

PROXIMATE AND PHYTOCHEMICAL ANALYSIS OF STEVIA LEAVES POWDER

Dr. Ekta Singh Chouhan¹, Shivani Srivastava², Paridhi Chawla³

¹Associate Professor, ²Research Scholar, ³Msc Student;

Dept. Food Science and Nutrition, Banasthali Vidyapith, Banasthali, Rajasthan (India).

ABSTRACT

Stevia rebaudiana (Bert) is a plant of composite family and native to Paraguay, its sweetness and calorie free property increased its demand tremendously. It not only imparts the sweetness but also maintain the normal blood sugar level and also in allied industries for diabetics. The leaves of stevia contain more sweetness and having potential application in food industry. The leaves of stevia contain such as moisture, ash, carbohydrate, protein, crude fat and fiber. The study concluded that leaves are rich in carbohydrate, protein and minerals. Phytochemical screening of various extract like aqueous and alcoholic contains anthraquinone, glycosides, saponin, steroids and sterols. Stevia leaves are rich in antioxidant like phenol and flavonoids. According to the further analysis the leaves may consider as source of natural antioxidant and use in food industry

Keywords: *Stevia rebaudiana*, Phytochemical studies, proximate studies, Total phenols

INTRODUCTION

One of the major nutritional problems that face mankind in this century is the consumption of high quantities of fat and sugar, which has been associated with serious health problems, especially diabetes. Diabetes is a global of the twenty-first century and a real threat to the entire world community. Over the past twenty years, the global prevalence of diabetes has increased six-fold. Experts believe that diabetes currently affects 246 million people worldwide. This number is expected to reach 380 million by 2025. Every year, 3.8 million deaths are attributing to diabetes, representing over 6% of the total number of deaths in the world. Every ten seconds, someone dies of

diabetes-related causes. Diabetes is the fourth leading cause of death by disease world¹.

Herbal medicines are being used by about 80% of the world population primarily in the developing countries for primary health care. They have stood through the test of time for their efficacy, cultural acceptability and lesser side effects. Ancient literature also mentions herbal medicines for various diseases for which no scientific proof is available^{2,3}.

The main source of sugar has for long been cane sugar with beet sugar contributing as small percentage. These sugars along with sweetening qualities also have

How to cite this URL: Shivani Srivastava Et Al: Proximate And Phytochemical Analysis Of Stevia Leaves Powder.

International Ayurvedic medical Journal {online} 2016 {cited 2016 July} Available from:

http://www.iamj.in/posts/images/upload/2476_2481.pdf

been found to contribute calories, which can lead to obesity, a risk factor for some chronic diseases such as hypertension, cardiovascular diseases. Some sugar substitutes are available in the market, natural and some are synthetic. Those that are not natural are, in general, referred to as artificial sweeteners. Researchers are in progress to replace sucrose with natural intense sweeteners, taking into account both health and technological aspects sucrose is used with caution due to its calorie contribution which is correlated with adverse metabolic consequences and carcinogenic effects^{4,5}.

Stevia rebaudiana (*S.rebaudiana*), a natural alternative to artificial sweetener is found to contain over 100 phytochemicals including well characterized stevioside and rebaudioside⁶. Stevioside is one of the principle diterpene glycosides having a sweetness of 30 - 320 times than sucrose. The crude stevia leaves and herbal green powder

is 10-15 times sweeter than sucrose⁷. Besides, it is well known for its application in treatment of many diseases like diabetes, high blood pressure and weight loss in various traditional systems of medicine. Stevia sweetener extractive has been suggested to exert beneficial effects on human health, including antihypertensive, antihyperglycemic, noncarcinogenic, anti-human rotavirus activities, glucose metabolism and renal function⁸. Plant extracts and phytochemicals with known antimicrobial properties can be of great significance in therapeutic treatments^{9,10}. The medicinal value of plants lies in some chemical substances that produce a definite physiological action on the human body. The most important bioactive compounds of plants are alkaloids, flavonoids, tannins and phenolic compounds¹¹. Many plant leaves have antimicrobial principles such as tannins, essential oils and other aromatic compounds^{12,13}.



MATERIALS AND METHODS

The green stevia powder was procured from Bakshish aromatics, Pinjore. The green stevia powder was procured from Bakshish aromatics, Pinjore. The stevia leaves powder was analyzed for proximate like ash, moisture content¹⁴ crude fiber estimation¹⁵. Pro-

tein estimation was done by macrokjeldhal method, estimation of iron by Wong's method¹⁴. Calcium analysis was done by titrametric method¹⁵.

Phytochemical analysis was done on aqueous and alcoholic extract. Alkaloid was done by Mayer's test, glycosides done by Bron-

trager's test. Terpenoids, steroids, tannins, phytosterol were done by Libermann-buchard's test. Flavonoid was done by Shonoda test^{16,17}.

Antioxidants are nonnutritive chemicals that act as food medicine and work

against diseases, reduction of the free radicals in the body. Antioxidant analysis will be done on aqueous extract such as total phenols and flavonoids¹⁸.

RESULTS AND DISCUSSION

Table no. 1- Proximate analysis of stevia leaves powder

Proximate composition	Concentration %DW
Moisture (g/100g)	6.7±1.0
Ash (g/100g)	11.5±0.95
Crude fiber (g/100g)	14.89±0.89
Protein (g/100g)	18.0±0.58
Crude fat (g/100g)	4.2±0.3
Carbohydrates (g/100g)	30.4±1.10
Minerals	
Calcium (mg/100g)	17.70±0.20
Iron (mg/100g)	8.0±1.15

Table no. 2-Phytochemical analysis of stevia leaves extract

Phyto-constituents	Aqueous	Alcoholic
Anthraquinones	+	+
Cardiac glycosides	+	-
Cynagenetic glycosides	-	-
Flavonoids	+	-
Glycosides	+	+
Saponins	+	+
Steroids	+	+
Sterols and triter penes	+	+
Tannins	+	-
Terpenoids	+	-

Table no. 3-Antioxidant activity of stevia leaves extract

Antioxidant	Mean±SD
Flavonoids QE (mg/g)	41.8-67.5
Total phenols GAE (mg/g)	25.5-69.0

PROXIMATE COMPOSITION

The proximate analysis of stevia powder was done for moisture, ash, and crude fiber. The moisture content of stevia powder comes out to be (6.7±1.0). Carbohydrate (30.4±1.10), protein (18.0±0.58), crude fiber (14.89±0.89) and ash (11.5±0.95) con-

tent of stevia leaf were found to be higher whereas fat was estimated to be less in the leaf. It was carried out on dry basis. The one another study shows the similar results of the proximate composition¹⁹.

MINERALS COMPOSITION

Analyzed minerals composition of stevia leaves powder indicated that calcium and iron were found to be 17.70 ± 0.20 and 8.0 ± 1.15 respectively. This further establishes a fact that stevia as a mineral loaded ingredient required protecting body, regulating and maintaining the various metabolic process²⁰.

PHYTOCHEMICAL ANALYSIS

Phytochemicals are biologically active compounds, found within the fruits in small amounts, they are not considered to be established nutrients but nevertheless contribute significantly to protect against degenerative disease²¹. The extract subjected to preliminary phytochemical screening using chemical method showed the most abundant compounds in the extract were of tannins followed by cardiac glycosides, saponins, sterols and triterpenes, terpenoids, saponins, steroids, glycosides and anthraquinones. Test for cyanogenic glycosides, however showed negative results as depicted in the table.

ANTIOXIDANT ANALYSIS

Antioxidants refer as effective in controlling the effect of oxidative damage. Antioxidants are molecules that neutralize the harmful effect of the ROS through the endogenous enzymatic defense system in human body. The extract of stevia leaves taken to antioxidant analysis by appropriate methods showed the total phenol and flavonoids. The total phenol content of stevia leaves extract ranged in 25.3-65.2 mg/g gallic acid equivalent²². In present study, total phenol included in this range. Flavonoids content of stevia leaf extract ranged between 39.8-62.2 mg/g quercetin equivalent. In this study flavonoids included in this range²³. Antioxidants uses shown to influence human health when consumed daily.

CONCLUSION

To summarize the present study evaluated the properties of two extract. The study focused on less described phytoconstituents such as anthraquinone, glycosides, saponin, steroids and sterols. The work concluded that stevia leaves prepared in different solvent contain significant amount of nutrients, phytochemical with antioxidant and might be used as ingredient of food and dietary supplements.

REFERENCES

1. Kujur RS, Singh HN, Ram M, Yadava HN, Singh HN, Kumari S, Roy BK. Antidiabetic activity and phytochemical screening of crude extract of *Stevia rebaudiana* in alloxan induced diabetic rats. *Pharmacognosy Research*. 2014; 2(4):258-263.
2. Rajesh P, Kannan VR, Durai MT. Effect of stevia rebaudiana bertonian extract on anti-cancer activity of esophageal carcinoma induced mice. Department of Microbiology. 2010; 3(4):549-554.
3. Tadhani M, Subhash R. Preliminary studies on *Stevia rebaudiana* leaves proximal composition, mineral analyses and phytochemical screening. *Journal of Medicinal Science*. 2006; 6(3):321-326.
4. Mohammed A A G, Ruijin Y, Issoufou A, Xiao H. Nutritional Composition of *Stevia rebaudiana* Berton Leaf: Effect of Drying Method. *Tropical Journal of Pharmaceutical Research* January 2014; 13(1): 61-65.
5. Nwauzoma AB, Dawari, Songo L. Studies of the phytochemical properties and proximate analysis of *Piper umbellatum* (LINN) from Nigeria. *American Journal of Research Communication*. 2013; 1(7):164-177.

6. Kumari M, Chandra S. Phytochemical studies and estimation of major steriolglycosids in varied part of *Stevia rebaudiana*. International Journal of Pharmacy and Pharmaceutical Sciences. 2015; 7(7):62-65.
7. Bawane AA, Gopalkrishna B, Akki SK, Das S, Gupta MK. Pharmacognostical and phytochemical studies on leaves of *Stevia rebaudiana* Linn. Indian Journal of Research in Pharmacy and Biotechnology. 2000; 1(1):17-20.
8. Gupta E, Purwar S, Sundaram S, Rai GK. Nutritional and therapeutic values of *Stevia rebaudiana*: A review. Journal of Medical Plant Research. 2013; 7(46):3343-3353.
9. Dabur R, Ali M, Singh H, Gupta J, Sharma G. A novel antifungal pyrole derivative from *Daturametelleaves*. Pharmazie. 2004; 59(7):568-570.
10. Darabpour E, Motamedi H, Nejad SMS. Antimicrobial properties of *Teucrium populium* against some clinical pathogens. Asian Pacific Journal of Tropical Medicine. 2010; 3(2): 124-127.
11. Dhiman A, Lal R. Phytochemical and pharmacological status of *Daturafastosa* Linn. International Journal of Research in Ayurveda and Pharmacy. 2011; 2(1): 145-150.
12. Donatus EO, Igara EC. Isolation, characterization and antibacterial activity of alkaloid from *Daturametel* Linn leaves. African Journal of Pharmacy and Pharmacology. 2009; 3(5): 277-281.
13. Kaushik R, Narayana P, Vasudevan, Muthukumaran G, Antony U. Nutrient composition of cultivated stevia leaves and the influence of polyphenols and plant pigments on sensory and antioxidant properties of leaf extracts. Journal of Food Science and Technology. 2013; 47(1):27-33.
14. NIN. Effect of simple processing of food bioavailability of iron measure by in vitro procedure. Annual report: National Institute of Nutrition. 1998.
15. Sharma S. Estimation of proximate chemical composition. Experiment in biochemistry. Galgotya publication pvt. Ltd New Delhi. 55-60.
16. Wadood, A., Ghufra., Syed, B. J., Muhammad, N., Khan, A., Ghaffar, R., Asnad. Phytochemical Analysis of Medicinal Plants Occurring in Local Area of Mardan. Biochemistry and Analytical. 2011; 2(4), 2-4.
17. Yadav, R. N. S. and Agrawala, M. Phytochemical Analysis of Some Medicinal Plants. Journal of Phytology. 2011; 3(12), 10-14.
18. Gawel-B ben K, Tomasz Bujak, Zofia Nizioł-Łukaszewska, Beata Antosiewicz, Anna Jakubczyk, Monika Kara and Kamila Rybczy ska. *Stevia Rebaudiana* Bert. Leaf Extracts as a Multifunctional Source of Natural Antioxidants. *Molecules* 2015; 20(4): 5468-5486.
19. Mondaca RM, Gálveza AV, Bravo LZ, Ah-Hen K. *Stevia rebaudiana* Bertoni, source of a high-potency natural sweetener: A comprehensive review on the biochemical, nutritional and functional aspects. Food Chemistry. 2011; 132(2012):1121-1132.
20. Savita SM, Sheela K, Sunanda S, Shankar AG, Ramkrishna P. *Stevia rebaudiana*- a functional component for food industry. Journal of Human Ecology. 2004; 15(4): 261-264.
21. Siddique AB, Syed MMR, Mohammad AH, Mohammad AR. Phytochemical screening and comparative antimicrobial

- potential of different extracts of *Stevia rebaudiana* Bertoni leaves. Asian Pac J Trop Dis 2014; 4(4): 275-280.
22. Jahan IA, Mostafa M, Hossain H, Nimmi I, Sattar A, Alim A, Moeiz SMI. Antioxidant activity of *Stevia rebaudiana*-Bert. leaves from Bangladesh. Bangladesh Pharmaceutical Journal. 2010; 13(2): 67-75.
23. Mandal B, Madan S. Preliminary phytochemical screening and evaluation of free radical scavenging activity of *Stevia rebaudianabertoni* from different geographical sources. Journal of Phar-

macognosy and Phytochemistry. 2013; 2(1): 14-19.

CORRESPONDING AUTHOR

Shivani Srivastava

Research scholar

Department of food science and nutrition

Hostel Shri Shanta Nikunj, Room no. 92

Banasthali Vidyapith,

Tonk, Newai, Rajasthan, India

Email: ssshivani537@gmail.com

Source of Support: Nil

Conflict of Interest: None Declared