(-)-Limonene

Cat. No.: HY-Z0478

CAS No.: 5989-54-8

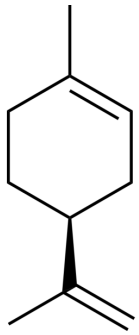
Molecular Formula: $C_{10}H_{16}$

Molecular Weight: 136.23

Target: Bacterial; Antibiotic; CaMK

Pathway: Anti-infection; Neuronal Signaling

Storage: 4°C, protect from light
* In solvent : -80°C, 6 months; -20°C, 1 month (protect from light)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 100 mg/mL (734.05 mM; Need ultrasonic)
H_2O : 50 mg/mL (367.03 mM; Need ultrasonic)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	7.3405 mL	36.7026 mL	73.4053 mL
5 mM	1.4681 mL	7.3405 mL	14.6811 mL
10 mM	0.7341 mL	3.6703 mL	7.3405 mL

Please refer to the solubility information to select the appropriate solvent.

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 50 mg/mL (367.03 mM); Clear solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (18.35 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: 2.5 mg/mL (18.35 mM); Suspended solution; Need ultrasonic
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (18.35 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

(-)-Limonene ((S)-(-)-Limonene) is orally active and can cause mild bronchoconstriction. (-)-Limonene alleviates cytosolic and mitochondrial oxidative stress by inhibiting the increase of calcium ions (Ca^{2+}) and Ca^{2+}/calmodulin-dependent protein kinase II (CaMKII). It also exerts anti-stress effects by inhibiting the activity of the hypothalamic-pituitary-adrenal (HPA) axis. Additionally, (-)-Limonene can be used as an antibacterial agent in aquaculture[1][2][3][4].

IC_{50} & Target	Human Endogenous	CaMK II

	Metabolite	
In Vitro	(-)-Limonene (3.125-6400 μg/mL, 24 h) strongly inhibits Aeromonas hydrophila biofilm formation[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	
In Vivo	(-)-Limonene (5-50 mg/kg, p.o., once daily for 1 week) can inhibit hypothalamic-pituitary-adrenal (HPA) axis activity in male Wistar rats[3]. (-)-Limonene (1 mg/kg, i.p., single dose) alleviates isoproterenol (HY-B1670A)-induced myocardial infarction in a Wistar rat model of heart attack[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	
	Animal Model:	Isoproterenol (HY-B1670A)-induced myocardial infarction Wistar rats model (200 to 250g) [4]
	Dosage:	1 mg/kg
	Administration:	Intraperitoneal injection (i.p.), single dose
	Result:	Restored endogenous antioxidant enzyme activities, restored the oxidative status of the infarcted heart and attenuated most of the cardiac remodeling observed in anIsoproterenol (HY-B1670A) myocardial infarction.
	Animal Model:	Wistar male rats[3]
	Dosage:	5, 25, 50 mg/kg
	Administration:	Oral gavage (p.o.),once daily for 1 week
	Result:	Significantly decreased the concentration of glutamate (Glu) (25-50 mg/kg) and dose-dependently increased the concentration of GABA ((γ-Aminobutyric Acid)) in the whole brain. Significantly increased the 5-HIAA (5-Hydroxyindoleacetic Acid)/5-HT (5-Hydroxytryptamine) ratio and decreased the concentration of 5-HT.

REFERENCES

[1]. da Silva E G, et al. In vitro antimicrobial and antibiofilm activity of S-(-)-limonene and R-(+)-limonene against fish bacteria[J]. Fishes, 2021, 6(3): 32.

[2]. Zhou W, et al. Sub-chronic effects of s-limonene on brain neurotransmitter levels and behavior of rats. J Nutr Sci Vitaminol (Tokyo). 2009 Aug;55(4):367-73.

[3]. Rhana P, et al. S-limonene protects the heart in an experimental model of myocardial infarction induced by isoproterenol: Possible involvement of mitochondrial reactive oxygen species. Eur J Pharmacol. 2022 Sep 5;930:175134.

[4]. Larsen ST, et al. Effects of R-(+)- and S-(-)-limonene on the respiratory tract in mice. Hum Exp Toxicol. 2000 Aug;19(8):457-66.

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