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Stevia Rebaudiana: A Potential Boon for Human Health

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Abstract

A high potency low calorie bio-sweetener "Stevia" has been grown in many countries around the globe for its sweetening and health promoting properties. Besides of making the world a sweeter place, stevia is well known for its efficient therapeutic and pharmacological agents. This review article summarizes the existing literature on nutritional, therapeutic and pharmacological properties of stevia and its metabolites to provide a baseline for new research on this phenomenal plant.

Stevia rebaudiana is a sweet herb, belonging to the genus 'Stevia' and family 'Asteraceae'. This small, herbaceous, semi-bushy perennial plant is also known as sweet herb, sweet leaf, honey leaf, candy leaf and honey yerba [1]. Leaves of Stevia have been used from the ancient times to cure various chronic and non-chronic diseases. The phytoconstituents of the plant have found to be nontoxic in many research studies. Stevioside is the main herbal sweetener present in leaves of the plant that is 100-350 times sweeter than the sucrose. It has a pleasant taste, good solubility in water and easily metabolized by the body without any toxic effect. High nutritional profile of stevia leaves makes it superior to other sugar substitutes. There is an increased demand for stevia production from past decade due to fast growing trend of diet foods and beverages [2].

Nutritional Profile of Stevia

Stevia is enriched with the substantial amount of many nutrients, like 80 to 85% water, amino acids, proteins, fiber, lipids, essential oils, free sugars, vitamins and organic acids. The plant is considered a good source of calcium, magnesium, potassium, iron, phosphorus, sulphur, sodium and trace elements as well [3,4]. More than 100 natural products have been isolated from Stevia species, the best known natural compounds have been listed in the Table 1. Particularly, steviol glycosides are responsible for the sweetening properties of plant. The most representative form of steviol glycosides in the leaves are steviosides followed by rebaudiosides. The rest of the sweetening compounds are present in very less quantities. The sweetening constituents of stevia represent 14% of dried leaves by weight [5,6]. Stevia provides 2.7 kcal g⁻¹ of energy on dry weight basis. Toxicological studies have revealed that secondary metabolites present in stevia do not have any mutagenic, teratogenic or carcinogenic effects and no allergic reactions have been observed after consuming it as a sweetener [2].

Therapeutic and Pharmacological Properties

Stevia has been used from ancient times due to its efficient therapeutic and pharmacological agents which possess antioxidant, antimicrobial, antitumor, anti-inflammatory, antifungal and anticarcinogenic activities [4,5]. Leaves of *S. rebaudiana* has been recommended as a treatment for various chronic and non-chronic disorders like diabetes, hypertension, cardiovascular disease, cancer, renal disease, inflammatory bowel disease, diarrhea, obesity and dental caries. Steviol glycosides are involved to enhance insulin production by directly acting on β -cells without modifying the activity of K⁺ - ATP channels and cAMP level in the islets, thus proving its efficiency to cure diabetes [3]. Steviosides regulate blood glucose levels by enhancing the insulin secretion and its utilization. Stevia and its products have proved helpful to avoid the risk of hypertension and heart diseases. Stevia leaf extracts show an inhibitory effect on tumor initiation and proliferation. The natural constituents of stevia have been proved as potential drug candidates for the treatment of renal and bowel diseases. The bacteriostatic and bactericidal properties benefit oral health by eliminating the cause of dental caries and gingivitis. The zero-calorie sweetening property of stevia assists to control weight as compared to other nutritive sweeteners, such as table sugar [4]. The calorie consciousness has tremendously increased the commercialization of stevia. With increased consumer interest in reducing sugar intake, food products made with natural sweeteners have become popular in many countries.

Table 1: Stevia-derived Natural Compounds.

Group	Phytoconstituents
Glycosylated diterpene derivatives	Steviol (ent-13-hydroxy kaur-16-en-19-oic acid) Stevioside Steviolbioside Dulcoside A Rebaudioside A-F
Sterol derivatives	β -sitosterol Campesterol Stigmasterol
Essential oils	β -caryophyllene α -humulene δ -cadiene Trans β -tarnesene α -terpinol Terpinen-4-ol caryophyllene oxide Nerolidol Linalol
Flavonoids	Glucosyl-4'-O-apigenin Glucosyl-7-O-luteolin Quercetin Glucosyl-3-O-quercetin Arabinosyl-3-O-quercetin Rhamnosyl-3-O-kaempferol 3, 6, 4'-methoxyflavone 5, 7, 3'-methoxyflavone

Conclusion and Future Prospects

The sweet herb *S. rebaudiana* has a valuable future and is extensively used worldwide. The recent interest of scientists in stevia has fueled many studies on it to explore full potential regarding benefits on human health. Markets exist for stevia but still, there is a lack of its efficient production strategies to meet the rising food market demands.

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