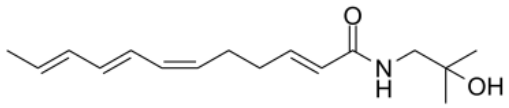
Product Data Sheet

Product Name: Hydroxy-α-sanshool
Cat. No.: GC36277

Chemical Properties

Cas. No.	83883-10-7		
SMILES	C/C=C/C=C/C=C\CC/C=C/C(NCC(C)(O)C)=O		
Formula	$C_{16}H_{25}NO_2$	M.Wt	263.38
Solubility	DMSO : 100 mg/mL (379.68 mM; Need ultrasonic)	Storage	Store at -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 PC12 cells

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Preparation Method	PC12 cells were pretreated with different concentrations of Hydroxy-α-sanshool (15, 30, and 60μM) for 2 hours and then incubated with 90μM H_2O_2 for another 4 hours. The control group was administered with the same amount of 1640 medium and then stimulated with H_2O_2. Hydroxy-α-sanshool was solubilized with DMSO and subsequently diluted in culture medium with the final concentration of DMSO less than 0.1% (v/v).
Reaction Conditions	15, 30, 60μM; 2h
Applications	Hydroxy-α-sanshool showed a significant protective effect on H_2O_2-stimulated PC12 cells without significant cytotoxicity against normal PC12 cells. Hydroxy-α-sanshool also reduced H_2O_2-induced apoptosis of PC12 cells by decreasing intracellular ROS and increasing mitochondrial membrane potential (MMP).

Animal experiment [2]:

Animal models	Type 2 diabetic mouse model (T2DM)
Preparation Method	Male C57BL/6J mice were prepared as a model of T2DM. The mice were randomly divided into five groups, including HFD/STZ (HFD feeding plus STZ treatment), HFD/STZ+Metformin (Met 150mg/kg), HFD/STZ+Hydroxy-α-sanshool -L (HAS 1.25mg/kg), HFD/STZ+HAS-M (Hydroxy-α-sanshool 2.5mg/kg), and HFD/STZ+Hydroxy-α-sanshool-H (Hydroxy-α-sanshool 5mg/kg). Subsequently, Hydroxy-α-sanshool was dissolved in 0.5% CMC-Na, and mice in the NC+Hydroxy-α-sanshool (5mg/kg) and HFD/STZ+Hydroxy-α-sanshool (1.25, 2.5, 5mg/kg) groups were administered Hydroxy-α-sanshool orally at doses of 5mg/kg, 1.25mg/kg, 2.5mg/kg, or 5mg/kg for 4 weeks, respectively. The positive control treatment used in this study was Met, which was administered daily by gavage at 150mg/kg. The mice in the NC and HFD/STZ groups received vehicle solvent. During the experiment, changes in blood glucose, body weight, feed intake, and water intake were recorded.

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Dosage form	0.5, 1.25, 2.5, 5mg/kg; po; 4 weeks
Applications	Hydroxy-α-sanshool reduces blood glucose in the T2DM mouse model by regulating glycogen metabolism through a mechanism involving the regulation of the PI3K/Akt/GSK3β/GS signaling pathway.

References:
[1]. Li R L, Zhang Q, Liu J, et al. Hydroxy-α-sanshool Possesses Protective Potentials on H2O2-Stimulated PC12 Cells by Suppression of Oxidative Stress-Induced Apoptosis through Regulation of PI3K/Akt Signal Pathway[J]. Oxidative Medicine and Cellular Longevity, 2020, 2020(1): 3481758.
[2].Zhang Q, Li R L, Wang L Y, et al. Hydroxy-α-sanshool isolated from Zanthoxylum bungeanum Maxim. has antidiabetic effects on high-fat-fed and streptozotocin-treated mice via increasing glycogen synthesis by regulation of PI3K/Akt/GSK-3β/GS signaling[J]. Frontiers in Pharmacology, 2022, 13: 1089558.

Background

Hydroxy-α-sanshool is a transient receptor potential base 1 (TRPA1) and TRP vanilloid 1 (TRPV1) agonist with EC_{50} values of 69 and 1.1μM, respectively, commonly used in hyperlipidemia studies [1].

In HaCaT cells, Hydroxy-α-sanshool (10-40μM; 24h) effectively inhibited intracellular ROS production induced by C. acnes.10μM of Hydroxy-α-sanshool significantly reduced ROS levels in THP-1 cells[2]. Hydroxy-α-sanshool showed a significant protective effect on H_2O_2-stimulated PC12 cells without significant cytotoxicity against normal PC12 cells. Hydroxy-α-sanshool also reduced H_2O_2-induced apoptosis of PC12 cells by decreasing intracellular ROS and increasing mitochondrial membrane potential (MMP)[3].

Hydroxy-α-sanshool (0.5, 1.25, 2.5, 5mg/kg; po) reduces blood glucose in the T2DM mouse model by regulating glycogen metabolism through a mechanism involving the regulation of the PI3K/Akt/GSK3β/GS signaling pathway[4]. In the insulin resistance model, the Hydroxy-α-sanshool (8mg/kg) intervention lowered serum total cholesterol and LDL cholesterol and significantly reduced triacylglycerol[5].

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References:

[1]. Riera C E, Menozzi-Smarrito C, Affolter M, et al. Compounds from Sichuan and Melegueta peppers activate, covalently and non-covalently, TRPA1 and TRPV1 channels[J]. British journal of pharmacology, 2009, 157(8): 1398-1409.
[2]. Zhou X, Su Y, Wang H, et al. Hydroxy-α-sanshool has anti-inflammatory and antioxidant effects and affects the NF-κB/STAT3 pathway via TRPV1 in acne[J]. Journal of Functional Foods, 2023, 110: 105823.
[3]. Li R L, Zhang Q, Liu J, et al. Hydroxy-α-sanshool Possesses Protective Potentials on H2O2-Stimulated PC12 Cells by Suppression of Oxidative Stress-Induced Apoptosis through Regulation of PI3K/Akt Signal Pathway[J]. Oxidative Medicine and Cellular Longevity, 2020, 2020(1): 3481758.
[4]. Zhang Q, Li R L, Wang L Y, et al. Hydroxy-α-sanshool isolated from Zanthoxylum bungeanum Maxim. has antidiabetic effects on high-fat-fed and streptozotocin-treated mice via increasing glycogen synthesis by regulation of PI3K/Akt/GSK-3β/GS signaling[J]. Frontiers in Pharmacology, 2022, 13: 1089558.
[5]. Xu F, Zhu Y, Lu M, et al. Effects of hydroxy-alpha-sanshool on intestinal metabolism in insulin-resistant mice[J]. Foods, 2022, 11(14): 2040.

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