Gallic acid

Cat. No.: HY-N0523

CAS No.: 149-91-7

Molecular Formula: $C_7H_6O_5$

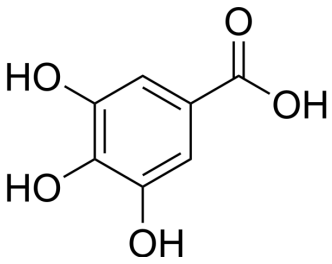
Molecular Weight: 170.12

Target: COX; Reactive Oxygen Species; Apoptosis; Ferroptosis; Endogenous Metabolite

Pathway: Immunology/Inflammation; Metabolic Enzyme/Protease; NF-κB; Apoptosis

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	6 months
	-20°C	1 month



SOLVENT & SOLUBILITY

In Vitro

DMSO : ≥ 100 mg/mL (587.82 mM)

H_2O : 8.33 mg/mL (48.97 mM; ultrasonic and warming and heat to 60°C)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	5.8782 mL	29.3910 mL	58.7820 mL
5 mM	1.1756 mL	5.8782 mL	11.7564 mL
10 mM	0.5878 mL	2.9391 mL	5.8782 mL

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

In Vivo

1. Add each solvent one by one: corn oil
   Solubility: 20 mg/mL (117.56 mM); Suspended solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (14.70 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (14.70 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Gallic acid (3,4,5-Trihydroxybenzoic acid) is a natural polyhydroxyphenolic compound and an free radical scavenger to inhibit cyclooxygenase-2 (COX-2)[1]. Gallic acid has various activities, such as antimicrobial, antioxidant, antimicrobial, anti-inflammatory, and anticance activities[2].

IC_{50} & Target			
	COX-2	Microbial Metabolite	Human Endogenous Metabolite

In Vitro	Gallic acid is an antioxidant which can inhibit both COX-2[1]. After 18 h treatment with Gallic acid, the number of viable neutrophils is dramatically decreased from 40.3% to 27.7%, highly comparable with 26.4% for untreated neutrophils. Gallic acid fails to attenuate isoproterenol-induced myocytolysis[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	The food intake (2.6±0.08 g/day, p=0.69) and the body weight (2.5±0.69 g, p=0.76) of the Gallic acid group do not differ significantly from those of the control group (food intake; 2.41±0.14 g/day and the body weight; 2.83±0.84 g/day). The blood glucose tolerance in the Gallic acid group is significantly improved after 2 weeks of treatment. The blood glucose tolerance of the Gallic acid group after a treatment period of 2 weeks is also significantly better than that of the control group at 90 and 120 min ($p<0.05$). The serum triglyceride concentration in the Gallic acid group (0.67±0.03 mM, $p<0.05$) is significantly reduced relative to that of the control group (1.08±0.20 mM). The total cholesterol concentration is similar in the control (3.19±0.27 mM) and Gallic acid (3.01±0.18 mM) groups[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Cell Assay [3]	Neutrophils are treated with 8?μg/mL Gallic acid in RPMI1640/10% FBS for 3, 6, 9, and 18?h. At the end of Gallic acid treatment, the cells are stained with Annexin V-FITC and PI according to manufacturer's instructions. Briefly, the cells are washed twice with ice-cold PBS and resuspended in 1× Binding Buffer at a concentration of 1×10^6 cells/mL. Cell suspensions (1×10^5 cells in 100?μL) are incubated with 5?μL of Annexin V-FITC and 10?μL PI in a 5?mL culture tube at room temperature for 20?min. The stained cells are immediately analyzed on flow cytometry system[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [2]	Five-week-old male C57BL/6 mice are used in this study. The animals are maintained in a temperature-controlled room at 22° C on a 12 h light-dark photocycle. The mice are divided into the control vehicle group and the Gallic acid group. For 2 weeks, the mice are administered intraperitoneal treatment on a daily basis with vehicle (10% alcohol, 10% tween 80, and 80% saline) alone or with 10 mg/kg Gallic acid. After this treatment, GTTs are again conducted, and the blood samples are taken for subsequent biochemical analysis. Over the experimental period, food intake and body weight are measured on a daily basis[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Biomaterials. 2021, 120952.
- Food Chem. 2022: 134807.
- Eur J Pharmacol. 2022 May 18;926:175041.
- Plants. 2021, 10(11), 2525.
- J Immunol Res. 2022 May 23;2022:7909971.

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REFERENCES

[1]. Amaravani M, et al. COX-2 structural analysis and docking studies with gallic acid structural analogues. Springerplus. 2012 Dec;1(1):58.

[2]. Bak EJ, et al. Gallic acid improves glucose tolerance and triglyceride concentration in diet-induced obesity mice. Scand J Clin Lab Invest. 2013 Dec;73(8):607-14.

[3]. Cheng Y, et al. Plant Natural Products Calycosin and Gallic Acid Synergistically Attenuate Neutrophil Infiltration and Subsequent Injury in Isoproterenol-Induced Myocardial Infarction: A Possible Role for Leukotriene B4 12-Hydroxydehydrogenase? Oxid Med Cell Longev. 2015;2015:434052.

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