

# PRODUCT INFORMATION



## Methotrexate (hydrate)

Item No. 13960

CAS Registry No.: 133073-73-1

Formal Name: N-[4-[(2,4-diamino-6-pteridyl)methyl]methylamino]benzoyl]-L-glutamic acid, hydrate

Synonyms: Amethopterin, CL 14,377, EMT 25299, MTX, NSC 740, R 9985

MF:  $C_{20}H_{22}N_8O_5 \cdot XH_2O$

FW: 454.4

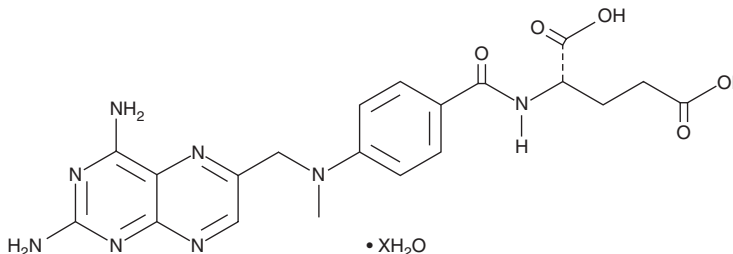
Purity:  $\geq 98\%$

UV/Vis.:  $\lambda_{max}$ : 262, 299, 377 nm

Supplied as: A crystalline solid

Storage:  $-20^\circ C$

Stability:  $\geq 2$  years



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

### Laboratory Procedures

Methotrexate (MTX) (hydrate) is supplied as a crystalline solid. A stock solution may be made by dissolving the MTX (hydrate) in the solvent of choice, which should be purged with an inert gas. MTX (hydrate) is soluble in organic solvents such as DMSO and dimethyl formamide. The solubility of MTX (hydrate) in these solvents is approximately 3 and 14 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 MTX (hydrate) can be prepared by directly dissolving the crystalline solid in aqueous buffers. The solubility of MTX (hydrate) in PBS, pH 7.2, is approximately 1 mg/ml. We do not recommend storing the aqueous solution for more than one day.

### Description

Methotrexate (MTX) is similar in structure to folic acid (Item No. 20515) and aminopterin (Item No. 21802). It acts by inhibiting the metabolism of folic acid and blocking key enzymes in the synthesis of purines and pyrimidines required for cell proliferation.<sup>1,2</sup> MTX is known to induce adenosine release, which mediates many of its anti-inflammatory effects, including the reduction of proinflammatory cytokines.<sup>2-4</sup> Formulations containing MTX have been used as immunosuppressants, in the treatment of cancer, autoimmune disease, ectopic pregnancy, and for the induction of medical abortions. MTX formulations have been considered the gold standard of disease-modifying antirheumatic drug (DMARD) therapy to treat both the immune-inflammatory and joint destructive processes of rheumatoid arthritis.<sup>5</sup>

### References

1. Tian, H., and Cronstein, B.N. *Bull. NYU Hosp. Jt. Dis.* **65**(3), 168-173 (2007).
2. Swierkot, J. and Szechinski, J. *Pharmacol. Rep.* **58**(4), 473-492 (2006).
3. Chan, E.S.L. and Cronstein, B.N. *Arthritis Res.* **4**(4), 266-273 (2002).
4. Wessels, J.A.M., Huizinga, T.W.J., and Guchelaar, H.-J. *Rheumatology (Oxford)* **47**(3), 249-255 (2008).
5. Smolen, J.S. and Steiner, G. *Nat. Rev. Drug Dis.* **2**(6), 473-488 (2003).

#### WARNING

THIS PRODUCT IS FOR RESEARCH ONLY - NOT FOR HUMAN OR VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

#### SAFETY DATA

This material should be considered hazardous until further information becomes available. Do not ingest, inhale, get in eyes, on skin, or on clothing. Wash thoroughly after handling. Before use, the user must review the complete Safety Data Sheet, which has been sent via email to your institution.

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