

Product Data Sheet

Product Name: Rebaudioside A

Cat. No.: GN10011

Chemical Properties

Cas. No. 58543-16-1

Chemical Name Rebiana; Stevioside a3; Sweetener 4G-S

SMILES O[C@@H]1[C@@H](CO)O[C@@]([H])(OC2C[C@]([C@@](CCC[C@@]3(C)C(OC4O[C@H](CO)[C@@H](O)[C@H](O)[C@H]4O)=O)(C)[C@]3([H])CC5)([H])C5(C6)CC2C6=C)[C@H](O[C@@]7([H])[C@H](O)[C@@H](O)[C@H](O)[C@@H](CO)O7)C1O[C@@]8([H])[C@H](O)[C@@H](O)[C@H](O)[C@@H](CO)O8

Formula C₄₄H₇₀O₂₃

M.Wt 967.1

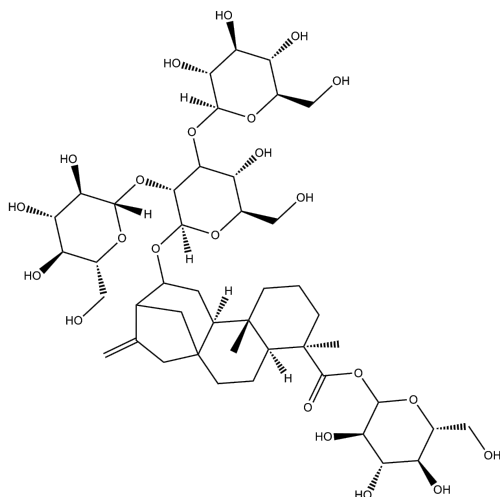
Solubility DMF: 1 mg/ml, DMSO: 1 mg/ml, PBS (pH 7.2): 10 mg/ml

Storage Store at 2-8°C

General tips For obtaining a higher solubility, please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution: ship with blue ice. All other available size: ship with RT, or blue ice upon request.

Structure



Protocol

Caution: Product has not been fully validated for medical applications. For research use only.

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Cell experiment [1]:

Cell lines IPEC-J2 cells

The IPEC-J2 cells were cultured in the modified Eagle's medium/Ham's F-12 medium (DMEM/F-12) supplemented with 100 units/ml penicillin, 100µg/ml streptomycin and 10% heat-inactivated fetal bovine serum (FBS). The cells were cultured at 37°C, 5% CO₂ and 95% relative humidity, and the medium was

changed three times a week. The cells were cultured in 25 or 75cm² simple culture flasks and passaged before confluence (approximately every 3-4 days).

The IPEC-J2 cells were cultured in the transwell chambers and treated with the medium containing Rebaudioside A (0.5, 2.5, 5.0µM). The cells were incubated for 24 hours, washed with PBS, and 800µl of Tri-Reagent was added for extracting RNA. cDNA was synthesized using a cDNA synthesis kit, and real-

Preparation Method time PCR was performed under the following conditions: 50°C for 2 minutes, 95°C for 10 minutes, followed by 40 cycles of 15 seconds at 95°C and 1 minute at 60°C. The relative mRNA expression was standardized based on the mRNA expression of β-actin and reported as the relative mRNA expression compared to the control. Cell viability was determined using the MTT method. The cells were washed with PBS, then 0.5mg/ml MTT was added to the culture medium. After 2.5 hours of incubation, PBS was used to wash the cells, and 300µl of DMSO was added to dissolve the formed methylene blue crystals. After incubation at room temperature for 15 minutes, 100µl was transferred to a transparent 96-well microtiter plate, and the absorbance was measured at 590nm.

Reaction Conditions 0.5, 2.5, 5.0µM; 24h

Applications Rebaudioside A induced a significant increase in intracellular CYP3A29 expression in a dose-dependent manner, without affecting cell viability.

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Animal experiment [2]:

Animal models Wistar rats

Preparation Method Place 100-120g, 1-month-old male Wistar rats in polycarbonate cages under controlled conditions ($21 \pm 1^\circ\text{C}$, 50%-60% relative humidity, and a 12-hour dark/light cycle). Feed them with rat food and provide water freely. Divide the rats into four groups ($n = 8$). Generate liver fibrosis by intraperitoneal injection of thioacetamide (TAA) three times a week (200mg/kg; i.p.) for 8 weeks. During TAA treatment, inject Rebaudioside A twice a day (20mg/kg; i.p.). The first group ($n = 8$) consisted of control animals that only received the carrier (saline, i.p.); the second group ($n = 8$) received TAA; the third group ($n = 8$) received TAA dissolved in saline solution intraperitoneally daily; the fourth group ($n = 8$) only received Rebaudioside A twice a day (20mg/kg; i.p.). Under mild ketamine/salazopyrin anesthesia, bleed the animals through cardiac puncture and quickly obtain the liver and blood samples. Take liver sections from the right lobe of each rat and store them at -70°C for further immunohistochemical assays.

Dosage form 20mg/kg, twice a day for 8 weeks a day; i.p.

Applications Rebaudioside A treatment blocked the oxidation process by upregulating nuclear erythropoietin 2, thereby preventing liver damage in Wistar rats.

References:

[1] Thøgersen R, Petrat-Melin B, Zamaratskaia G, et al. In vitro effects of rebaudioside A, stevioside and steviol on porcine cytochrome p450 expression and activity[J]. Food Chemistry, 2018, 258: 245-253.

[2] Casas?Grajales S, Reyes?Gordillo K, Cerda?García?Rojas C M, et al. Rebaudioside A administration prevents experimental liver fibrosis: An in vivo and in vitro study of the mechanisms of action involved[J]. Journal of Applied Toxicology, 2019, 39(8): 1118-1131.

Background

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Rebaudioside A, from leaves of *Stevia rebaudiana*, inhibits α -glucosidase activity with $IC_{50}=35.01\mu g/ml$ ^[1]. Rebaudioside A has been used in studies related to hypertension treatment, diabetes management, and dental caries prevention^[2].

In vitro, Rebaudioside A pretreatment at 1mM for 2h can significantly stimulate the release of glucagon-like peptide 1 (GLP-1) from STC-1 cells^[3]. Treatment with 5.0 μ M Rebaudioside A for 24 hours significantly increased the expression of CYP3A29 mRNA in IPEC-J2 cells^[4]. Rebaudioside A (10^{-6} mol/L) incubation for 60 minutes significantly increased insulin secretion in isolated mouse pancreatic islets stimulated by glucose at 16.7mM^[5].

In vivo, Rebaudioside A (20mg/kg/day; administered twice daily; i.p.) treatment for 8 weeks can prevent liver damage caused by the administration of thioacetamide (200mg/kg; administered three times weekly, i.p.), and maintain collagen content in Wistar rats^[6]. Oral administration of Rebaudioside A and Honokiol micelles (100mg/kg/day) for 15 consecutive days can inhibit tumor growth in the H22 solid tumor model of mice, without affecting the body weight of the mice^[7].

References:

- [1] Adari B R, Alavala S, George S A, et al. Synthesis of rebaudioside-A by enzymatic transglycosylation of stevioside present in the leaves of *Stevia rebaudiana* Bertoni[J]. Food chemistry, 2016, 200: 154-158.
- [2] Wang Y, Luo X, Chen L, et al. Natural and low-caloric rebaudioside A as a substitute for dietary sugars: A comprehensive review[J]. Comprehensive Reviews in Food Science and Food Safety, 2023, 22(1): 615-642.
- [3] Noya-Leal F, van der Wielen N, Behrens M, et al. Rebaudioside A from *Stevia rebaudiana* stimulates GLP-1 release by enteroendocrine cells via bitter taste signalling pathways[J]. Food & Function, 2023, 14(15): 6914-6928.
- [4] Thøgersen R, Petrat-Melin B, Zamaratskaia G, et al. In vitro effects of rebaudioside A, stevioside and steviol on porcine cytochrome p450 expression and activity[J]. Food Chemistry, 2018, 258: 245-253.
- [5] Abudula R, Jeppesen P B, Rolfsen S E D, et al. Rebaudioside A potently stimulates insulin secretion from isolated mouse islets: studies on the dose-, glucose-, and calcium-dependency[J]. Metabolism, 2004, 53(10): 1378-1381.

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- [6] Casas-Grajales S, Reyes-Gordillo K, Cerda-García-Rojas C M, et al. Rebaudioside A administration prevents experimental liver fibrosis: An in vivo and in vitro study of the mechanisms of action involved[J]. Journal of Applied Toxicology, 2019, 39(8): 1118-1131.
- [7] Wang J, Yang H, Li Q, et al. Novel nanomicelles based on rebaudioside A: a potential nanoplatform for oral delivery of honokiol with enhanced oral bioavailability and antitumor activity[J]. International journal of pharmaceutics, 2020, 590: 119899.

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