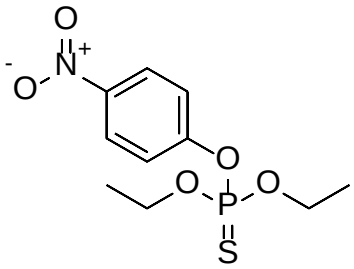
Product data sheet

MedKoo Cat#: 571292 Name: Parathion CAS: 56-38-2 Chemical Formula: $C_{10}H_{14}NO_5PS$ Exact Mass: 291.033 Molecular Weight: 291.2578	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
Parathion is a highly toxic cholinesterase inhibitor that is used as an acaricide and as an insecticide.

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
TBD	TBD	TBD

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	3.43 mL	17.17 mL	34.33 mL
5 mM	0.69 mL	3.43 mL	6.87 mL
10 mM	0.34 mL	1.72 mL	3.43 mL
50 mM	0.07 mL	0.34 mL	0.69 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study
In vitro study

1. Argentin G, Divizia M, Cicchetti R. Oxidative Stress, Cytotoxicity, and Genotoxicity Induced by Methyl Parathion in Human Gingival Fibroblasts: Protective Role of Epigallocatechin-3-Gallate. J Toxicol Environ Health A. 2015;78(19):1227-40. doi: 10.1080/15287394.2015.1079582. Epub 2015 Oct 19. PMID: 26479333.

2. Edwards FL, Yedjou CG, Tchounwou PB. Involvement of oxidative stress in methyl parathion and parathion-induced toxicity and genotoxicity to human liver carcinoma (HepG$_2$) cells. Environ Toxicol. 2013 Jun;28(6):342-8. doi: 10.1002/tox.20725. Epub 2011 May 4. PMID: 21544925; PMCID: PMC3768275.

In vivo study

1. Chen T, Chen H, Wang A, Yao W, Xu Z, Wang B, Wang J, Wu Y. Methyl Parathion Exposure Induces Development Toxicity and Cardiotoxicity in Zebrafish Embryos. Toxics. 2023 Jan 15;11(1):84. doi: 10.3390/toxics11010084. PMID: 36668810; PMCID: PMC9866970.

2. Urióstegui-Acosta M, Tello-Mora P, Solís-Heredia MJ, Ortega-Olvera JM, Piña-Guzmán B, Martín-Tapia D, González-Mariscal L, Quintanilla-Vega B. Methyl parathion causes genetic damage in sperm and disrupts the permeability of the blood-testis barrier by an oxidant mechanism in mice. Toxicology. 2020 May 30;438:152463. doi: 10.1016/j.tox.2020.152463. Epub 2020 Apr 12. PMID: 32294493.

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7. Bioactivity

Biological target:

Parathion is a highly toxic cholinesterase inhibitor.

In vitro activity

The goal of this study was to investigate the in vitro effects of mPT (methyl parathion) on cells in the oral cavity and evaluate the potential protective role of epigallocathechin-3-gallate (EGCG) on these effects. Human gingival fibroblasts (HGF) were exposed to 10, 50, or 100 μ g/ml mPT for 24 h and assessed for oxidative stress, as evidenced by reactive generation of oxygen species (ROS), induction of apoptotic cell death, DNA damage (comet assay and cytochinesis-block micronucleus test), and nitric oxide (NO) production. The results showed that mPT produced significant oxidative stress, cytotoxicity, and genotoxicity and increased NO levels through stimulation of inducible NO synthase expression.

Reference: J Toxicol Environ Health A. 2015;78(19):1227-40. https://pubmed.ncbi.nlm.nih.gov/26479333/

In vivo activity

The results showed that MP (methyl parathion) exposure reduced spontaneous movement, hatching, and survival rates of zebrafish embryos and induced developmental abnormalities such as shortened body length, yolk edema, and spinal curvature. Notably, MP was found to induce cardiac abnormalities, including pericardial edema and decreased heart rate. Exposure to MP resulted in the accumulation of reactive oxygen species (ROS), decreased superoxide dismutase (SOD) activity, increased catalase (CAT) activity, elevated malondialdehyde (MDA) levels, and caused cardiac apoptosis in zebrafish embryos. Moreover, MP affected the transcription of cardiac development-related genes (vmhc, sox9b, nppa, tnnt2, bmp2b, bmp4) and apoptosis-related genes (p53, bax, bcl2).

Reference: Toxics. 2023 Jan 15;11(1):84. https://pubmed.ncbi.nlm.nih.gov/36668810/