Stevia: A Promising Herbal Sweeteners

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We live in an age of modern convenience and great advancement but mankind's ongoing battle with health disorders shows no signs of diminishing. These are the results of the fast urban artificial lifestyle, changing diet patterns, lack of exercise, stress etc which are responsible for making many in developing countries susceptible to obesity related health problems like diabetes, dyslipidemia, heart disease, hypertension, stroke etc. The most alarming of them is Diabetes. The World Health Organization (WHO) has commented that there is 'an apparent epidemic of diabetes which is strongly related to lifestyle and economic change'. India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the "diabetes capital of the world. Besides, the so called "Asian Indian Phenotype" and genetic factors, the primary driver of the epidemic of diabetes is the rapid epidemiological transition associated with changes in dietary patterns and decreased physical activity. Consumption of sugar sweetened beverages may be one of the dietary causes of metabolic disorders such as diabetes. So, either one can stop sugar altogether and deprive oneself of the sweet goodies in life or give in to the use of low calorie sugar substitutes like Saccharin, Sucralose & Aspartame which are nothing but artificial. Moreover, recently it has been indicated that artificially sweetened beverage use on long-term basis can cause weight gain and recent epidemiological study found a relationship between aspartame and an increased frequency of brain tumors in humans raising health concerns (1). Thus, substituting sugar with low calorie, natural sweetener may be an efficacious weight management strategy (2).

Stevio is a natural and healthy alternative to sugar and artificial sweeteners. Stevia a perennial shrub, belongs to the family asteraceae, genus stevia and species rebaudiana. It is extensively grown in places like Brazil, Central America and Israel but is native to Paraguay. For centuries this herbal sweetener has been used in native cultures to counteract the bitter taste of various plant based medicines and beverages. S. Rebaudiana was rediscovered by Europeans in Paraguay in 1888 by Dr. M. S Berton (3). It contains sweet tasting glycosides, mainly Stevioside in addition to Rebaudiosides A, B, C, D and E. Stevioside, obtained in the form of a white crystalline compound is 100 to 300 times sweeter than table sugar (3, 4). According to new tentative specifications prepared at 63rd meeting in 2004 of JECFA, published in FNP52 and ADD12 (2004); Stevial glycosides are functionally designated as sweetener not as a food additive. It is often recommended for inclusion in weight loss diets and diabetic foods. Studies have suggested it to be safe in diabetics, phenylketonurian (PKU) patients as compared to other sweeteners (3). Apart from its use as a non calorie sweetener, it possesses flavor enhancing properties which add to the attractiveness of using stevial glycosides in foods and beverages. Besides sweetness, stevioside along with related compounds, which include rebaudioside A (second most abundant component of Stevia rebaudiana leaf), steviol and isosteviol may also offer other therapeutic benefits, as they have anti-hyperglycemic, anti-hypertensive, anti-inflammatory, anti-tumor, anti-diarrhoeal, diuretic and immunomodulatory actions. As steviol can interact with drug transporters its role as a drug modulator is proposed (4).

Anti-Hyperglycemic Effect: Stevioside reduces postprandial blood glucose levels in type 2 diabetic patients indicating beneficial effects on the glucose metabolism. It also stimulates insulin secretion via direct action on beta cells. So, Stevioside may be advantageous in the treatment of type 2 diabetics (3).

Anti-Oxidant Effects: Stevioside is a potential source of natural anti oxidants. Isosteviol, a derivative of Stevioside inhibits angiotensin-II-induced cell proliferation and endothelin -1 secretion while attenuation of reactive oxygen species generation (3,5).

Anti-Hypertensive Effect: Evaluation of two long term studies indicates that stevia may be effective in lowering blood pressure in hypertensive patients. Although the hypotensive effect was not better than other antihypertensive drugs, it appears comparable with almost all the active drugs. It has been found that stevioside...
causes vasorelaxation via inhibition of Ca2+ influx into the blood vessels (3,6). It is of interest to know that their effects on plasma glucose levels and blood pressure are only observed when these parameters are higher than normal (7).

Anti-inflammatory & Immunomodulatory activity: It has been found that Stevioside attenuates synthesis of inflammatory mediators in LPS-stimulated THP-1 cells by interfering with the Ikappa B kinases (IKKbeta) and NF- kappa B signaling pathway (3).

Digestive supplement and Universal Tonic: Stevia contains protein, calcium, phosphorus, iron, potassium and ash of crude fibre, which are essential for the maintenance of good health and are comparable to commonly used cereals in India. Few studies have shown that Stevioside has a protective effect on the degradation of vitamin C in comparison to other sweeteners (3).

USFDA has approved Stevia as a dietary supplement or an herb but not as a sweetener(8).

Safety Profile: Recently completed studies on the general and reproductive toxicity demonstrates its safety at high dietary intake levels. Moreover, there is no indication of genotoxic potential of Stevioside. No allergic reactions to it seem to exist (3,9,10).

Conclusion

Substituting sugar with low calorie, natural sweetener may be an efficacious weight management strategy in view of recent reports questioning safety of artificial sweeteners.