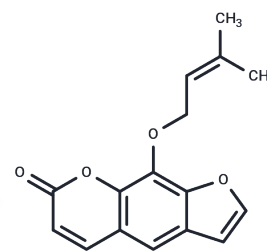


## Imperatorin

## Chemical Properties

CAS No. :	482-44-0
Formula:	C <sub>16</sub> H <sub>14</sub> O <sub>4</sub>
Molecular Weight:	270.28
Appearance:	no data available
Storage:	Powder: -20°C for 3 years   In solvent: -80°C for 1 year



## Biological Description

Description	Imperatorin (8-Isopentenylloxypsoralene) is a modulator of p38, ERK pathway. Imperatorin increases BMP-2 expression (mRNA) and increases bone density/volume and mineralization in vivo.
Targets(IC50)	AChR,NOD,Cholinesterase (ChE),TRP/TRPV Channel
In vitro	Imperatorin, a furanocoumarin plant secondary metabolite, enhances GABA-induced chloride ion current (IGABA) via $\alpha 1\beta 2\gamma 2S$ receptors, potentiating IGABA at 100 $\mu\text{mol}$ by $50.5\pm 16.3\%$ and at 300 $\mu\text{mol}$ by $109.8\pm 37.7\%$ . Found in <i>A. dahurica</i> roots alongside Phellopterin, Imperatorin inhibits [3H]diazepam binding to the rat brain GABAA receptor benzodiazepine site in vitro, with IC50 values of 12.3 $\mu\text{mol}$ and 400 nmol, respectively. At concentrations of 3.5 to 14 mmol, Imperatorin significantly and irreversibly inhibits GABA-T in a time- and concentration-dependent manner. It also acts as a dose-dependent, reversible acetylcholinesterase (AChE) inhibitor and shows low AChE inhibition (13.75-46.11%) but significant butyrylcholinesterase (BChE) inhibition (37.46-83.98%) with an IC50 of 31.4 $\mu\text{mol}$ . Imperatorin, along with (+)-Byakangelicol, is a potent BACE-1 inhibitor with IC50 values of 91.8 $\mu\text{mol}$ and 104.9 $\mu\text{mol}$ , respectively, and acts as an inhibitor of NO synthesis (IC50=9.2 $\mu\text{mol}$ ). Additionally, Imperatorin is a weak agonist of TRPV1, exhibiting an EC50 of $12.6\pm 3.2 \mu\text{M}$ .
In vivo	Administered at doses of 10 and 20 mg/kg and observed 30 minutes post-injection, Imperatorin demonstrates anxiolytic properties alongside enhancements in memory and learning stages, both acquisition and consolidation. Furthermore, at these dosages, Imperatorin acutely mitigates the anxiety-inducing effects of nicotine (0.1 mg/kg, subcutaneous, s.c.). At increased doses of 30 and 40 mg/kg, intraperitoneally, Imperatorin notably augments the anticonvulsant efficacy of carbamazepine against maximal electroshock-induced seizures, evidenced by a substantial reduction in the effective dose 50 (ED50) of carbamazepine from 10.8 to 6.8 mg/kg (by 34%) and to 6 mg/kg (by 42%), respectively. Additionally, a combination of Imperatorin at 30 mg/kg and carbamazepine at 6.8 mg/kg elevates the total brain concentration of carbamazepine from 1.260 to 2.328 $\mu\text{g/mL}$ (by 85%), potentially through alterations in blood-brain barrier permeability or as an inhibitor of multi-drug resistance proteins. As a naturally occurring furanocoumarin, Imperatorin deactivates gamma-aminobutyric acid transaminase and hinders acetylcholinesterase activity. When administered acutely in doses of 5 and 10 mg/kg prior to scopolamine (1 mg/kg), it counters the memory acquisition and consolidation impairments induced by scopolamine. Repeated administration (7 days, twice daily) of Imperatorin at the highest studied dose (10

mg/kg) significantly diminishes scopolamine's adverse effects on memory acquisition, with doses of 5 and 10 mg/kg proving effective in memory consolidation.

### Solubility Information

Solubility	DMSO: 55 mg/mL (203.49 mM), Sonication is recommended. (< 1 mg/ml refers to the product slightly soluble or insoluble)
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### Preparing Stock Solutions

	1mg	5mg	10mg
1 mM	3.6999 mL	18.4993 mL	36.9987 mL
5 mM	0.740 mL	3.6999 mL	7.3997 mL
10 mM	0.370 mL	1.8499 mL	3.6999 mL
50 mM	0.074 mL	0.370 mL	0.740 mL

Please select the appropriate solvent to prepare the stock solution, according to the solubility of the product in different solvents. Please use it as soon as possible.

### Reference

- Kozioł, E., & Skalicka-Woźniak, K. (2016). Imperatorin—pharmacological meaning and analytical clues: profound investigation. *Phytochemistry Reviews*, 15(4), 627-649. doi: 10.1007/s11101-016-9456-2
- Chen X, et al. Furanocoumarins are a novel class of modulators for the transient receptor potential vanilloid type 1 (TRPV1) channel. *J Biol Chem*. 2014 Apr 4;289(14):9600-10.
- Budzynska B, et al. Effects of imperatorin on scopolamine-induced cognitive impairment and oxidative stress in mice. *Psychopharmacology (Berl)*. 2015 Mar;232(5):931-42.

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