

Product Data Sheet

Product Name: Stachyose

Cat. No.: GC18245

Chemical Properties

Cas. No. 470-55-3

Formula $C_{24}H_{42}O_{21}$

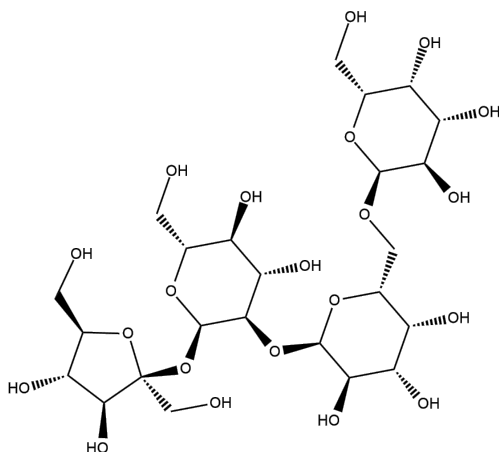
M.Wt 666.58

Solubility H_2O : 125 mg/mL (Need ultrasonic) Storage Store at RT

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

Cell experiment [1]:

Cell lines Caco-2 cells

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

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Preparation Method

Caco-2 cells from passages 30 to 50 were used in this experiment. After reaching subconfluence, Caco-2 cells were recovered from the culture flask through 0.25% trypsin digestion after washing twice with PBS. The medium was changed every 2d. Cell counts based on conductivity measurements and cell viability were assessed using the trypan blue test. To evaluate the cytotoxic effect of Stachyose, cells in the log phase were seeded in 96-well cell culture plates (10^4 cells per well) and pre-incubated for 24h. The cells were then treated with Serum free medium (SFM) mixed with different Stachyose concentrations (0, 0.4, 0.8, 1.6, 3.2mg/mL) for 24h. The MTT assay was used to measure cell viability according to the commercially available protocol. Flow cytometry analysis for cell apoptosis was performed by using an annexin V-fluorescein isothiocyanate (FITC)/propidium iodide (PI) apoptosis detection kit.

Reaction Conditions

0.4-3.2mg/mL; 24h

Applications

Stachyose dose-dependently inhibited Caco-2 colon cancer cells proliferation and induced cells apoptosis.

Animal experiment [2]:

Animal models

Male C57BL/6J mice

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Preparation Method	Male C57BL/6J mice, aged 6 weeks were housed in a controlled environment with regulated humidity and temperature, and were provided free access to standard chow and clean water on a 12-h light-dark cycle. After one week acclimatization, the effects of Stachyose on a mouse model of MIRI were evaluated. Stachyose (1 or 5g/kg/day) was administered via gavage for three consecutive days before sham or MIRI surgery. The MIRI model was established under clean and standardized conditions. Echocardiography was performed using the Vevo 3100LT ultrasound cardiology system. After the echocardiography was completed, the mice were euthanized by cervical dislocation, the chest skin and ribs were incised, and the apex of the heart was rinsed with physiological saline. The hearts were then removed and frozen at -20°C for 20min. Once the hearts were fully frozen, it was dissected using a surgical tool. The hearts were then soaked in 2,3,5-triphenyltetrazolium chloride (TTC dye) at 37°C for 30min. The necrotic area appeared white, while the viable myocardium was red. After being incubated in 4% paraformaldehyde for 24h, the heart was photographed against a white background.
Dosage form	1 or 5g/kg/day; oral gavage for 3 days
Applications	Stachyose reduced myocardial infarction area and improved cardiac function in a mouse model of myocardial ischemia-reperfusion injury.

References:

- [1] Huang G, Mao J, Ji Z, Ailati A. Stachyose-induced apoptosis of Caco-2 cells via the caspase-dependent mitochondrial pathway. *Food Funct.* 2015;6(3):765-771.
- [2] Zhang AY, Su JB, Sun HT, et al. Stachyose ameliorates myocardial ischemia-reperfusion injury by inhibiting cardiomyocyte ferroptosis and macrophage pyroptosis. *Int Immunopharmacol.* 2024;143(Pt 1):113334.

Background

Stachyose is an oligosaccharide and prebiotic^[1]. Stachyose also serves as a specific inhibitor of PRDX5 (peroxiredoxin 5), acts directly on the PRDX5 protein, and inhibits its enzymatic activity^[2].

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Stachyose is commonly used in research on castration-resistant prostate cancer and metabolic diseases such as type 2 diabetes^{[3][4]}.

In vitro, Stachyose (0.4-3.2mg/mL in medium; 24h) dose-dependently inhibited Caco-2 colon cancer cells proliferation, induced cells apoptosis, decreased mitochondrial membrane potential, upregulated Bax, downregulated Bcl-2, promoted cytochrome C release, and activated caspases 3/9^[5].

In vivo, Stachyose (200-600mg/kg/day; oral gavage for 3 weeks) dose-dependently alleviated DSS-induced colitis symptoms, increased tight junction protein expression (Occludin, Claudin-1, ZO-1), decreased pro-inflammatory cytokines (TNF- α , IL-1 β , IL-6), increased anti-inflammatory cytokine IL-10, and restored Treg/Th17 cell balance in a DSS-induced colitis mouse model^[6]. Stachyose (1 or 5g/kg/day; oral gavage for 3 days) reduced myocardial infarction area and improved cardiac function in a mouse model of myocardial ischemia-reperfusion injury^[7].

References:

- [1] Li CN, Wang X, Lei L, et al. Berberine combined with stachyose induces better glycometabolism than berberine alone through modulating gut microbiota and fecal metabolomics in diabetic mice. *Phytother Res*. 2020;34(5):1166-1174.
- [2] Wang R, Pan Y, Zhang L, et al. Prebiotic stachyose inhibits PRDX5 activity and castration-resistant prostate cancer development. *Int J Biol Macromol*. 2024;278(Pt 3):134844.
- [3] Wang R, Mi Y, Ni J, et al. Identification of PRDX5 as A Target for The Treatment of Castration-Resistant Prostate Cancer. *Adv Sci (Weinh)*. 2024;11(9):e2304939.
- [4] Wu Y, Cao Y, Feng L, et al. The natural compound stachyose targets SGLT2-mediated metabolic reprogramming to ameliorate diabetic kidney disease. *Phytomedicine*. 2025;147:157182.
- [5] Huang G, Mao J, Ji Z, Ailati A. Stachyose-induced apoptosis of Caco-2 cells via the caspase-dependent mitochondrial pathway. *Food Funct*. 2015;6(3):765-771.
- [6] He N, Chen K, Yu S, et al. Stachyose Exerts Anticolitis Efficacy by Re-balancing Treg/Th17 and Activating the Butyrate-Derived PPAR γ Signaling Pathway. *J Agric Food Chem*. 2024;72(21):12171-12183.
- [7] Zhang AY, Su JB, Sun HT, et al. Stachyose ameliorates myocardial ischemia-reperfusion injury by inhibiting cardiomyocyte ferroptosis and macrophage pyroptosis. *Int Immunopharmacol*. 2024;143(Pt 1):113334.

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