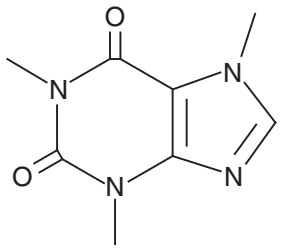
PRODUCT INFORMATION

Caffeine

Item No. 14118

CAS Registry No.: 58-08-2
Formal Name: 3,7-dihydro-1,3,7-trimethyl-1H-purine-2,6-dione
Synonyms: Methyltheobromine, NSC 5036
MF: $C_8H_{10}N_4O_2$
FW: 194.2
Purity: ≥98%
UV/Vis.: λ_{max}: 273 nm
Supplied as: A crystalline solid
Storage: -20°C
Stability: ≥4 years



Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Laboratory Procedures

Caffeine is supplied as a crystalline solid. A stock solution may be made by dissolving the caffeine in the solvent of choice, which should be purged with an inert gas. Caffeine is soluble in organic solvents such as ethanol, DMSO, and dimethyl formamide. The solubility of caffeine in these solvents is approximately 0.2, 3, and 10 mg/ml, respectively.

Further dilutions of the stock solution into aqueous buffers or isotonic saline should be made prior to performing biological experiments. Ensure that the residual amount of organic solvent is insignificant, since organic solvents may have physiological effects at low concentrations. Organic solvent-free aqueous solutions of caffeine can be prepared by directly dissolving the crystalline solid in aqueous buffers. The solubility of caffeine in PBS (pH 7.2) is approximately 5 mg/ml. We do not recommend storing the aqueous solution for more than one day.

Description

Caffeine is a methylxanthine alkaloid naturally found in various plant parts that acts as an antagonist at central adenosine receptors at relevant physiological concentrations (IC_{50} = ~30 µM).[1,2] It alters fatigue, mood, alertness, motor reaction time, vascular hemodynamics, and pain sensation.[2-4] Caffeine has also been implicated in carcinogenesis, although the concentrations used to affect cell cycling and apoptosis in the laboratory may not be commonly achieved *in vivo*.[5]

References

1. Snyder, S.H., Katims, J.J., Annau, Z., *et al*. Adenosine receptors and behavioral actions of methylxanthines [caffeine/theophylline/N^6-cyclohexyladenosine/N^6-(phenylisopropyl)adenosine]. *Proc. Natl. Acad. Sci. USA* **78(5)**, 3260-3264 (1981).
2. Fredholm, B.B., Bättig, K., Holmén, J., *et al*. Actions of caffeine in the brain with special reference to factors that contribute to its widespread use. *Pharmacol. Rev.* **51(1)**, 83-133 (1999).
3. Carrillo, J.A. and Benitez, J. Clinically significant pharmacokinetic interactions between dietary caffeine and medications. *Clin. Pharmacokinet.* **39(2)**, 127-153 (2000).
4. Pelligrino, D.A., Xu, H.-L., and Vetri, F. Caffeine and the control of cerebral hemodynamics. *J. Alzheimers Dis.* **20(Suppl 1)**, S51-S62 (2010).
5. Bode, A.M. and Dong, Z. The enigmatic effects of caffeine in cell cycle and cancer. *Cancer Lett.* **247(1)**, 26-39 (2007).

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