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A Comprehensive Review on Uses of Stevia Rebaudiana Plant

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Abstract: One of the most common medicinal plants with outstanding pharmaceutical and nutraceutical value is Stevia rebaudiana Bertoni. Stevia sweeteners sweeten hundreds of foods and drinks worldwide. Stevioside form Stevia plant is sweeter than sucrose and is widely used for its non-toxicity, non-calorific value and antimicrobial properties. The Stevia market is growing at a faster pace because of its use as a sugar substitute in tabletop sweetener, dairy items, and beverages. This review aims to showcase the developments made in recent years in medicine and food industry applications of Stevia Rebaudiana plant.

Keywords: Stevia Plant, Glycosides from Stevia, Stevioside from Stevia, Rebaudioside A., green environment

Introduction

A medicinally important plant found in Brazil and Paraguay, Stevia Rebaudiana Bertoni has been in use worldwide since ancient times.[1,2] Stevia, a common sweetener, is belonging to the Asteraceae family.[3] The plant is sweet owing to the presence of more than thirty steviol glycosides (sweet-tasting chemicals) present in twenty per cent weight compared to the total weight of the dry leaf of the plant.[4] The leaves of Stevia plant contains Stevioside, Rebaudioside A, polyphenols, flavonoids, vitamins, phytosterols and triterpenes.[5] Compared to young leaves, the old leaves of this plant have much more tannic acid that adds to a bitter taste.[6] Stevia has a bitter smell, attributed to the presence of certain oils and flavonoids along with other constituents. This plant also has mild menthol-like after taste,[7] and fresh leaves of Stevia have a mild liquorice flavour.[8] Particularly in comparison to sugar, Stevioside and Rebaudioside, are indeed two hundred times sweeter.[9] Steviol glycoside is a non-nutrient, anti-oxidant, stable towards heat/ pH and non-fermentable.[10,11] The Stevia plant is a source of vitamins (Vit. B3/ B1/ C) and minerals (K, Ca, Mg, P, Mn, Si, Cr, Fe and Zn).[12] Dried leaf extract of Stevia plant contains reducing sugars (39%), carbohydrates (33%), proteins (18%) and amino acids (10%).[13] The fat content of Stevia leaves in dry matter amounts to 1.9-4.34g; Carbohydrate content amounts to 35.2-61.9g, and lipid content amount to 1.9-5.6g 100 g^{-1} lipids.[14]

Uses of Stevia

The treatment of numerous diseases around the world includes the medicinal use of this herb.[15] No evidence of any harmful effects from human ingestion of Stevia rebaudiana extracts is present. There are no signs of toxicity when high rebaudioside A levels administered over 90 days in rat diets.[16] Also, no allergic reaction, mutagenic, teratogenic or carcinogenic effects are shown by Steviosides. Many reports have shown that stevioside has zero calorific value.[17-19] A report indicated Stevia interaction with appetite suppressants, blockers of calcium channels and other drugs.[20] Stevia has a high anti-oxidant activity because it contains a high percentage of phenols and flavonoids. Stevia can cure endocrine

disorders, according to a 2017 study published in the Journal of Medicinal Food.[21] It improved the overall gastrointestinal function,[22] and tea containing Stevia leaves helps in relief of stomach upset. Stevia prevents ulceration in the gastrointestinal tract and acts as anti-hypertensive that affects renal function.[23-25] It is used as a tonic to treat depression[26] and is useful in chronic yeast infections.[27] Stevia raw stuff utilized as a synthesizer for contraceptives pills and medicines for cholesterol suppressing.[28] Stevia leaves are used as a colour enhancer and are used mainly for their bioactive compounds.[29]

For centuries, Brazilian and Paraguayan natives used the plant's leaves as a sweetener[30] and are commonly used as food additives. In Japan, Stevia is commonly utilized as a sweets sweetener and carbonated beverages.[31] Stevia leaves are used to prepare sauces and used in cookies, pickles, chewing gum and tea. It can be used in baking because the sweet glycosides do not break down when heated.[32] The use of Stevia also makes excellent use in the food and beverage industries.[33] Stevia leaves are commonly used in herbal teas, and food[34] and are more used in beverages than food.[35] It is used in the manufacture of confectionery, sweet bakery goods,[36] nutraceuticals and functional foods.[37] Stevia can be used in milk and milk products as a sucrose replacer[38] and apple-cherry fruit drinks.[39] The use of Stevia in beverages is higher than in food has been reported in a study.[40] Stevia leaves were in use in herbal remedies in South America for several decades.[41] Dry Stevia leaf powder is used for the rejuvenation, nourishment, stimulation and restoration of the normal function of the pancreas.[42]

Stevia helps in minimizes blood sugar as sugar alternative[43-45] and reported to be used as herbal supplement. Non-glycemic Steviol glycosides do not show any effect on the blood glucose level.[46] The Steviol glycosides are not metabolized in body[47] and like artificial sweeteners, have zero calories.[48] In sugar, diabetes, obesity, high blood pressure and prevention of dental caries, Stevia and Stevioside, are used.[49] Stevia also helps in weight-loss to satisfy sugar cravings.[50] Stevia leaves are useful for hypoglycemia and diabetes type 2 and effective in controlling weight, blood pressure, diabetes and blood glucose level.[51] Steviol glycosides reported being beneficial for obesity, diabetes, and heart disease.[52] It can be used effectively in diabetic patients by enhancing insulin secretion.[53] A recent report demonstrated that certain ones who got a preload comprising Stevia before a diet consumed three hundred fewer calories than others who received sucrose preload.[54]

Stevia glycosides extract reported to increase sodium excretion, urine output, dilation of blood vessels.[55] Steviol glycosides improved cardiovascular functioning and showed the hypotensive property.[56] Stevia can be useful in reducing blood pressure[57,] and steviol demonstrated a substantial reduction in systolic blood pressure but no considerable impact on diastolic blood pressure due to Steviols.[58] Steviol glycosides include antitumor-active Stevioside & Rebaudioside A.[59] Steviol found in Stevia's leaves, are reported to demonstrate important anti-cancer activities against human gastrointestinal cancer cells in a recent study.[60]

Stevia extracts showed potential antimicrobial activities against pathogenic bacteria.[61] Stevia leaf extracts do not cause cavities and tooth decay, and a study reported that Stevia containing food decreased plaque acidogenicity and cariogenic microflora.[62,63] The Stevia can play a beneficial role in preventing dental caries[64] and also used in dental care products. Stevia provides excellent benefits when used for skin care daily and as an additive for animal food products.[65]

Conclusion

In recent years, the Stevia plant has become the focus of research worldwide, and its market is growing exponentially. This study provides a detailed description of the uses of Stevia plant and products based on this plant. The findings of the present study demonstrate that for centuries, Stevia has more benefits over other artificial sweeteners. In addition to the sweet contents, Stevia rebaudiana also exhibits therapeutic activities. A rapid rise in the prevalence of obesity and type 2 diabetes mellitus has resulted in strong consumer demand for zero-calorie sweeteners that are safe and have no side effects. The main growth factor in this area can be attributed to the production of products that meet the needs of substitutes for sugar. The use of Stevia-based products will thus help to understand the growth in future research by studying the properties.

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