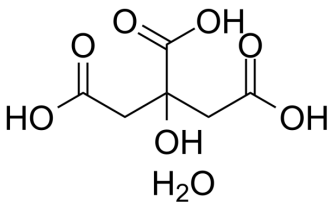
Citric acid monohydrate

Cat. No.:	HY-N1428A
CAS No.:	5949-29-1
Molecular Formula:	$C_6H_{10}O_8$
Molecular Weight:	210.14
Target:	Endogenous Metabolite; Apoptosis; Antibiotic
Pathway:	Metabolic Enzyme/Protease; Apoptosis; Anti-infection
Storage:	4°C, sealed storage, away from moisture * In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 100 mg/mL (475.87 mM; Need ultrasonic)

Preparing Stock Solutions	Mass / Solvent / Concentration	1 mg	5 mg	10 mg
	1 mM	4.7587 mL	23.7937 mL	47.5873 mL
	5 mM	0.9517 mL	4.7587 mL	9.5175 mL
	10 mM	0.4759 mL	2.3794 mL	4.7587 mL

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

BIOLOGICAL ACTIVITY

Description

Citric acid monohydrate is a natural preservative and food tartness enhancer. Citric acid monohydrate induces apoptosis and cell cycle arrest at G2/M phase and S phase. Citric acid monohydrate cause oxidative damage of the liver by means of the decrease of antioxidative enzyme activities. Citric acid monohydrate causes renal toxicity in mice[1][2][3].

IC_{50} & Target

Human Endogenous Metabolite

In Vitro

Citric acid monohydrate (0-12.5 mM; 24 h) shows antiproliferative activity in a dose dependent manner[3].
Citric acid monohydrate (12.5 mM; 72 h) induces apoptosis and cell cycle arrest at G2/M phase and S phase in a dosedependent manner[3].
Citric acid monohydrate (12.5 mM; 48 h) increases the expression of FAS, BAX, BID, AIF, EndoG, cytochrome c, PARP, GADD153, GRP78 and caspase-3, -8, -9, and decreases of BCL-2 and BCL-Xl[3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[3]

Cell Line:	HaCaT cells

Concentration:	0, 2.5, 5, 7.5, 10, 12.5 mM
Incubation Time:	24 h
Result:	Inhibited the cell viability in a dose dependent manner.

Cell Cycle Analysis[3]

Cell Line:	HaCaT cells
Concentration:	12.5 mM
Incubation Time:	0, 12, 24, 48, 72 h
Result:	Induced apoptosis and cell cycle arrest at G2/M phase and S phase in a dosedependent manner.

Western Blot Analysis[3]

Cell Line:	HaCaT cells
Concentration:	12.5 mM
Incubation Time:	12, 24, 48 h
Result:	Increased the expression of FAS, BAX, BID, AIF, EndoG, cytochrome c, PARP, GADD153, GRP78 and caspase-3, -8, -9, and decreased of BCL-2 and BCL-Xl.

In Vivo

Citric acid monohydrate (120, 240, and 480 mg/kg; i.p.) significantly decreases GSH-Px activity and induces an increase in the MDA (malonyldialdehyde) levels in mouse liver[1].
Citric acid monohydrate (120, 240, and 480 mg/kg; i.p.) induces apoptosis by increases caspase-3 activity in a dose-dependent manner in mouse hepatocytes[1].
Citric acid monohydrate (120, 240, and 480 mg/kg; i.p.; weekly for 3 weeks) causes renal toxicity in mice[2].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	20 g male Kunming mice[2]
Dosage:	120, 240, 480 mg/kg
Administration:	I.p.; weekly for 3 weeks
Result:	T-SOD and GSH-Px activities in the treated groups decreased with increasing doses of citric acid, NOS activity tended to increase, and H2O2 and MDA contents gradually decreased.

CUSTOMER VALIDATION

- Food Chem. 2022: 134807.
- New J Chem. 03 Aug 2022.

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REFERENCES

[1]. Chen X, et al. Study on injury effect of food additive citric acid on liver tissue in mice. Cytotechnology. 2014 Mar;66(2):275-82.

[2]. Chen X, Lv Q, Liu Y, Deng W. Effects of the food additive, citric acid, on kidney cells of mice. Biotech Histochem. 2015 Jan;90(1):38-44.

[3]. Ying TH, et al. Citric acid induces cell-cycle arrest and apoptosis of human immortalized keratinocyte cell line (HaCaT) via caspase- and mitochondrial-dependent signaling pathways. Anticancer Res. 2013 Oct;33(10):4411-20.

Tel: 609-228-6898 Fax: 609-228-5909 E-mail: tech@MedChemExpress.com

Address: 1 Deer Park Dr, Suite Q, Monmouth Junction, NJ 08852, USA