

Product Information

Methotrexate hydrate

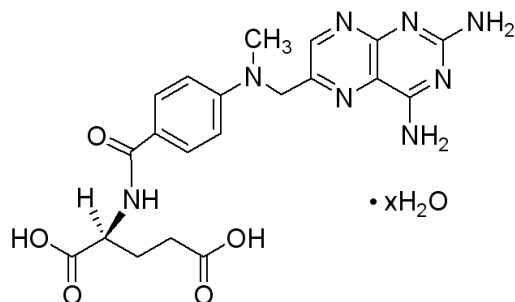
Catalog Number **A6770**

Storage Temperature $-20\text{ }^{\circ}\text{C}$

CAS RN 133073-73-1

Synonyms: (+)-Amethopterin hydrate, amethopterin, methylaminopterin, 4-amino-10-methylfolic acid, 4-amino- N^{10} -methylpteroylglutamic acid, antifolan, N-bismethylpteroylglutamic acid, MTX

Product Description



Molecular formula: $\text{C}_{20}\text{H}_{22}\text{N}_8\text{O}_5 \cdot x\text{H}_2\text{O}$

Molecular weight: 454.44 (anhydrous)

pK_a values:¹ Approximately 3.8, 4.8, and 5.6 (temperature not specified)

Absorbance:

$\lambda_{\text{max}} = 244\text{ nm}, 307\text{ nm (0.1 N HCl)}$ ^{2,3}

E^{mM} (257 nm) = 22.3 (0.1 N NaOH)

E^{mM} (302 nm) = 22.7 (0.1 N NaOH)

E^{mM} (370 nm) = 7.3 (0.1 N NaOH)²

Methotrexate, an anticancer drug, is structurally similar to folic acid. Methotrexate and aminopterin are both potent, stoichiometric inhibitors of dihydrofolate reductase (DHFR), an enzyme involved in cellular DNA synthesis. The reaction between methotrexate and dihydrofolate reductases has been described, and a three-dimensional structure of the complex has been published.^{4,5} The metabolism and pharmacokinetics of methotrexate have been studied.⁶⁻⁸ Methotrexate appears to be preferred to aminopterin, which is photosensitive and toxic. The stability and low toxicity of methotrexate also favor its use in the selection of hybridomas.⁹ Resistance to the drug as a result of permeability changes has been studied.¹⁰

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

Methotrexate is insoluble in water, ethanol, chloroform, and ether. It is, however, soluble in solutions of mineral acids and in dilute solutions of alkali hydroxides and carbonates.¹ Methotrexate is unstable in basic solution.²

For cell culture work, a stock solution of methotrexate is prepared using a minimum amount of 1 M NaOH and then diluted with saline or medium. The diluted stock remains active at $4\text{--}8\text{ }^{\circ}\text{C}$ for about a week or at $-20\text{ }^{\circ}\text{C}$ for about a month.

Storage/Stability

Store the product at $-20\text{ }^{\circ}\text{C}$. Protection from light for long-term storage has been suggested.¹ When stored at $-20\text{ }^{\circ}\text{C}$, methotrexate remains active for at least three years.

References

1. *Martindale: the Extra Pharmacopoeia*, 29th ed., p. 636 (1989).
2. *Merck Index*, 12th ed., #6065 (1996).
3. Seeger, D.R. et al., *J. Amer. Chem. Soc.*, **71**, 1753 (1949).
4. Sloboda, A.E., *J. Pharmac. Exp. Ther.*, **128**, 419 (1960).
5. Matthew, D.A. et al., *Science*, **197**, 452 (1977).
6. Freeman, M.V., *J. Pharmacol Exp. Ther.*, **122**, 154 (1958).
7. Henderson, E.S. et al., *Cancer Research*, **25**, 1008 and 1018 (1965).
8. Evans, W.E., *Appl. Pharmacokin.*, p. 518-548 (1980).
9. Horenstein, A.L. et al., *J. Immunological Methods*, **98**, 145-149 (1987).
10. Mandelbaum-Shavit, F., *Biochim. Biophys. Acta*, **428**, 674 (1976).

TG,FEB,MAM 01/18-1