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Review Article

A REVIEW ON *STEVIA REBAUDIANA* - A RAY OF HOPE FOR DIABETIC PATIENTS

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ABSTRACT

Diterpene glycosides found in *Stevia rebaudiana* leaves provide food items a sweet flavour but no calories. For generations, the indigenous Guarani Indians of South America have used stevia as a sweetener to offset the harsh flavour of a variety of medications and drinks. This plant produces diterpene glycosides, which are used as sweeteners in foods and drinks since they are 100–300 times sweeter than sucrose. They have no shelf-life restrictions and stay stable in food items over a broad range of pH and temperature conditions during processing. These glycosides are appropriate for diabetics and obese people since they do not cause a glycaemic reaction when consumed. India has a large potential market for this natural sweetener due to the country's rising rates of obesity and diabetes.

INTRODUCTION

Stevia rebaudiana is one of the 950 genera of the Asteraceae family. The North and Central American species of Stevia were studied by Grashaff in 1962. Its first botanical description was given by M.S. Bertoni. Earlier, this herb was named *Eupatoria rebaudiana* Bert. A chemist named Revodi was the first to isolate its chemical and in his honor, its name was later changed to *Stevia rebaudiana* Bert. Although, among the many species of this genus, only *Stevia rebaudiana* has the properties of sugar. It has 150 species found all over the world. Stevia is also known by many nicknames in different regions such as Chinese basil, Madhu basil, Madhupatra, Highleaf etc. and it is a natural alternative to sugar. Health conscious people are using the species called *Stevia rebaudiana* more as a sweet herb and this Ayurvedic plant is also being used a lot as a zero calorie herb in the modern era. Many countries of the world have also given recognition to use the products made from this plant.

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MATERIAL AND METHODS

Stevia is the most different genus of the tribe Eupatorii because 5 tubular flowers and 5 bracts are found in this genus and both are found to be quite similar in size.

Distribution: *Stevia* is originally a plant of Paraguay, a country in South America and the natives here have been using it as sugar for about 1500 years. In the year 1989, a botanist named Moses Santiago Bertoni discovered that a plant called *Stevia* is many times sweeter than sugar and does not contain any harmful elements. After Paraguay, it has also spread to Taiwan, America, Brazil, Japan, China, Malaysia, Korea, Israel, Argentina and India. Since its use in these countries, no incident related to its harmful effects has come to light. Since then, diabetic patients in almost every country of the world are using Stevia as sugar. It is also being cultivated in some states of India such as Madhya Pradesh, Himachal, Bihar, Punjab, Haryana and Uttar Pradesh.

Climate and Soil: Stevia can be successfully grown as a perennial crop in the subtropical Shivalik region and foothills of the Himalayas and in moderately temperate hills. This crop can be grown in high altitude hilly areas during the summer season. It can also be grown as an annual crop in the temperate plains of South India. The high temperature and hot winds of summer in North and Central India are

unbearable for it. It is a short-day plant, this crop develops well when the average temperature during the growth period of its crop is 10-37° C and humidity is 65-80%. Stevia crop tolerates rain but proper drainage is necessary. One of the characteristics of Stevia crop is that even after the ill effects of frost, shoots start coming out from its roots in the spring season. It can be easily grown in red, loamy and sandy soil and the pH of the soil should generally be between 5.5-7.5. Generally, the land which is considered suitable for planting vegetables is actually suitable for Stevia as well.

Botanical Description: *Stevia* is an annual herb of 2 to 4 feet height which grows in the form of a bush in hilly areas, river banks andwater. The root system of this herb is extensive, the stem is brittle and the leaves are minutely oval. The flowers are white, short and attached at the indefinite tip. Its seeds are hairy and small in size and the amount of food stored in them is very less. Two types of seeds are formed in it, live seeds are dark in colour and dead seeds are light yellow in colour.

Propagation: The stem of *Stevia* is prepared by cuttings of its top stems and seeds. There are two main problems in its propagation, one is the low germination capacity in the seeds and second it takes a lot of time to plant the stems through cuttings. Its plant can be cultivated as an annual or multi-year crop by transplanting it. Vegetative (clonal) propagation is very successful for production in small areas. But this process is not profitable for cultivation on a large scale because propagation by cuttings involves a lot of time and labour costs. They can also be grown successfully through seeds and its seeds are also available in seed stores for farmers.

Chemical composition: Stevia leaves are rich in important nutrients like protein, essential amino acids, lipids, saccharides, vitamins and minerals. However, their exact amount varies from place to place due to climate and regional variations. Stevia leaves are a good source of monounsaturated (oleic) and polyunsaturated (linoleic and linolenic) fatty acids. Apart from this, sesquiterpenes and monoterpenes are also found in it. Stevia leaves and roots contain some functional saccharides like inulin-fructooligo saccharide and dietary fiber etc. which act as probiotic antioxidants. Apart from this, some anti-nutritional elements like oxalic acid and tannin are found in its leaves. Oxalic acid reduces the digestibility of minerals and calcium found in green leafy vegetables and tannin has antibacterial and antioxidant properties, but its excessive quantity reduces the digestibility of nutrients.

Important properties: The main property of stevia is its sweetness, due to which it is also called sweet leaf, sugar leaf and due to its sweet properties it is used in place of sugar. Compared to sugar, it produces sweetness slowly and its sweetness is more. It lasts for a long time. However, in high concentrations, some of its alkalis bring bitterness in taste or taste like liquorice. The sweetness of its alkali is 300 times more than that of sugar and due to this reason it is also being stored as a low carbohydrate and low sugar alternative. Due to its low effect on blood glucose, it is very effective for diabetic patients. Its sweetness is mainly due to steviol and apart from this, stevioside and revodioside A, B, C, D, E.F and glycoside A are found in it. The plant and its sweet taste were first described by Swiss botanist Moises Tiago Butroni in 1899 during research in Paraguay and in 1921 two French chemists isolated the glycosides that give stevia its sweet taste. These compounds were named stevioside and rebaudioside. They are 250–300 times sweeter than sucrose and are stable at high temperatures and pH.

Medicinal Uses

- Stevia herb is also used as a sweetener in place of sugar.
- Food items made of sugar form a layer of bacteria on the teeth which later causes inflammation in the teeth and gums, whereas the use of stevia helps in avoiding all these health-related diseases.
- People who are suffering from the problem of weight loss and swelling of feet should use stevia instead of sugar. Because it has sweetness like sugar but the amount of calories is negligible. To lose weight, 8-10 drops of stevia juice should be mixed in hot or cold water and used 15-20 minutes before eating.
- This herb is very beneficial to remove all the problems related to hair like dandruff, dryness, thin hair. Adding 2 to 3 drops of Stevia in shampoo while washing hair gets rid of all hair related problems.
- Stomach related problems like indigestion, stomach ache, heartburn etc. can be cured by using Stevia. If we consume four leaves of Stevia plant after eating every day, then stomach related diseases can be cured.
- Diseases like high blood pressure can increase the risk of heart attack, hypertension, stroke and kidney failure in the future. In South America,

doctors advise blood pressure patients to use Stevia leaves.

- Some elements are found in Stevia plant which are beneficial for the skin and its use makes the skin look beautiful. Applying the paste of its leaves on the face for 15-20 minutes prevents pigmentation and also keeps the face glowing.

Commercialization: Stevia cultivation was started in Japan in the early 1970s as an alternative to artificial sweeteners. Products made from Stevia:

- There are many products available in the market in the form of tablets and powder of Stevia. Due to the presence of stevioside in them, these products taste bitter. If you do not like its bitterness, you can also use products in which only rhyndioside has been used, which does not taste bitter.
- You can use tablets made from it in place of sugar in tea/coffee, ice cream and sweet food made from fruits.
- 3.In 2015, FSSAI allowed Stevia to be added as a sweetener in milk sweet food, curd, soda, flavored drink, jam and a big company named Mother Dairy has also shown its interest in it.
- 4. One thing to note here is that the Food and Drugs Administration has approved the use of only pure glycoside from the Stevia plant but has not approved the extract of its refined leaves. Therefore, make sure that it is not made from refined leaf extract.

Result And Discussion

Keeping in mind the immense usefulness of the stevia herb, it is necessary that it be preserved and efforts must be made to increase its production. This herb is being used rapidly not only in India but all over the world and its excessive use may not become a threat to its existence. At present, we have to take care that we collect as much of this plant as possible and preserve this extremely useful plant so that in future people suffering from diabetes and obesity can benefit from the sweetness of this plant.

CONCLUSION

"Diabetes" is a common name in today's time, from which every fifth person is suffering. It is a fatal disorder and due to this the amount of sugar in the blood increases, and the amount of insulin decreases and it directly affects carbohydrate digestion. According to the World Health Organization, every year 3.4 million people die due to diabetes in the world and the cause of death is diabetes, India is also not untouched by this curse. Due to changing lifestyle and wrong eating habits, the disease of diabetes has become common in India too. India ranks third among the top 10 diabetes-affected countries in the world and according to the latest data, about 5 percent of India's population is suffering from type 2 diabetes. In such a situation, adopting a healthy lifestyle has become the need of the hour. Sugar enhances the taste of our food and drinks, but also brings with it many diseases and diabetes is one of them. Many people are unable to control their desire to eat sweets. For such people, the stevia plant is like a panacea.

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