

Quality evaluation of *Stevia rebaudiana* Cultivated in farmers field.

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Abstract: Among the potential industrial crops *Stevia rebaudiana* introduced in newly developed state Uttarakhand for cultivation as well as quality evaluations of farmers produced and its comparative assessment with other parts of northern areas. *Stevia rebaudiana* is a natural, non-caloric, sweet-tasting plant used globally for its sweeter properties. *Stevia rebaudiana* cultivated in different regions of north India, stevioside varies 6.0- 9.5%, rebaudioside varies ranging 1.60-3.90 % within different locations.

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Key words *Stevia rebaudiana*- low calorie sweetener, stevioside, glycosides, cultivated Farmers fields.

1- Introduction

Stevia rebaudiana (Bert.) is a herbaceous perennial plant of the Asteraceae family it is native to Paraguay. Leaves of plant produced zero-caloric diterpene glycosides (stevioside and rebaudioside), a non-calorie nutritive, high potency sweetener and substitute to sucrose (Introducing *Stevia rebaudiana* a natural zero-caloric Sweetener) (Megeji, et al., 2005). Eight diterpene glycosides with sweetening properties have been identified in leaf tissues of *stevia*. The four major glycosides are stevioside, rebaudioside A, rebaudioside C, dulcoside was reported (Kinghorn, 1987) The Asian market consumed over 85 % of the global supply of fluffy white crystalline stevia extract. The current extract market is 1.5 million kg processed 12 million kg of the stevia leaf. Stevia leaves (Stevia Facts web page) stevioside is one of the active constituents which are available abundantly in the leaf of the stevia (5-10 %) on dry weight basis. *Stevia* acts as a favour enhancer it is hypoglycemic, contraceptive, cardiovascular and antimicrobial activity it is also used to weight loss, digestive and skin problems (Mourey, 1992). The leaf extract of these plants has been used traditionally in the treatment of diabetes. The crop was first established in Japan. Extremely used by food and flavors industry, worldwide demand for high potency sweeteners is increasing and especially with blending of different sweeteners, the demand for alternative is expected to increase. The sweet herb *Stevia rebaudiana* Bertoni produces an alternative sweetener with the added advantage that *Stevia* sweeteners are natural plant products. *Stevia* sweeteners have functional and sensory properties superior to those of many other high potency sweeteners. *Stevia* contains stevioside, a glycoside that is 200-350 times sweeter than sucrose (Zhang, 1999). It is useful for people with diabetes, hypoglycemia, and candidiasis. The sweetness in *Stevia* is mainly attributed to two compounds i.e.

stevioside and rebaudioside (Chauhan, et al., 2005). Environmental factors including biotic and abiotic stimuli carbon-nutrient balance, genotype, and ontogenesis usually control and regulate the biosynthesis of secondary metabolites (Lin et al., 2007). It is well reported phenolic and flavonoids greatly affect by UV radiation and habitats conditions (Harborne, 1988). Present Communication deals the quality evaluations of stevioside and rebaudioside in *Stevia rebaudiana* cultivated in farmers fields.

2-Materials and Methods

Plant Material Collection

Sample collected 10 different regions the leaves of *Stevia rebaudiana* collected from ten different locations namely Viz Vikasnagar, Sahaspur, Dehradun, Harbaspur, Jaspur, Haldwani, Pantnagar, Meeruth, Panjab, (Ludiana), and Lucknow of *Stevia rebaudiana* cultivated in different parts of North India.

Extraction of Plant Material

Sample of stevia sweeteners (100 mg) were dissolved in 100 ml volumetric flask with HPLC grade water 95% ethyl alcohol. The solutions were passed through a C8 Cartridge (Waters USA) prior to HPLC analysis.

Linearity response

Five concentrations of stevioside and rebaudioside with range 0.3 to 1.6 ranges were prepared by dissolving and diluting in mobile phase. The linear response of stevioside and rebaudioside 0.997, 0.999 respectively.

HPLC Condition

The samples were analyzed using HPLC system (Waters USA 600 pump) having carbohydrate column (250 x 4.6 mm, x 5 μ) analytical column. Mobile phase

ratio 80:20 Acetonitrile: Water), flow rate 1 ml/min, run time 15 minutes and detector wavelength was set at 210 nm. Standard stevioside and rebaudioside were procured from Sigma Chemicals USA, and other chemicals from Merck Co, Mumbai India.

3. Results

Result of present study show in (Table-1), study revealed that sample collected from Vikasnagar, contain (9.57 %) greater amount of stevioside and sample collected from Lucknow possessed (6.0%) lowest amount of stevioside in case of rebaudioside Vikasnagar sample also contain maximum amount (3.90 %), similarly Lucknow locality contain minimum amount of rebaudioside (3.80 %).

4. Discussions

The present study showed the greater variation in glycosides content different region of north India. Its is well reported that vegetative growth is reduced when temperature is below 200C and day length to 16 hours and increasing light intensity can enhance vegetative growth and stevioside level (Chauhan et al., 2005). However the chemical components and their contents of crude drug often vary depending on the geographical locations of the habitats seasons and plant parts and processing procedure also harvesting time including various

factors, such as an age of plant season, microbial attack grazing, radiation, competition and nutritional status, influence the production of secondary metabolites in higher plants (Harborne, 1988) The seasonal variations in the production of phenolic compounds have been reported for variety of plants, such as *Pteridium aquilinum*, *Robinsonia evenia*, and *Menziesia ferruginea* (Cooper et al., 1977). Literature survey revealed active constituent especially in steviosides in *stevia* is greatly depends on the package of practices for the cultivation of *Stevia* and adoption of modern agro- techniques (Genus, 2003). Present study concluded that climatic and habitat conditions of Uttarakhand region favorable for production of such glycosides (i.e. stevioside, rebaudioside). This is needed to warrant for detail investigations.

5. Conclusion

Study revealed that such difference of active ingredients due to environmental factors as well various physiological responses like temperature vary with altitudes edaphic features phenological of species etc. Thus the glycoside contents influence probably more due to environmental factors. It is further recommended that such locations planting material used for mass multiplications for production of valuable glycoside.

Table-1, Percentage of stevioside and rebaudioside Cultivated in North India

S.N.	Locality	Stevioside (%)	rebaudioside (%)
1.	Vikasnagar	9.5	3.90
2.	Sahaspur	8.82	3.30
3.	Selaqui	8.37	2.17
4.	Herbatpur	8.30	2.07
5.	Jaspur	7.40	3.20
6.	Haldwani	8.06	1.60
7.	Pantnagar	7.60	2.30
8.	Meeruth	7.11	1.80
9.	Panjab	6.53	2.50
10.	Lucknow	6.05	3.80

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