.

Cinnamon leaves are valued for their potential health benefits. They are believed to possess properties that can aid in alleviating digestive issues, stimulating circulation, and providing relief from minor ailments. Cinnamon leaf oil, extracted from these leaves, finds application in aromatherapy and various topical treatments.

ROOTS OF CINNAMON

Figure 2: Roots of Cinnamon

Significance of Cinnamon Tree Roots

While the roots of cinnamon trees play a crucial role in the overall health and growth of the tree, they are not commonly consumed or utilized for culinary or medicinal purposes. The

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bark, renowned for its aromatic and flavorful properties, remains the most prized and sought-after part of the cinnamon tree for human use.

FRUIT

Figure 3: Fruits of Cinnamon

Cinnamon Tree Fruits

The fruits of cinnamon trees are small, berry-like drupes that emerge following the pollination of the tree's flowers. Typically, these fruits contain a single seed. The appearance and size of the fruits may vary depending on the species of cinnamon tree.

STEVIA LEAVES

Figure 4: Stevia Leaves

Characteristics of Stevia Leaves

Stevia leaves are typically bright green, with a slightly serrated margin and an oval or elliptical shape. They are sessile, meaning they attach directly to the stem without a stalk.

These leaves are arranged oppositely along the stem, growing in pairs. They typically measure around 2-3 cm (0.8-1.2 inches) in length and 1-2 cm (0.4-0.8 inches) in width, although their size can vary depending on growing conditions.

Stevia leaves have a smooth texture and may occasionally feel slightly sticky due to the presence of resinous compounds.

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Medicinal Applications of Stevia:

Blood Sugar Management: Stevia is recognized as a suitable sweetener for individuals with diabetes due to its ability to sweeten without causing spikes in blood glucose levels.

Weight Management: As a low-calorie sweetener, Stevia can be incorporated into weight management and diet plans to help reduce overall calorie intake.

Potential Health Benefits: Research indicates that Stevia may possess antioxidant, anti-inflammatory, and anti-hypertensive properties, suggesting potential health benefits beyond its role as a sweetener.

Cosmetic and Personal Care Applications of Stevia:

Skincare Products: Stevia extracts are utilized in skincare products for their potential antioxidant and anti-inflammatory effects.

Oral Care: Stevia is found in oral care products like toothpaste and mouthwash, leveraging its sweetness and potential antimicrobial properties.

Industrial and Other Applications:

Food Manufacturing: Stevia is extensively used in the food industry as a natural sweetener, appearing in products such as yogurt, sauces, and processed foods.

Beverage Products: Stevia is commonly employed in the production of sugar-free and low-calorie beverages.

Dietary Supplements: Stevia may also be included in dietary supplements as a natural sweetener.

CONCLUSION

Our research underscores the promising potential of cinnamon herbal nutraceutical tablets as a natural supplement to enhance health and overall well-being. Due to its abundance of bioactive compounds, cinnamon exhibits diverse therapeutic properties, including regulating blood sugar levels, supporting cardiovascular health, acting as an antioxidant, and providing anti-inflammatory effects. These results indicate that cinnamon tablets could provide significant benefits for individuals looking for natural methods to manage diabetes, promote heart health, combat oxidative stress, and reduce inflammation.

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