Citric acid trisodium

Cat. No.: HY-B2201

CAS No.: 68-04-2

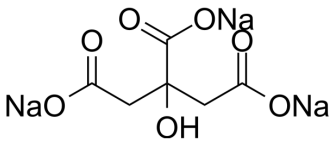
Molecular Formula: $C_6H_5Na_3O_7$

Molecular Weight: 258.07

Target: Apoptosis; Endogenous Metabolite

Pathway: Apoptosis; Metabolic Enzyme/Protease

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

H_2O : 50 mg/mL (193.75 mM; Need ultrasonic)

Preparing Stock Solutions	Mass / Solvent / Concentration	1 mg	5 mg	10 mg
	1 mM	3.8749 mL	19.3746 mL	38.7492 mL
	5 mM	0.7750 mL	3.8749 mL	7.7498 mL
	10 mM	0.3875 mL	1.9375 mL	3.8749 mL

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

BIOLOGICAL ACTIVITY

Description

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

IC_{50} & Target

Human Endogenous Metabolite

In Vitro

Citric acid trisodium (0-12.5 mM; 24 h) shows antiproliferative activity in a dose dependent manner[3].
Citric acid trisodium (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 trisodium (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 trisodium (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 trisodium (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 trisodium (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.
- Insect Biochem Mol Biol. 2023 May 12;103958.
- 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.

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