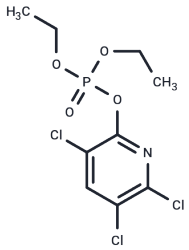
Data Sheet (Cat.No.T40642)

TargetMol

Chlorpyrifos-oxon

Chemical Properties



CAS No. : 5598-15-2

Formula: C9H11Cl3NO4P

Molecular Weight: 334.52

Storage: Powder: -20°C for 3 years | In solvent: -80°C for 1 year
Actual storage temperature shall be subject to the COA.

Biological Description

Description	Chlorpyrifos-oxon, an active metabolite of Chlorpyrifos, is a potent phosphorylating agent that significantly inhibits AChE activity and induces cross-linking between tubulin subunits, thereby disrupting microtubule function [4].
Targets(IC50)	Others,Cholinesterase (ChE)
In vitro	Treatment with 1.5 mM Chlorpyrifos-oxon (CPO) induces aggregation in tubulin proteins. Remarkably, at a concentration as low as 1.5 μM, Chlorpyrifos-oxon still facilitates the formation of cross-linked trimers. This compound enhances the cross-linking of tubulin monomers through isopeptide bonds, resulting in the formation of multimers[2]. In the context of cultured PC12 cells, exposure to Chlorpyrifos at a concentration 10 times lower than that required to inhibit acetylcholinesterase (AChE) activity (3.0 μM) adversely affects neurite outgrowth. Conversely, Chlorpyrifos-oxon exhibits its inhibitory effect on neurite extension at an even lower concentration of 1.0 nM[3].
In vivo	Chlorpyrifos-oxon (CPO) undergoes rapid detoxification in human liver microsomes through CYP-dependent deethylation and dearylation, as well as glutathione-S-transferase activity. Additionally, it is efficiently degraded or scavenged by liver enzymes, including A-esterases like paraoxonase 1 (PON 1) and B-esterases such as carboxylesterase and butyrylcholinesterase (BChE). Moreover, when wild-type mice are treated with Chlorpyrifos-oxon (3 mg/kg, ip; once), it significantly affects microtubule integrity, reducing their size to approximately 60% compared to those in control mice, indicating altered amino acid covalency and compromised microtubule structure, which suggests a disruption of their function[1][4].

Preparing Stock Solutions

	1mg	5mg	10mg
1 mM	2.9894 mL	14.9468 mL	29.8936 mL
5 mM	0.5979 mL	2.9894 mL	5.9787 mL
10 mM	0.2989 mL	1.4947 mL	2.9894 mL
50 mM	0.0598 mL	0.2989 mL	0.5979 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.

Note: The dilution table applies only to solid products. For liquid products, please calculate the stock solution based on the stated concentration and/or density.

Reference

Florian Eyer, et al. Extreme variability in the formation of chlorpyrifos oxon (CPO) in patients poisoned by chlorpyrifos (CPF). Biochem Pharmacol. 2009 Sep 1;78(5):531-7.
Lawrence M Schopfer, et al. Chlorpyrifos oxon promotes tubulin aggregation via isopeptide cross-linking between diethoxyphospho-Lys and Glu or Asp: Implications for neurotoxicity. J Biol Chem. 2018 Aug 31;293(35):13566-13577.
Jie Gao, et al. Chlorpyrifos and chlorpyrifos oxon impair the transport of membrane bound organelles in rat cortical axons. Neurotoxicology. 2017 Sep;62:111-123.
Wei Jiang, et al. Mice treated with chlorpyrifos or chlorpyrifos oxon have organophosphorylated tubulin in the brain and disrupted microtubule structures, suggesting a role for tubulin in neurotoxicity associated with exposure to organophosphorus agents. Toxicol Sci. 2010 May;115(1):183-93.