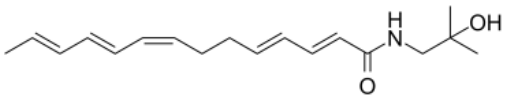
Product Data Sheet

Product Name: Hydroxy-γ-sanshool
Cat. No.: GC36281

Chemical Properties

Cas. No.	78886-66-5		
SMILES	C/C=C/C=C/C=C\CC/C=C/C=C/C(NCC(C)(C)O)=O		
Formula	$C_{18}H_{27}NO_2$	M.Wt	289.41
Solubility	Soluble in DMSO	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 HCT-116 cells

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Preparation Method	Cells were exposed to various concentrations (0, 50, 90, or 130μM) of Hydroxy-γ-sanshool (HRS) for 24 or 48h, with assessment of apoptosis and cell cycle arrest as well as regulatory gene and protein expression associated with apoptosis and the cell cycle.
Reaction Conditions	0, 50, 90, 130μM; 24, 48h
Applications	Hydroxy-γ-sanshool inhibited cell growth, induced morphological distortion, and arrested the cell cycle at G1 phase, and also caused programmed cell death in a dose-dependent manner. Hydroxy-γ-sanshool significantly inhibited mRNA and protein levels of Cyclin D1, CDK4, PCNA, and increased mRNA and protein levels of P21, P53, Fas, and Caspase 8.

Animal experiment [2]:

Animal models	C57BL/6 mice
Preparation Method	Mice were randomly divided into the following six groups: the normal control group, Dextran sulfate sodium (DSS)-model group, DSS+Hydroxy-α-sanshool (HAS) group, DSS+Hydroxy-γ-sanshool (HBS) group, DSS+Hydroxy-γ-sanshool (HRS) group, DSS+γ-sanshool (RS) group. The intragastric dose of sanshool was 2.5mg/kg. After mice were termination, the liver and colon were collected at –80°C.
Dosage form	2.5mg/kg; p.o.

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Applications	After intragastric administration of sanshool, HRS increased the the level of hepatic T-AOC and colon GSH-Px and SOD. Hydroxy-γ-sanshool exhibited efficacy in mitigating DSS-induced oxidative stress in the colon of mice.

References:
[1]Zhaojun C, Lulin T, Xin F, et al. Hydroxy-γ-sanshool from Zanthoxylum bungeanum (prickly ash) induces apoptosis of human colorectal cancer cell by activating P53 and Caspase 8[J]. Frontiers in Nutrition, 2022, 9: 914638.
[2]Chen Z, Tan L, Li L, et al. Sanshools from Zanthoxylum genus and their antioxidant properties in vitro and in vivo[J]. Frontiers in Sustainable Food Systems, 2024, 8: 1256568.

Background

Hydroxy-γ-sanshool is a natural alkaloid extracted from Zanthoxylum plants and belongs to the class of unsaturated fatty acid amide compounds[1]. Hydroxy-γ-sanshool has multiple physiological activities such as neuroactivation, analgesia, anti-inflammatory, and antioxidant[2, 3]. Hydroxy-γ-sanshool can activate TRPV1 channels in human sensory neurons and trigger calcium ion influx[4].

In vitro, treatment of human colon adenocarcinoma HCT-116 cells with Hydroxy-γ-sanshool (0-130μM) for 24-48h inhibited cell growth, induced cell morphological distortion, induced cell cycle arrest in the G1 phase, caused programmed cell death, reduced the mRNA and protein levels of Cyclin D1, CDK4, and PCNA, and increased the mRNA and protein levels of P21, P53, Fas, and Caspase 8[5].

In vivo, oral administration of Hydroxy-γ-sanshool (2.5mg/kg) to mice induced by dextran sulfate sodium (DSS)-induced oxidative stress increased the hepatic antioxidant capacity (T-AOC) and the levels of colonic GSH-Px and SOD[6].

References:
[1] Lu I C, Hu P Y, Lin C H, et al. Alkamides in Zanthoxylum Species: Phytochemical Profiles and Local Anesthetic Activities[J]. International Journal of Molecular Sciences, 2024, 25(22): 12228.
[2] Yan H, Zhou F, Liu Y, et al. Zanthoxylum bungeanum Maxim: A Review of Its Phytochemistry,

Pharmacology, and Pharmacokinetics[J]. Natural Product Communications, 2023, 18(10): 1934578X231209153.
[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] Luo J, Ke J, Hou X, et al. Composition, structure and flavor mechanism of numbing substances in Chinese prickly ash in the genus Zanthoxylum: A review[J]. Food Chemistry, 2022, 373: 131454.
[5] Zhaojun C, Lulin T, Xin F, et al. Hydroxy-γ-sanshool from Zanthoxylum bungeanum (prickly ash) induces apoptosis of human colorectal cancer cell by activating P53 and Caspase 8[J]. Frontiers in Nutrition, 2022, 9: 914638.
[6] Chen Z, Tan L, Li L, et al. Sanshools from Zanthoxylum genus and their antioxidant properties in vitro and in vivo[J]. Frontiers in Sustainable Food Systems, 2024, 8: 1256568.

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