

Product Data Sheet

Product Name: Beta-Sitosterol

Cat. No.: GC20142

Chemical Properties

Cas. No. 83-46-5

Formula $C_{29}H_{50}O$

M.Wt 414.71

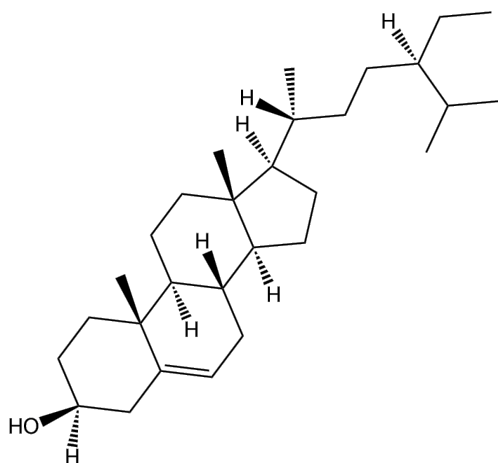
Solubility Ethanol : 5 mg/mL (12.06 mM;
ultrasonic and warming and heat to
60°C)

Storage -20°C, protect from light

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 MH7A cells

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

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The test was divided into the control group (DMSO), positive drug group (methotrexate, 80 μ M), and drug intervention group (Beta-Sitosterol, 10, 20, 40, 80, and 160 μ M, respectively). After cells were treated with different concentrations of Beta-Sitosterol, the MTT method was used to detect the proliferation of cells at 12, 24, and 48h.

Reaction Conditions 10, 20, 40, 80, 160 μ M; 12, 24, 48h

Applications Beta-Sitosterol inhibits the proliferation of MH7A cells in a concentration- and time-dependent manner.

Animal experiment [2]:

Animal models Wistar rats

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Used 30 rats organized in 6 groups with 5 individuals each: a negative control group that was intra-gastrically (IG) administered with mineral oil; three other groups that were IG administered with Beta-Sitosterol (50, 100 and 200mg/kg), previously diluted in mineral oil; and finally, two more groups intraperitoneally (i.p.) administered with known anti-inflammatory drugs, in which one group was injected 200mg/kg of ibuprofen (a non-steroidal anti-inflammatory agent), and the other group was injected with 10mg/kg of prednisone (a steroidal anti-inflammatory agent). All animals were immediately injected with 0.1mL of anti-

Preparation Method ovalbumin antibody (diluted 1:3) in the hindquarter of the plantar area of the right leg, and in the contralateral leg; rats were injected with 0.1mL of 0.9% NaCl. In a subsequent step, all animals were intravenously (i.v.) injected with a suspension of egg albumin (25mg/kg). The volume of the swollen leg was determined with a digital pletysmometer 3h after the ovoalbumin injection. The paw edema value was established by determining the difference between the volume obtained in the treated leg and in the control (left leg). For data calculation, the volume of the swollen leg was considered to represent 100% inflammation.

Dosage form 50, 100, 200mg/kg; i.p.

Applications The three tested doses of Beta-Sitosterol were found to induce a significant, dose dependent inhibition of the edema in comparison with the result found in the control group. The inhibition was 51, 63, and 70% with 50, 100, and 200mg/kg of Beta-Sitosterol, respectively.

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References:

- [1]Wang X, Mao J. Systematic pharmacology-based strategy to investigate the mechanism of beta-sitosterol for the treatment of rheumatoid arthritis[J]. *Frontiers in Genetics*, 2024, 15: 1507606.
- [2]Paniagua-Pérez R, Flores-Mondragón G, Reyes-Legorreta C, et al. Evaluation of the anti-inflammatory capacity of beta-sitosterol in rodent assays[J]. *African Journal of Traditional, Complementary and Alternative Medicines*, 2017, 14(1): 123-130.

Background

Beta-Sitosterol is a plant sterol with multiple biological activities, including anti-inflammatory, anti-tumor, antipyretic and immunomodulatory activities^[1, 2]. Beta-Sitosterol can inhibit the migration of vascular smooth muscle cells through the PPARG/AMPK/mTOR pathway^[3].

In vitro, Beta-Sitosterol (10-160μM) treatment of MH7A cells for 12-48h inhibited cell proliferation in a concentration- and time-dependent manner, significantly reduced the expression of MMP9, HSP90AA1, SRC, EGFR and ALB genes, and significantly increased the expression of CASP3 protein^[4]. Beta-Sitosterol (0.2-1mM) treatment of human liver cancer HepG2 cells for 24h induced cytotoxicity in a dose-dependent manner and induced intracellular ROS accumulation^[5].

In vivo, Beta-Sitosterol (50, 100, 200mg/kg) was intraperitoneally injected into rats with paw edema and inhibited edema in a dose-dependent manner, with the inhibitory effect reaching 50-70%^[6].

References:

- [1] Nandi S, Nag A, Khatua S, et al. Anticancer activity and other biomedical properties of β-sitosterol: Bridging phytochemistry and current pharmacological evidence for future translational approaches[J]. *Phytotherapy Research*, 2024, 38(2): 592-619.
- [2] Fraile L, Crisci E, Córdoba L, et al. Immunomodulatory properties of beta-sitosterol in pig immune responses[J]. *International Immunopharmacology*, 2012, 13(3): 316-321.
- [3] He S, He S, Chen Y, et al. Beta-sitosterol modulates the migration of vascular smooth muscle cells via the PPARG/AMPK/mTOR pathway[J]. *Pharmacology*, 2022, 107(9-10): 495-509.
- [4] Wang X, Mao J. Systematic pharmacology-based strategy to investigate the mechanism of beta-sitosterol for the treatment of rheumatoid arthritis[J]. *Frontiers in Genetics*, 2024, 15: 1507606.
- [5] Ditty M J, Ezhilarasan D. β-sitosterol induces reactive oxygen species-mediated apoptosis in

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human hepatocellular carcinoma cell line[J]. Avicenna Journal of Phytomedicine, 2021, 11(6): 541.
[6] Paniagua-Pérez R, Flores-Mondragón G, Reyes-Legorreta C, et al. Evaluation of the anti-inflammatory capacity of beta-sitosterol in rodent assays[J]. African Journal of Traditional, Complementary and Alternative Medicines, 2017, 14(1): 123-130.

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