

# *Stevia:* Plant-Based Natural Zero-Calorie Sweetener in Food Industry

Sheetal<sup>1\*</sup>, Monika Sood<sup>2</sup>, Julie D. Bandral<sup>3</sup>, VP. Rahul<sup>4</sup> and Zoya Ali<sup>5</sup>

<sup>1,5</sup>M.Sc. Research Scholar, <sup>2</sup>Associate Professor, <sup>3</sup>Professor, <sup>4</sup>Senior Scientist,  
Division of Post Harvest Management<sup>1,2,3,5</sup>.

Division of Plant Sciences and Agrotechnology<sup>4</sup>,

<sup>1,2,3,5</sup>Sher-e-Kashmir University of Agricultural Sciences and Technology-Jammu, Chatha

<sup>4</sup>CSIR- Indian Institute of Integrative Medicine (IIIM), Canal Road, Jammu

## INTRODUCTION

Sucrose, often known as table sugar, can be harmful to human health if ingested in large quantities on a daily basis. Sucrose eating gives 4kcal/g of energy but no other nutrients that our bodies require. High sugar consumption can degrade the other nutrients found in nutritionally dense foods. Sugar can cause a condition known as "internal famine" if taken in significant quantities. This makes us feel hungry after eating it. According to a 2016 study, a high-sugar diet has more far-reaching impacts than a high-saturated fat diet. Sugar raises the likelihood of coronary heart disease. It may result in high blood glucose levels and an increased risk of fatty liver disease. When sugar consumption is excessive, the death rate from cardiovascular disease is much higher. CVDs are a major concern in India, with a death rate that is greater than the global norm. The major causes of this disease include an unhealthy lifestyle and poor food. As a result, there is a need to minimize sugar consumption and develop low-calorie alternative sweeteners. *Stevia*, an essential non-nutritive natural sweetener, has emerged as a safe sugar alternative that poses no risk to human health.

## *Stevia rebaudiana:*

*Stevia*, also known as the candyleaf plant (*Stevia rebaudiana*) is a shrubby plant in the Asteraceae family. It is indigenous to South America and has been prized for centuries in Paraguay and Brazil for its sweet flavour. For hundreds of years, this country has been known for its usage in food preparation and as a medication. The sweet flavour of the leaves is caused by a group of 10 steviol glycosides. *Stevia* is a nutrient-dense plant that contains a variety of nutrients such as fibre, protein, lipids, amino acids, riboflavin, quercetin and others. Stevioside and rebaudioside are the tastiest glycosides found in *Stevia* leaves; they are 250-300 times sweeter than sucrose and are chemically and thermally stable. Stevioside and rebaudioside, derived from *Stevia* leaves, are commercially used to sweeten a variety of foods in Japan, South America, China and Korea.



## PROCESSING OF STEVIA:

Crushing the leaves, extracting the steviol glycosides from the Stevia leaf extracting with water, filtering and separating the liquid from the material and finally purifying the extract with water or food-grade alcohol are all processes in the Stevia process. This is followed by drying to get a pure Stevia extract. Dried leaves are soaked in water and once separated and filtered, the sweet molecules found in the plant are extracted. The extraction and purifying process of pure Stevia leaf extract results in sweetness that tastes more like sugar. The ADI (Acceptable Daily Intake) for steviol glycosides is 4mg/kg body weight/day, according to the Codex Alimentarius Commission.

## APPLICATIONS OF STEVIA IN THE FOOD INDUSTRY:

*Stevia* could potentially be utilised by prominent beverage companies in ready-to-drink (RTD) teas, sweet occasional beverages, carbonated soft drinks (CSDs), flavoured waters, juices and alcoholic beverages. It offers a strategic selling approach such as innovation, artificial sweetener replacement and sugar moderation for teenagers and adults. Stevia could also be a powerful component for removing sugars from a variety of drinks. It offers advantages like zero calories, natural origin, stability and a great variety of applications.



### 1. Soft Drinks:

Stevia's quick expansion in the beverage market has various advantages, including the fact that it is natural and calorie-free, and that it is good for oral health because it does not ferment and has a steady pH. Another advantage is that it is resistant to heat and light, making it a good choice even for drinks that require heat treatment, such as pasteurisation. Stevia may be an excellent sweetener substitute for carbonated soft drinks with low pH. The number of flavour options that use Stevia as a sweetener has also increased in recent years. Additional flavours such as coke, lime and lemon have been introduced. The options are limitless. While developing a novel beverage, it is critical to strike a balance between sweetness and acidity. The concentration of steviol glycosides employed is critical in this process.

### 2. Tea and Coffee:

Tea is one of the most widely drunk beverages in the world. Many people enjoy sweet tea, either hot or cold. Natural extract or artificial sweeteners can be used to sweeten home-baked or RTD (ready-to-drink) tea. With the increasing quality of Stevia, 392 new RTD teas sugared with Stevia have recently entered the market. Formulators aim to provide options for consumers to have a sweet drink without calories. Stevia-based sweeteners reduce the quantity of sugar in coffee while increasing the mouthfeel perception in frozen coffee, making it creamier. Stevia enhances the flavour of sweetened tea drinks.

### 3. Juice:

Customers are striving to find juice products with less sugar. People have shifted to healthier options with fewer calories and extra sweets. Sugar is added to juices and fruit beverages to enhance the natural sweetness of the fruit; this accounts for higher levels of total calories. When scientists combined stevioside and saccharose for juice. They discovered that it might result in a 25% reduction in calories

while being stable under traditional thermal as well as high-process settings.

### 4. Yoghurt:

Flavoured yoghurt is a common breakfast companion, particularly in European countries, but increasingly elsewhere. A study was carried out to replace sugar in strawberry-flavoured yoghurt. It demonstrated that utilising sucrose in conjunction with Stevia can reduce the amount of sucrose used by half. This can be accomplished without altering the remainder of the music. When combined with another sweetness, Stevia works fantastically well. As a result, it possesses excellent synergistic properties.

### 5. Ice cream:

Sweeteners used in desserts have a significant impact on consumer acceptance due to their effect on texture and freezing purpose, consistency and texture. Saccharose (sugar) is commonly utilised in dessert production for economic and practical reasons. However, due to health concerns about the high sugar content of ice cream, the use of non-nutritive sweeteners is expanding.

### 6. Flavoured Milk:

Flavoured milk, like milk, is a favoured and consumed beverage with broad sensory acceptance across consumers of various ages and socioeconomic levels. Calcium, vitamin D, heptoflavin, phosphorus, potassium, vitamin A, cobalamin and vitamin B complex are all found in milk. Stevia may be an excellent option for lowering the sugar content of flavoured milk. When decreasing sugar in milk, it is critical to consider customer acceptance, particularly among children. For larger sugar reductions, flavouring milk with Stevia works best, and Stevia's natural flavours enhance cocoa and farm products. Stevia is commonly used as a thickening agent and complex carbohydrate in low-sugar formulations to provide a greater mouthfeel.



## CONCLUSION:

*Stevia* can be used as a calorie substitute, particularly in high carbohydrate diets. *Stevia* leaves are delicious and have numerous health advantages. Additionally, *Stevia* contains antioxidants that decrease blood pressure, cholesterol, kidney issues, obesity, dental cavities and diabetes. Minerals such as potassium, phosphorus, magnesium and others are found in trace levels. Beverage, dairy, confectionary, chocolates and baked goods are examples of food processing sectors. *Stevia* is an essential component for removing sugars while retaining the original product's flavour and texture. *Stevia* has demonstrated to perform effectively as a sucrose substitute and to be safe for human ingestion in most tests, resulting in rising market demand.

### 7. Baked Goods:

Sweet items such as cakes, cookies, muffins and biscuits contribute significantly to overall sugar intake in many parts of the world, including Europe. *Stevia* is an excellent choice for decreasing the sugar content of many of these goods. Sugar is an important ingredient in baked goods. It has a sweet flavour and also helps with crispness, cell structure, browning, tenderization and shelf stability. The benefits of integrating bulking agents like fibre into *Stevia*-sweetened baked goods have been validated by research. The use of coffee silver skin (fibrous husks) increased moisture and colouring in *Stevia*-sweetened biscuits. More moisture, in addition to bulking agents, can help create a higher texture. Because *Stevia* is heat labile, its sweetness is not lost during baking.

### 8. Chocolate and Confectionary:

Sugar, particularly sucrose, is a major component of chocolate. Sucrose is responsible for increasing the final product's taste and texture. Sugar replacement with *Stevia* may be used with different techniques to reduce the amount of sugar. *Stevia* with isomalt was utilised as an alternative. Inulin, polydextrose and maltitol were utilised as bulking agents in addition to *Stevia* to replace sucrose.

