STEVIOL GLYCOSIDES pdf

1: Global Steviol Glycoside Market Research Report

Steviol glycosides are the chemical compounds responsible for the sweet taste of the leaves of the South American plant Stevia rebaudiana and the main ingredients (or precursors) of many sweeteners marketed under the generic name stevia and several trade names.

Among all these glycosides, Stevioside and Rebaudioside A received most of the attention so far. The older breeds of Stevia plants contained higher proportion of Stevioside and Rebaudioside A was a minor component of the total glycosides. But, it was fond that Rebaudioside A has a more acceptable taste profile than the then predominant Stevioside. Rebaudioside A was mainly used in more demanding applications like beverages as it has comparatively less aftertaste. Dulcoside A was 30 times sweeter than sucrose. Rebaudioside A was the least astringent, the least bitter, had the least persistent aftertaste and was judged to have the most favourable sensory attributes of the four major steviol glycosides. Stevioside tastes somewhat bitter, and show aftertaste. In order to improve of sweetness, modifications of sugar moieties of both the glycosides were conducted by enzymatic transglucosylation. Cyclomaltodextrin-glucanotransferase CGTase efficiently catalyzes intermolecular glycosylation to transfer a-glucosyl units from starch to 4-OH of a glucosyl moiety trans-a-l,4-glucosylation. The optimum stevioside-to-Cyclodextrine ratio and total concentration of dry matter for the synthesis of the best-tasting product were 1: Stevioside, when treated with CGTase, yields a complex mixture of products which were mono-, di-, tri and more glucosylated both at the O-glucosyl unit and the terminal glucosyl unit of the O-sophorosyl moiety. Significant improvement in quality of taste was observed for most of the glucosylated products, especially for Sla and S2a which were mono- and di-glucosylated at the O-sophorosyl moiety, respectively. Remarkable enhancement of intensity of sweetness was also observed for both the products, while glucosylation at the glucosyl moiety resulted in decrease of intensity of sweetness. Products Sla, S2a and S2c were also obtained from stevioside by pullulan and crude pullulanase from Klebsiella sp though yields were rather low. Transglucosylation of stevioside by Pullulanase and pullulan exclusively afforded three products, O-[b-maltotriosyl- -b-D-glucosyl]O-b-D-glucosyl- steviol 1 , O-[b-maltosyl- -b-D-glucosyl]O-b-D-glucosyl- steviol 2 and O-b-sophorosylO-b-maltotriosyl-steviol 3. All of these products have already been obtained by trans-alpha-1,4-glucosylation of stevioside by the cyclodextrin glucanotransferase starch system, and 1 and 2 have been proven to be tasty and potent sweeteners. Transglucosylation of stevioside by a amylase from Aspergillus niger and maltose afforded three new products, viz. A significantly high quality of taste was evaluated for 4. The enzyme system from Streptomyces sp. W forms several kinds of transfer products when incubated in the presence of both stevioside ST and curdlan. Three of the major were separated and purified and found to be 1 O-b-sophorosylO-b-laminaribiosyl steviol; 2 O-b-glucosylsophorosylO-b-glucosyl steviol, and 3 O-b-sophorosylO-b-laminaritriosyl steviol. Treatment of stevioside by l3-glucan and an enzyme from Streptomyces sp. DIC yielded rebaudioside A, the better sweetener. An Actinomycete strain K- isolated from soil was cultured in a medium containing stevioside and curdlan to give a trans-p-1,6-glucosylated product, [p-glucosyl- -p-glucosyl- -p-glucosyl]-p-glucosyl-steviol. Incubation of stevioside with sucrose and p-fructofuranosidase from Arthrobactor sp. K- 1 afforded a product trans-O-2,6-fructofuranosylated at the glucosyl moiety in a high yield. Relative intensity of sweetness was not enhanced, however, significant improvement of quality of taste was observed for both the compounds. It is noteworthy that the fructofuranosyl linkage is rather unstable, being hydrolyzed on standing in foods. These results strongly suggested that for enhancement of intensity of sweetness of steviol glycosides, the elongation of the glucosyl moiety up to a total of four glucosyl units under suppression of glucosylation at glucosyl moiety, may be desirable. These enzymes are shipped in as liquid stebilised preparations in 25 litre HDPE containers. The suppliers claim that the active shelf life of these preparations is about 8 months when preserved in C. Enzymatic transglycosylation of stevioside usually takes long reaction time and concerns thermo-deactivation of the enzyme. Using a thermophilic enzyme and employing low power microwave irradiation, transglycosylation of stevioside was found to be speeded up over folds. It has been observed that, to achieve better sweetness with less astringency, suppression of glycosylation at O-glucosyl moiety is

necessary. By treatment with this enzyme, tri- and more a-1,4-glucosyl chains are converted into a mono- or di-a-1,4-glucosyl chain. Since decrease of sweetness was observed for products with a poly-a-1,4-glucosyl chain, treatment of glucosylated products with b-amylase resulted in the further improvement of sweetness. After transglycosylation, the stevioside derivatives are to be separated from the reaction mixture consisting water, dissolved donor starch or cyclo-dextrin and residual enzyme formulation. This may be a very complicated and cumbersome step. Extraction and purification of stevioside from crude Stevia extract is a multi-step and cost intensive process. If transglycosylation is performed with purified stevioside, preparation of modified steviosides will involve another costly post-transglycosylation recovery and purification stage. The total economics of this two stage purification may not be commercially feasible. Thus, to achieve commercial success, a CGTase system effective on crude Stevia extract is to be identified, so that, modified steviosides can be directly recovered from the crude reaction mixture in a single stage purification process. Direct fermentation of stevioside by specific organisms may also not be commercially feasible at present. After fermentation, the modified steviosides are to be separated from the residual medium components and microbial metabolites â€" all of which may not be entirely non toxic. Industrial Fermentors with efficient process control along with all its peripherals are very expensive. Moreover, to ensure freedom from fermenting organisms, a very capital intensive biomass separation system comprising cross flow micro-filtration system is to be employed. Total cost of ownership of this setup, its maintenance cost and the cost of manpower to run this setup will be really prohibitive. The maximum stevioside concentration usable in the medium may not be very high â€" thus the setup may not have high throughput. Hence, I feel that the most cost efficient setup for transglycosylation process will be immobilized enzyme column array. Specific CGTase enzyme may be immobilized on a proper matrix either by gel entrapment or by adsorption or by covalent linking and a percolation column is to be filled with that matrix. Crude Stevia extract with dissolved donor starch can be recirculated through these columns until desired extent of transglycosylation is achieved. After transglycosylation, the solution may be passed through amylase columns for O- chain shortening. Then modified steviosides can be recovered from the reaction mixture by conventional method. Development of commercially feasible technology for the process should involve the following steps â€" Identification of a CGTase and amylase system effective in crude Stevia extract Determination of most effective immobilization process. Working out of process parameters like optimal temperature, pH, enzyme cofactors, donor substrate ratio, reaction kinetics etc. Construction of a pilot facility and further standardization of process parameters. Scaling up of the process and determination of immobilized enzyme column dimensions, design of specific liquid handling and process control systems and further standardization of process parameters. Development of cost effective post extraction and transglycosylation purification technology. Keeping in view the recently discovered anti-diabetic, anti-hypertensive and anti-neoplastic activity of absolutely natural sweetener steviosides, I feel, it has tremendous market potential in future.

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2: Are stevia plant extracts safe? - NHS

Find patient medical information for Steviol Glycosides (Bulk) on WebMD including its uses, side effects and safety, interactions, pictures, warnings and user ratings.

More evidence is needed to rate the effectiveness of stevia for these uses. How does it work? Stevia is a plant that contains natural sweeteners that are used in foods. Researchers have also evaluated the effect of chemicals in stevia on blood pressure and blood sugar levels. However, research results have been mixed. Are there safety concerns? Stevioside has been safely used in research in doses of up to mg daily for 2 years. Some people who take stevia or stevioside can experience bloating or nausea. Other people have reported feelings of dizziness, muscle pain, and numbness. There is not enough reliable information about the safety of taking stevia if you are pregnant or breast feeding. Stay on the safe side and avoid use. Allergy to ragweed and related plants: This family includes ragweed, chrysanthemums, marigolds, daisies, and many other plants. In theory, people who are sensitive to ragweed and related plants may also be sensitive to stevia. Some developing research suggests that some of the chemicals contained in stevia might lower blood sugar levels and could interfere with blood sugar control. However, other research disagrees. If you have diabetes and take stevia or any of the sweeteners it contains, monitor your blood sugar closely and report your findings to your healthcare provider. There is some evidence, though not conclusive, that some of the chemicals in stevia can lower blood pressure. There is a concern that these chemicals might cause blood pressure to drop too low in people who have low blood pressure. Are there interactions with medications? Moderate Be cautious with this combination. Lithium Stevia might have an effect like a water pill or "diuretic. In theory, this could increase how much lithium is in the body and result in serious side effects. Talk with your healthcare provider before using this product if you are taking lithium. Your lithium dose might need to be changed. Minor Be watchful with this combination. Medications for diabetes Antidiabetes drugs Some research shows that stevia might decrease blood sugar in people with type 2 diabetes. In theory, stevia might cause an interaction with diabetes medications resulting in blood sugar levels going too low; however, not all research has found that stevia lowers blood sugar. Therefore, it is not clear if this potential interaction is a big concern. Until more is known, monitor your blood sugar closely if you take stevia. The dose of your diabetes medication might need to be changed. Some medications used for diabetes include glimepiride Amaryl , glyburide DiaBeta, Glynase PresTab, Micronase , insulin, pioglitazone Actos , rosiglitazone Avandia , chlorpropamide Diabinese , glipizide Glucotrol , tolbutamide Orinase , and others. Medications for high blood pressure Antihypertensive drugs Some research shows that stevia might decrease blood pressure. In theory, taking stevia along with medications used for lowering high blood pressure might cause your blood pressure to go too low. However, some research shows that stevia does not affect blood pressure. Some medications for high blood pressure include captopril Capoten , enalapril Vasotec , losartan Cozaar , valsartan Diovan , diltiazem Cardizem , Amlodipine Norvasc , hydrochlorothiazide HydroDiuril , furosemide Lasix , and many others. Are there interactions with herbs and supplements? Herbs and supplements that might lower blood pressure Stevia might lower blood pressure. Using it along with other herbs and supplements that have this same effect might increase the risk of blood pressure dropping too low in some people. Herbs and supplements that might lower blood sugar Stevia might lower blood sugar. Using it along with other herbs and supplements that have the same effect might cause blood sugar to drop too low in some people. Are there interactions with foods? There are no known interactions with foods. What dose is used? At this time there is not enough scientific information to determine an appropriate range of doses for stevia. Keep in mind that natural products are not always necessarily safe and dosages can be important. Be sure to follow relevant directions on product labels and consult your pharmacist or physician or other healthcare professional before using. Methodology To learn more about how this article was written, please see the Natural Medicines Comprehensive Database methodology. Stevia rebaudiana Bertoni, source of a high-potency natural sweetener: A comprehensive review on the biochemical, nutritional and functional aspects. Journal of Applied Science Research ;6: A review on the improvement of stevia [Stevia rebaudiana Bertoni. Canadian Journal of Plant Science ; J Med Assoc Thai.

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Soc Ital Biol Sper. A phytochemical screening procedure for sweet ent-kaurene glycosides in the genus Stevia. Structures of the novel diterpene glycosides from Stevia rebaudiana. Two minor diterpene glycosides from the leaves of Stevia rebaudiana. A new acylated quercetin glycoside from the leaves of Stevia rebaudiana Bertoni. Stimulatory effect of stevioside on peripheral mu opioid receptors in animals. Chemopreventive effects of stevioside and related compounds. Effect of stevioside on growth and reproduction. Metabolism of stevioside by healthy subjects. Exp Biol Med Maywood. Mechanism of the hypoglycemic effect of stevioside, a glycoside of Stevia rebaudiana. Rebaudioside A potently stimulates insulin secretion from isolated mouse islets: Metabolism of stevioside and rebaudioside A from Stevia rebaudiana extracts by human microflora. Antihyperglycemic and blood pressure-reducing effects of stevioside in the diabetic Goto-Kakizaki rat. In vitro metabolism of the glycosidic sweeteners, stevia mixture and enzymatically modified stevia in human intestinal microflora. Inhibitory effect of stevioside on tumor promotion by O-tetradecanoylphorbolacetate in two-stage carcinogenesis in mouse skin. Stevioside induces antihyperglycaemic, insulinotropic and glucagonostatic effects in vivo: Inhibitory effect of stevioside on calcium influx to produce antihypertension. Dominant lethal test in rats treated with some plant extracts. Southeast Asian J Trop. Med Public Health ;31 Suppl 1: Investigation of the antihypertensive effect of oral crude stevioside in patients with mild essential hypertension. Apparent lack of pharmacological effect of steviol glycosides used as sweeteners in humans. A pilot study of repeated exposures in some normotensive and hypotensive individuals and in Type 1 and Type 2 diabetics. Regul Toxicol Pharmacol ; Specific immunomodulatory and secretory activities of stevioside and steviol in intestinal cells. J Agric Food Chem ; Development of rebiana, a natural, non-caloric sweetener. Food Chem Toxicol ;46 Suppl 7: The hemodynamic effects of rebaudioside A in healthy adults with normal and low-normal blood pressure. A critical review of the genetic toxicity of steviol and steviol glycosides. Food and Drug Administration, December 17, Food and Drug Administration, December Effects of stevioside on glucose transport activity in insulin-sensitive and insulin-resistant rat skeletal muscle. Antihyperglycemic effects of stevioside in type 2 diabetic subjects. A double-blind placebo-controlled study of the effectiveness and tolerability of oral stevioside in human hypertension. Br J Clin Pharmacol ; Efficacy and tolerability of oral stevioside in patients with mild essential hypertension: Office of Regulatory Affairs. Automatic detention of stevia leaves, extract of stevia leaves, and food containing stevia. J Clin Pharmacol ; Developmental toxicity of steviol, a metabolite of stevioside, in the hamster. Drug Chem Toxicol ; Effects of stevioside and steviol on intestinal glucose absorption in hamsters. J Nutr Sci Vitaminol Tokyo ;

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3: What is Reb A Stevia? â€“ MycoTechnology

Steviol glycosides are approved for use in sugar-free soft drinks, hot beverages, jams, flavoured milk and other dairy products, cakes, desserts and alcohol, among other things. When consumed, steviol glycosides are broken down into steviol, which is absorbed by the body.

Provisional Patent application No. Field of the Invention The present invention relates generally to glucosylated steviol glycoside compositions and methods for making and using them as a taste improver and flavor modifier in various food and beverage products. The invention also relates to a combination of selective combination of glucosylated steviol glycoside components and steviol glycoside molecules from Stevia rebaudiana Bertoni plant extract to make the optimum sweetness profile and flavor modification in food and beverage applications. The invention also relates to the combination of the steviol glycoside derived molecules and maltodextrin derived from starch to provide the mouthfeel and flavor modification characteristics of Glucosylated steviol Glycosides in reduced or no sugar added food and beverage products. Description of the Related Art The extract of Stevia rebaudiana plant contains a mixture of different sweet diterpene glycosides, which have a single baseâ€"steviol and differ by the presence of carbohydrate residues at positions C13 and C Other minor components are Rebaudioside E, Steviolbioside and Rubusoside. Recent research found additional steviol glycoside molecules Ohta et al, ; Prakash et al, All steviol glycoside molecules have high intensity of sweetness, ranging between 50 to times sweeter than sugar. However, apart from the high level of sweetness, they have also intrinsic properties of bitter and licorice taste and undesirable aftertaste. Some undesirable taste characteristics of glycosides can be as a result of contamination of other substances present in stevia extract. One of the main ways to improve the taste quality is the enzymatic glycosylation of mixture of semi-purified steviol glycosides. It is known that the undesired taste attributes can be substantially reduced or eliminated by the reaction of intermolecular transglycosylation of various enzymes, upon which the attachment of new carbohydrates at positions C13 and C19 of steviol glycosides takes place FIG. With an increase in the number of glucose units in steviol glycoside molecules for example, from stevioside to Rebaudioside A , the sweetness intensity increases and sweetness profile taste improves. However, the relative sweetness does not increase significantly beyond a certain level with a further increase of glucose units, as shown in FIG. The published data show that the sweetness quality improves with the addition of glucose units, but does not explicitly or implicitly mention that the addition of glucose units contributes to a reduction of sweetness. In this invention, a process is developed to make a mixture of glucosylated steviol glycosides with small amount of other steviol glycosides and maltodextrin. The process involved precise control of pH, temperature, enzyme source and activity, quality of stevia extract, glucose-donor amount and source and time to achieve blends of different ratios of glucosylated steviol glycosides, steviol glycoside molecules, and maltodextrin. The composition includes glucosylated steviol glycosides, steviol glycosides and maltodextrin. In some embodiments, the glucosylated steviol glycosides may include a plurality of glucose units. For example, the glucosylated steviol glycosides may include three, four, five, or more than five glucose units FIG. The invention, in part, pertains to an ingredient containing glucosylated steviol glycoside GSG of different degree of glycosylation to steviol glycoside molecules derived from stevia extract of Stevia Rebaudiana Bertoni plant. Also, this invention, in part, pertains to specific blends of GSG components with varying degree of glycosylation. The invention, in part, pertains to an ingredient comprising steviol glycosides of Stevia Rebaudiana Bertoni plant. The steviol glycosides are selected from the group consisting of stevioside, Rebaudioside A, Rebaudioside B, Rebaudioside C, Rebaudioside D, Rebaudioside E, Rebaudioside F, dulcoside A, steviolbioside, rubusoside, as well as other steviol glycosides found in Stevia Rebaudiana Bertoni plant and mixtures thereof. Rebaudioside is commonly expressed as Reb or reb also. The invention, in part, pertains to specific blends of different steviol glycosides SG and glucosylated steviol glycosides GSG for producing an ingredient containing Rebaudioside D, Rebaudioside A, Rebaudioside B, stevioside, Rebaudioside C, and other steviol glycosides found in Stevia Rebaudiana Bertoni plant and mixtures thereof. The invention, in part, pertains to specific blends of different GSG, SG components and residual maltodextrins

derived from starch, which is used as glucose-donor. The source of starch, such as, but not limited to, tapioca, maize, wheat, potato, barley, sweet potato and other commercial and non-commercial carbohydrate source. The present invention is also directed to a process to make the different blends of GSG and SG from stevia extracts of different amount and mixture of steviol glycosides. The process conditions, type and ratio of stevia extract and starch used are crucial for making the composition, which will yield different amount and composition of GSG, SG and maltodextrin. The invention, in part, pertains to a process of manufacturing the specific blend of GSG components, selected steviol glycosides SG and maltodextrin. The processing steps include: The present invention is also directed to a food or beverage product having an intense taste and flavor profile, wherein the food or beverage product includes a taste and flavor modifying composition comprising glucosylated steviol glycosides, selected steviol glycosides and maltodextrins. A wide range of food and beverage products, such as, but not limited to, carbonated soft drinks, fruit juices, dairy foods, dairy beverages, baked goods, cereal products, and table top sweeteners, may be made in accordance with the present invention. The taste and flavor profile of a food or beverage product including a taste and flavor modifying composition, wherein the taste and flavor modifying composition includes the blend of glucosylated steviol glycosides, steviol glycosides and maltodextrin, may be more intense than a comparative taste and flavor profile of a comparative food or beverage product which does not include the taste and flavor modifying composition. Moreover, the mouthfeel of a food or beverage product including the taste and flavor modifying composition, wherein the taste and flavor modifying composition includes glucosylated steviol glycosides, selected steviol glycosides and maltodextrins, may be improved in relation to a mouthfeel of a comparative food or beverage product which does not include the taste and flavor modifying composition. The present invention is further directed to a method of enhancing the taste and flavor intensity of a food or beverage product, including the step of adding a taste and flavor modifying composition to the food or beverage product, wherein the taste and flavor modifying composition includes the blend of glucosylated steviol glycosides, selected steviol glycosides and maltodextrins. The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features of the invention which form the subject of the claims of the invention will be described hereinafter. It should be appreciated by those skilled in the art that the specific embodiments disclosed may be readily utilized as a basis for modifying or designing other methods or structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims. The novel features which are believed to be characteristic of the invention, both as to its organization and method of operation, together with further objects and advantages will be better understood from the following description. It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed. The compositions can be used as flavor modifier in various food and beverage products. Non-limiting examples of beverage products include carbonated and still beverages, flavored water, juice-based beverages, energy drinks and powder soft drinks. Non-limiting examples of food include dairy products yogurt, yogurt drinks, flavored milk, frozen dairy desserts including ice cream , baked goods and baking mixes bread, biscuits, cookies, muffins, rolls, and baking mixes , sauces and gravies, jams and jellies, gelatins, puddings and fillings, soy sauce and other soy based products, breakfast cereals, condiments and relishes, confections and frostings, processed fruits and vegetables, sugar substitutes and confectionery products including chewing gums. The drawings illustrate embodiments of the invention and together with the description serve to explain the principles of the embodiments of the invention. It has also been discovered that the modification of flavor and sweetness profile is affected by the composition of the blend of GSG, steviol glycosides SG and maltodextrin. The size and amount of GSG molecules and the type and amount of residual steviol glycoside SG contribute different degree of flavor modification. Therefore, while sweetness decreases with glycosylation, flavor modification increases. The blend of GSG and SG provides a certain amount of sweetness, but the present invention shows that such blends modify the flavor and sweetness profile in a wide range of food and beverage applications. The specific type of GSG means

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GSG molecules derived from steviol glycosides with different degree of glycosylation, resulting number of additional glucose units added to base steviol glycoside molecules. The type of residual steviol glycosides means the unreacted residual steviol glycosides, which may be stevioside, Reb A, Reb B, Reb C, Reb D and other steviol glycoside molecules present in the stevia extract. The present invention also pertains to the specific composition of blends, where the type and amount of different GSG molecules and SG molecules contribute different degree of taste modification in the food and beverage applications. Advantages of the present invention will become more apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description. The compositions can be used as flavor and sweetness profile modifier in various food and beverage products. Non-limiting examples of food and beverage products include carbonated soft drinks, ready to drink beverages, energy drinks, isotonic drinks, low-calorie drinks, zero-calorie drinks, sports drinks, teas, fruit and vegetable juices, juice drinks, dairy drinks, yoghurt drinks, alcohol beverages, powdered beverages, bakery products, cookies, biscuits, baking mixes, cereals, confectioneries, candies, toffees, chewing gum, dairy products, flavored milk, yoghurts, flavored yoghurts, cultured milk, soy sauce and other soy base products, salad dressings, mayonnaise, vinegar, frozen-desserts, meat products, fish-meat products, bottled and canned foods, tabletop sweeteners, fruits and vegetables. Additionally the compositions can be used in drug or pharmaceutical preparations and cosmetics, including but not limited to toothpaste, mouthwash, cough syrup, chewable tablets, lozenges, vitamin preparations, and the like. The following examples illustrate various embodiments of the invention. It will be understood that the invention is not limited to the materials, proportions, conditions and procedures set forth in the examples, which are only illustrative. The samples as outlined below were produced by treating the raw materials, steviol glycosides extracted from the Stevia plant, and starch extracted from tapioca, with a natural enzyme. The enzyme transfers glucose units from starch to the steviol glycosides. The enzyme used to facilitate this transfer is produced by means of fermentation using non-GMO non-genetically modified organism bacteria. This process can yield multiple glycosylation G2, G3, etc.

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4: USB2 - Glucosylated steviol glycoside as a flavor modifier - Google Patents

Steviol glycosides Steviol glycosides are natural constituents of the leaves of Stevia rebaudiana (Bertoni) Bertoni, a plant native to parts of South America and commonly known as Stevia.

Stevioside structure What is rebaudioside A? It contains four glucose molecules in total. The leaves are extracted with hot water and the aqueous extract is passed through an adsorption resin to trap and concentrate the component steviol glycosides. The resin is washed with a solvent alcohol to release the glycosides and product is recrystallized from methanol or aqueous ethanol. Ion exchange resins may be used in the purification process. The final product may be spray-dried. The results obtained are in accordance with technological applications of this solvent for Stevioside and Rebaudioside A separations. Rebaudioside A was poorly soluble in ethanol and water whilst Stevioside was poorly soluble in water. Solubility of Stevioside and Rebaudioside A in water, ethanol and their binary mixtures. Stevia is a new natural sweetener extracted from the stevia leaves Stevia Rebaudiana Bertoni. Stevia has a high sugar sweetness with low calorie. After a large amount of laboratory tests, stevia sugar has been proven to be without any toxic and side-effect, non-carcinogenic and is safe to be consumed. If taken frequently, it can benefits a lot of diseases such as high blood pressure, diabetes, obesity, heart disease and tooth decay, etc. It is an ideal sugar alternative sweetener. Stevia can be widely used in food, beverages and drinks, medicine, chemical products for daily use, wine-making, cosmetics, flavorings and etc. What is Steviol glycosides? Steviol glycosides are high intensity sweeteners, times sweeter than sucrose. They are isolated and purified from the leaves of the stevia plant Stevia rebaudiana Bertoni. Steviol glycosides powder is a high intensive sweetener with low calorie, which is times sweeter than that of sugar. Steviol glycosides can be widely used in food, beverage, medicine, wine and other industries. Stevia extracts mainly contain 9 Steviol glycosides: Steviol is a diterpene, it is the base structure of steviol glycoside. Steviol glycosides Property Stevioside Properties It is white to off-white powder or granular with cool flavor which is about times as sweet as cane sugar with slight bitter aftertaste in high concentration conditions. The sweetness can stay longer in the mouth and not easy to disappear. Stevioside is able to endure in high temperature, and more stable in acidic and alkaline solution PH It also can be easily dissolved in ethanol. It belongs to non fermented products so it can be widely used in the food which is difficult to sterilize by heating and would keep white without any Maillard brown reaction. As a non-calorie sweetener for food, it contributes to low the blood pressure, and cure the acid stomach etc. It also can be used as a kind of sweeting agent for liquorice or cane sugar. Rebaudioside A Properties White to off-white crystalline powder or granular. Its taste is much closer to the can sugar without any bitter taste. It is the substitute of stevia sugar while at the same time it can keep the original sweet taste and also the sweet taste is not easy to disappear in the mouth. It can be resistant at high temperature and more stable in the acidic and alkali solution PH It can be used as the substitute of cane sugar with low costs, better tastes, and can be widely used in the food industry, beverage, pickles, cosmetics, medicine, health care, and so on. Glucosyl Stevia Properties White to off-white powder, flake or granular. Glucosyl Stevia, which is more like cane sugar, has overcome the shortcomings such as different purity, low solubility, and the bitter taste of the general stevia sugar. Glucosyl Stevia is commonly used as the dispersing agent in lactose, malt dextrin etc to low down the sweetness to 0. It is mainly used in the low calorie food, carbonated beverage, juice, freshments, pickles , aquatic product and so on. It is used as table top sweetener. It is a kind of white powder, granular or tablets with times sweetness and extremely low calorie. Its sweetness is very pure and no bitter aftertaste. It contains no cane-sugar and saccharin, aspartame or any synthetic sweeteners. It is very stable in acidic and alkaline solutions, easy to be dissolved in ethanol, resistant to high temperature and it belongs to non-fermented products. Steviol glycosides Advantage As a plant-free calorie substitute, steviol glycosides are perfect for those who are looking for a natural, no-calorie, sweetener alternative for their healthy lifestyle balance and weight management program. Residents of stevia origin Paraguay and Marcy, South America have been eating steviol glycoside for hundreds of years and have not found any poison. It is used to make low-calorie foods and beverages. The sweetness of it is times of cane sugar and the main components of it are Stevioside

and Rebaudioside-A. It tastes pure, cool, lasting etc. Stevia sugar is widely recognized as a good nutritional supplement and health care food by international medical community. Medical research in modern times shows that it is useful for regulating blood sugar and blood pressure, improving energy, losing weight and skin caring etc. Steviol glycoside good solubility. It is easily soluble in water and alcohol, and tastes better when mixed with sucrose, fructose, and isomerized sugar. Steviol glycosides are non-fermentable substances, stable in nature, not easy to mildew, will not change in the production of food, beverages. It is easy to store and transport. Long-term consumption will not cause dental caries. Steviol glycosides taste like sucrose, but also has a unique cool, sweet features. It can be used to make flavor foods, candy, etc. It can also be used as a flavoring agent. It can be used as a substitutes sucrose in pharmaceuticals, syrups, granules, and pills to suppresses the odor of certain foods and medicines. Stevia glycosides can also be used for spices, pickles products, toothpaste, cosmetics and cigarettes. Under normal food and beverage processing conditions, the properties of steviol glycosides are quite stable, which helps to reduce the viscosity, inhibit bacterial growth, and extend the product shelf life. Under the condition of PH3 room temperature , decomposition loss does not occur in days, and precipitation does not occur. Whether it is powder or solution, it is very stable to sunlight. The long-term storage will not be mildewed and the finished product will be heat-treated without sucrose browning. Steviol glycosides Uses As a new generation sweetener, stevia can be widely used in food, beverage, medicine, and so on. It can be said that stevia can be used almost in all products that have sugar. Stevia tea The tea made with stevia leaves directly or use Steviol glycosides together with other food ingredients can be beneficial to patients with diabetes stomach to promote digestion, sober up and eliminate fatigue, obesity, high blood pressure and dental caries. Stevia Drink Steviol glycosides can be used in Soda, orange juice, various juices, ice cream and so on. Stevia Chocolate Steviol glycosides can be used in chocolates as a sweetener to replace sugar. Stevia dessert Moon cakes, biscuits and ect withSteviol glycosides have become special foods for nutrition, health care, and children and the elder. Stevia Can Steviol glycosides are used in Canned fruit such as candied bayberry, orange, hawthorn, longan, etc. Stevia Pickled products Radish pickles and mustard Stewed with Steviol glycosides can keep long shelf life, clear pickled and delicious, does not rot. Steviol glycosides can prevent spoilage and deterioration of aquatic products and reduce the cost while improving the flavor of aquatic products. Such as in various fish canned, kelp and so on. Stevia Fruit cake For example: After using Stevia glycosides, Fruit cake is not only sweet but refreshing. Stevia Wine The use of steviol glycosides in such as pears, sea buckthorn, grapes and other wines and liquors, can reduce the spicy taste of wine and improve the flavor. Can also increase beer foam, white, long-lasting. Meat food Adding steviol glycosides in foods such as sausages, hams, and bacon can improve flavor and extend shelf life. Daily Product The use of steviol glycosides in chewing gum and toothpaste can promote the sweetness of the product, reduce the proliferation of harmful bacteria in the oral cavity and reduce the occurrence of dental caries. Steviol glycosides have been used in a variety of toothpastes, chewing gums and cosmetics. Pharmaceuticals The Ministry of Health approved the use of steviol glycosides in medicine in Many products have been developed, such as in orange flavor VC , Diabetes throat tablets, pediatric compound sulfamethoxazole, cough syrup, zinc gluconate oral solution. Other Such as multi-fruit seeds, fool seeds, stevia, cigarettes, stevia powder and so on. Common use and dosage as follows:

5: Enzymatic conversion of steviol glycoside

These steviol glycosides differ in their molecular structure, their sweetening power and their taste. The sweet taste of the plant is mainly produced by stevioside and Rebaudioside A. As stevioside is the largest part of the steviol glycosides in the plant, stevia leaf extracts are sometimes mistakenly called stevioside.

Customs and Border Protection issued an order of detention for stevia products made in China based on information that the products were made using prison labor. Consequently, use of stevia as an alternative began in Japan, with the aqueous extract of the leaves yielding purified steviosides developed as sweeteners. To produce rebaudioside A commercially, stevia plants are dried and subjected to a water extraction process. The various glycosides are separated and purified via crystallization techniques, typically using ethanol or methanol as solvent. Rebiana is an abbreviated name for the stevia extract, rebaudioside A. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. March Learn how and when to remove this template message Glycosides are molecules that contain glucose residues bound to other non-sugar substances called aglycones molecules with other sugars are polysaccharides. Some steviol glycosides rebaudioside A are perceived sweeter than others stevioside. Meanwhile, the Memorial Sloan Kettering Cancer Center warns that "steviol at high dosages may have weak mutagenic activity," [44] and a review "conducted for" the Center for Science in the Public Interest notes that there are no published carcinogenicity results for rebaudioside A or stevioside. The legally allowed uses and maximum dosage of the extracts and derived products vary widely from country to country. All steviol glycoside extracts were approved in Steviol glycosides were approved and regulated as food additives by the European Commission on 11 November This includes carbonated water, dairy-based desserts and flavoured drinks, yoghurts, ready-to-eat cereals, fruit nectars and jams. Steviol glycoside approved as food additive E since June Stevia extract on sale in a supermarket in Paraguay Paraguay: Purified rebaudioside A has been allowed since December as a food additive sweetener , sold under various trade names, and classified as " generally recognized as safe " "GRAS". Archived from the original on 12 February Retrieved 13 February Archived from the original on 9 May Plant Foods for Human Nutrition. Archived from the original on 1 January Retrieved 15 September Agriculture and Agri-Food Canada.

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6: EFSA evaluates the safety of steviol glycosides | European Food

Several ent-kaurenoid diterpene glycosides with steviol as a common aglycon have been isolated from Stevia rebaudiana, which is native to subtropical and tropical South America and Central America. Among the glycosides, stevioside is the most abundant followed by rebaudioside A. Stevioside is times sweeter than sucrose, while.

Additional information Article last reviewed by Fri 27 October All references are available in the References tab. An alternative sugar replacer and its application in food industry. Review of Agricultural, Food and Environmental Studies. Natural sweeteners in a human diet [Abstract]. Roczniki Panstwowego Zakladu Higieny, 66 3 , â€" Nutritional and therapeutic values of Stevia rebaudiana: Journal of Medicinal Plants Research, 7 46 , â€" Detection of counterfeit stevia products using a handheld Raman spectrometer [Abstract]. Vibrational Spectroscopy, 83, â€" Health outcomes of non-nutritive sweeteners: Analysis of the research landscape. Nutrition Journal, 16, Metabolic effects of non-nutritive sweeteners. Sugar substitutes during pregnancy. Canadian Family Physician, 60 11 , â€" Steviol glycosides in purified stevia leaf extract sharing the same metabolic fate [Abstract]. Regulatory Toxicology and Pharmacology, 77, â€" In vitro bioassay investigations of the endocrine disrupting potential of steviol glycosides and their metabolite steviol, components of the natural sweetener Stevia [Abstract]. Molecular and Cellular Endocrinology, , 65â€" Toxicological evaluation of ethanolic extract from Stevia rebaudiana Bertoni leaves: Genotoxicity and subchronic oral toxicity [Abstract]. Regulatory Toxicology and Pharmacology, 86, â€"

7: Steviol glycosides side effects :: Bio Innovations - Stories about Biotechnology

Steviol glycosides are glycosides of steviol. their molecules can be viewed as a steviol molecule, with its carboxylhydrogen atom replaced by a glucose molecule to form an ester, and a hydroxyl hydrogen with combinations of glucose and rhamnose to form an acetal.

8: Safety of steviol glycosides as a food additive | European Food

A chemical formula is a way of expressing information about the proportions of atoms that constitute a particular chemical compound, using a single line of chemical element symbols and numbers.

9: Stevia side effects: What you need to know

Steviol glycosides in the present evaluation are mixtures of steviol glycosides that comprise not less than 95% of stevioside and/or rebaudioside A. Stevioside as a sweetener was evaluated by the SCF in , and

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