

Product Data Sheet

Product Name: PMSF
Cat. No.: GC10477

Chemical Properties

Cas. No. 329-98-6

Chemical Name phenylmethanesulfonyl fluoride

SMILES C1=CC=C(C=C1)CS(=O)(=O)F

Formula $C_7H_7FO_2S$

M.Wt 174.2

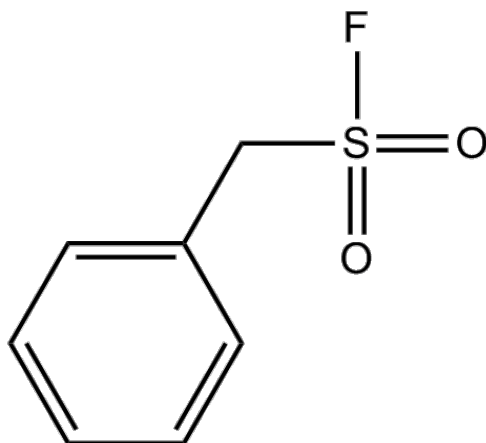
Solubility $\geq 17.4\text{mg/mL}$ in DMSO

Storage Store at RT

General tips For obtaining a higher solubility, please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution: ship with blue ice. All other available size: ship with RT, or blue ice upon request.

Structure



Protocol

Animal experiment [1]:

Animal models Adult male mice

Caution: Product has not been fully validated for medical applications. For research use only.

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Preparation Method This assay measures analgesic activity. All animals were placed on a 55 ± 1 °C hot plate, and the latency time to either jumping or licking was recorded. The cut-off time was set as 15 s to protect mice from any damage. The antinociceptive effects of a single dose of morphine (10 mg/kg s.c.) and PMSF (60, 120, and 300 mg/kg) were determined.

Dosage form 60, 120, and 300 mg/kg, i.p.

Applications The results suggest that the administration of the PMSF doses (120 and 300 mg/kg, i.p.) led to significant changes in the analgesic latency time, while administration with PMSF (60 mg/kg i.p.) had no significant difference.

References:

[1]: Akbarabadi E A, Vardanjani H R, Molavinia S, et al. PMSF Attenuates Morphine Antinociceptive Tolerance and Dependence in Mice: Its Association with the Oxidative Stress Suppression[J]. Iranian Journal of Pharmaceutical Research: IJPR, 2021, 20(3): 300.

Background

PMSF is an irreversible serine protease inhibitor that is often added to the lysis buffer before cell or tissue lysis to prevent protein degradation^[1,2]. PMSF can effectively inhibit chymotrypsin, trypsin, thrombin, etc. The principle of action of PMSF is that it can specifically recognize and sulfonate the serine residue active site that determines enzyme activity. PMSF is also an inhibitor of fatty acid amide hydrolase (FAAH), cysteine proteases (such as papain, the inhibitory activity of which is reversed by DTT), and acetylcholinesterase of mammalian origin^[3]. The inhibitory effect of PMSF on papain can be reversed by DTT (Dithiothreitol).

The deactivation of PMSF increases with increasing pH and temperature. The half-lives of the inhibitors are approximately 110, 55, and 35 minutes at 25°C and pH 7.0, 7.5, and 8.0, respectively. At pH 8, 100µM PMSF is almost completely inactivated within 1 hour at 25°C or 22 hours at 4°C.

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PMSF stock solutions prepared using 100% isopropyl alcohol are stable for months or longer at 25°C. Within 1 week at 25°C and pH 7.0, chymotrypsin inhibited by PMSF did not reactivate^[4].

In animal experiments, PMSF had significant analgesic effects at doses of 120 and 300 mg/kg. Sub-analgesic doses (60 mg/kg, i.p.) of PMSF can reduce tolerance resulting from acute and chronic administration of opioids^[3].

PMSF can be used alone or often mixed with other protease inhibitors such as aprotinin A or phosphatase inhibitors such as sodium orthovanadate.

PMSF is poorly soluble in water and has poor stability in aqueous solutions. It is recommended to add it to lysis buffer or other aqueous solutions before use. PMSF powder can be dissolved in methanol, ethanol or isopropyl alcohol to prepare a storage solution. The recommended concentration is 100-200mM. The effective working concentration of PMSF is 0.1-1mM.

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