

# Stevia

*Latin Name: Stevia rebaudiana*

SUGAR SUBSTITUTE; Supports PANCREAS

Use LEAVES

Native: BRAZIL; PARAGUAY

## HISTORY

- 1) Paraguay: Sweetener; Cardiotonic; Obesity; Blood pressure; Heartburn
- 2) 16<sup>th</sup> Century: Spanish Conquistadores brought to Europe
- 3) By 1994 FDA ruled Stevia safe as dietary supplement, but not safe as food additive (blocking use to food industry)

## QUALITIES

- 1) Components: Chlorophyll; Glycosides (sweetness)
- 2) Natural Herbal SWEETENER (up to 300 times sweeter than sugar); Non-Caloric; Non-toxic; SAFE for Diabetics; Hypoglycemics; Candida sufferers  
- When Using to COOK (1/4 tsp = about 1 tsp Sugar): 1-Less calories; 2-Adds green color; 3-Adds slight anise taste
- 3) DIABETES; Lowers Blood Glucose; Improves glucose tolerance; PANCREAS Support; Stimulates insulin secretion  
- STUDY (lowers blood glucose): ...reduced postprandial [after meal] blood glucose levels in 12 type-2 diabetic patients, indicating beneficial effects on glucose metabolism. (Gregersen 2004)
- 4) Heart Tonic (Tones, Balances, Strengthens Heart); Vasodilator; lowers Blood Pressure  
- STUDY (lowers blood pressure): In a 2-year study with 168 Chinese mild hypertension patients who took 500 mg stevioside powder capsules or placebo 3 times daily for 2 years. Oral stevioside significantly decreased Systolic BP and Diastolic BP compared with placebo. Quality of life was improved, and no significant adverse effects were noted. (Hsieh 2003)
- 5) Anti-Microbial; Antibacterial; Cavities  
- STUDY (antibacterial; cavities): The aim of this study was to evaluate the antibacterial activity of Stevia leaf extracts against cariogenic [cavity producing] bacteria. ...antimicrobial activity was noted using Stevia extracts against 16 bacterial strains of the genera Streptococcus (n= 12) and Lactobacillus (n=4). (Gamboa 2012)  
  
- Antiviral; Anti-Yeast; Antifungal; Anti-tumor

- STUDY (colon cancer): ... effects on human colon carcinoma cell lines were examined... showed that high concentrations of stevioside (2-5 mM) and steviol (0.2-0.8 mM) decreased cell viability. (Boonkaewwan 2008)

6) Weight Loss; Sweetener without calories; lowers Sugar Cravings

7) OTHER

- Inflammation

- Tobacco Cravings

CAUTION: Has Hypo-Glycemic and Hypotensive effects when taken in high doses (higher than when used for sweetening purposes) – May need to adjust blood pressure and anti-diabetic medications

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## Stevia References

### *Herb History and General Information*

Courtial, Marc. Stevia: The Best Natural Sweetener, or Just Another Fad? July 2011, See article: [http://botanical.com/site/by\\_you/stevia-best\\_natural\\_sweetner.html](http://botanical.com/site/by_you/stevia-best_natural_sweetner.html) accessed July 22, 2014

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Ritchason, Jack, N.D., *The Little Herb Encyclopedia*. Pleasant Grove, Utah: Woodland Health Books; 1995; p 227

Taylor, Leslie. Wealth of the Rainforest, Pharmacy to the World, Copyrighted 1996 to present by Leslie Taylor, Milam County, Texas 77857. Online at <http://www.rain-tree.com> accessed January 10, 2015

### *Studies*

Boonkaewwan C, Ao M, Toskulkao C, Rao MC. Specific immunomodulatory and secretory activities of stevioside and steviol in intestinal cells. *J Agric Food Chem*. 2008 May 28;56(10):3777-84. doi: 10.1021/jf072681o. [PubMed]

Hsieh MH, Chan P, Sue YM, Liu JC, Liang TH, Huang TY, Tomlinson B, Chow MS, Kao PF, Chen YJ. Efficacy and tolerability of oral stevioside in patients with mild essential hypertension: a two-year, randomized, placebo-controlled study. *Clin Ther*. 2003 Nov;25(11):2797-808. [PubMed]

Gamboa F, Chaves M. Antimicrobial potential of extracts from *Stevia rebaudiana* leaves against bacteria of importance in dental caries. *Acta Odontol Latinoam*. 2012;25(2):171-5. [PubMed]

Gregersen S, Jeppesen PB, Holst JJ, Hermansen K. Antihyperglycemic effects of stevioside in type 2 diabetic subjects. *Metabolism*. 2004 Jan;53(1):73-6. [PubMed]

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[Additional info on Studies:](#)

## LOWERS BLOOD PRESSURE

In a 2-year study in Chinese patients with mild hypertension, oral stevioside significantly decreased systolic blood pressure and diastolic blood pressure compared with placebo. Quality of life was improved, and no significant adverse effects were noted. Hsieh 2003

Hsieh 2003

Department of Medicine, Taipei Medical University--Wan Fang Hospital, Taipei City, Taiwan.

Abstract

**BACKGROUND:** Stevioside, a natural glycoside isolated from the plant *Stevia rebaudiana* Bertoni, has been used as a commercial sweetening agent in Japan and Brazil for >20 years. Previous animal and human studies have indicated that stevioside has an antihypertensive effect.

**OBJECTIVES:** This study was undertaken to investigate the long-term (2-year) efficacy and tolerability of stevioside in patients with mild essential hypertension. Secondary objectives were to determine the effects of stevioside on left ventricular mass index (LVMI) and quality of life (QOL).

**METHODS:** This was a multicenter, randomized, double-blind, placebo-controlled trial in Chinese men and women aged between 20 and 75 years with mild essential hypertension (systolic blood pressure [SBP] 140-159 mm Hg and diastolic blood pressure [DBP] 90-99 mm Hg). Patients took capsules containing 500 mg stevioside powder or placebo 3 times daily for 2 years. Blood pressure was measured at monthly clinic visits; patients were also encouraged to monitor blood pressure at home using an automated device. LVMI was determined by 2-dimensional echocardiography at baseline and after 1 and 2 years of treatment. QOL was assessed using the Medical Outcomes Study 36-Item Short-Form Health Survey. Electrocardiographic, laboratory, and QOL parameters were assessed at the beginning of treatment, and at 6 months, 1 year, and 2 years.

**RESULTS:** One hundred seventy-four patients (87 men, 87 women) were enrolled in the study, and 168 completed it: 82 (42 men, 40 women; mean [SD] age, 52 [7] years) in the stevioside group and 86 (44 women, 42 men; mean age, 53 [7] years) in the placebo group. After 2 years, the stevioside group had significant decreases in mean

(SD) SBP and DBP compared with baseline (SBP, from 150 [7.3] to 140 [6.8] mm Hg; DBP, from 95 [4.2] to 89 [3.2] mm Hg;  $P < 0.05$ ) and compared with placebo ( $P < 0.05$ ). Based on patients' records of self-monitored blood pressure, these effects were noted beginning approximately 1 week after the start of treatment and persisted throughout

the study. There were no significant changes in body mass index or blood biochemistry, and the results of laboratory tests were similar in the 2 groups throughout the study. No significant difference in the incidence of adverse effects was noted between groups, and QOL scores were significantly improved overall with stevioside compared with placebo ( $P < 0.001$ ). Neither group had a significant change in mean LVMI. However, after 2 years, 6 of 52 patients (11.5%) in the stevioside group had left ventricular hypertrophy (LVH), compared with 17 of 50 patients (34.0%) in the placebo group ( $P < 0.001$ ). Of those who did not have LVH at baseline, 3 of 46 patients (6.5%) in the stevioside group had developed LVH after 2 years, compared with 9 of 37 patients (24.3%) in the placebo group ( $P < 0.001$ ).

**CONCLUSIONS:** In this 2-year study in Chinese patients with mild hypertension, oral stevioside significantly decreased SBP and DBP compared with placebo. QOL was improved, and no significant adverse effects were noted.

### LOWERS BLOOD GLUCOSE

Stevioside from the plant *Stevia rebaudiana* reduced postprandial blood glucose levels in 12 type 2 diabetic patients, indicating beneficial effects on the glucose metabolism. Stevioside may be advantageous in the treatment of type 2 diabetes. Gregersen 2004

Gregersen 2004

Department of Endocrinology and Metabolism C, Aarhus University Hospital, Denmark.

#### Abstract

Stevioside is present in the plant *Stevia rebaudiana* Bertoni (SrB). Extracts of SrB have been used for the treatment of diabetes in, for example, Brazil, although a positive effect on glucose metabolism has not been unequivocally demonstrated. We studied the acute effects of stevioside in type 2 diabetic patients. We hypothesize that supplementation with stevioside to a test meal causes a reduction in postprandial blood glucose. Twelve type 2 diabetic patients were included in an acute, paired cross-over study. A standard test meal was supplemented with either 1 g of stevioside or 1 g of maize starch (control). Blood samples were drawn at 30 minutes before and for 240 minutes after ingestion of the test meal. Compared to control, stevioside reduced the incremental area under the glucose response curve by 18% ( $P = .013$ ). The insulinogenic index ( $AUC(i,insulin)/AUC(i,glucose)$ ) was increased by approximately 40% by stevioside compared to control ( $P < .001$ ). Stevioside tended to decrease glucagon levels, while it did not significantly alter the area under the insulin, glucagon-like peptide 1, and glucose-dependent insulinotropic polypeptide curves. In conclusion, stevioside reduces postprandial blood glucose levels in type 2 diabetic patients, indicating beneficial effects on the glucose metabolism. Stevioside may be advantageous in the treatment of type 2 diabetes.

### COLON CARCINOMA

The effects of stevioside and its metabolite, steviol, on human colon carcinoma cell lines were examined which showed that high concentrations of stevioside (2-5 mM) and steviol (0.2-0.8 mM) decreased cell viability in T84, Caco-2, and HT29 cells.

Boonkaewwan 2008

Department of Physiology, Faculty of Science, Mahidol University, Bangkok 10400, Thailand.

## Abstract

Stevioside, isolated from *Stevia rebaudiana*, is a commercial sweetener. It was previously demonstrated that stevioside attenuates NF-kappaB-dependent TNF-alpha and IL-1beta synthesis in LPS-stimulated monocytes. The present study examined the effects of stevioside and its metabolite, steviol, on human colon carcinoma cell lines. High concentrations of stevioside (2-5 mM) and steviol (0.2-0.8 mM) decreased cell viability in T84, Caco-2, and HT29 cells. Stevioside (2 mM) potentiated TNF-alpha-mediated IL-8 release in T84 cells. However, steviol (0.01-0.2 mM) significantly suppressed TNF-alpha-induced IL-8 release in all three cell lines. In T84 cells, steviol attenuated TNF-alpha-stimulated I kappa B --> NF-kappaB signaling. Chloride transport was stimulated by steviol (0.1 mM) > stevioside (1 mM) at 30 min. Two biological effects of steviol in the colon are demonstrated for the first time: stimulation of Cl(-) secretion and attenuation of TNF-alpha-stimulated IL-8 production. The immunomodulatory effects of steviol appear to involve NF-kappaB signaling. In contrast, at nontoxic concentrations stevioside affects only Cl(-) secretion.

## CAVITIES and ANTIBACTERIAL

Gamboia 2012

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## Abstract

In recent years, the antimicrobial activity of *Stevia rebaudiana* Bertoni leaf extracts against a large number of microorganisms has been evaluated, but not its activity against microorganisms of importance in dental caries. The aim of this study was to evaluate the antibacterial activity of *Stevia rebaudiana* Bertoni leaf extracts against cariogenic bacteria. Extracts were obtained from the dried *Stevia rebaudiana* Bertoni leaves in hexane, methanol, ethanol, ethyl acetate and chloroform. The antimicrobial activity of the 5 extracts against 16 bacterial strains of the genera *Streptococcus* (n= 12) and *Lactobacillus* (n= 4) was evaluated by the well diffusion method. Minimal inhibitory concentrations (MIC) of the extracts in hexane, methanol, ethanol, ethyl acetate and chloroform on the 16 bacterial strains were respectively 30 mg/ml, 120 mg/ml, 120 mg/ml, 60 mg/ml and 60 mg/ml. The zones of inhibition present at the MIC were variable, ranging from 9 mm to 17.3 mm. Our results suggest that inhibition zones with a hexane extract are similar to those obtained with ethanol and methanol, but the minimal inhibitory concentration (30 mg/ml) is lower. For the four *Lactobacillus* species, the inhibition zones obtained between 12.3 and 17.3 mm were somewhat larger with ethyl acetate and chloroform extracts, suggesting they were the most susceptible microorganisms.