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## Certificate of Analysis

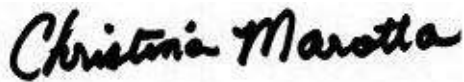
**Product Description:** Methotrexate, USP Grade  
**Catalog Number:** 102299  
**Lot:** MR29561

**Formula:**  $C_{20}H_{22}N_8O_5$   
**CAS #:** 59-05-2  
**Physical Description:** Orange Powder

**Formula Weight:** 454.5  
**Storage:** +4°C

Test	Specification	Result
Identity Test A	Passes	Passes
Identity Test B	Passes	Passes
Specific Rotation (anhydrous basis)	+19° to +24°	+22.81°
Water	≤12.0%	10.63%
Residue on Ignition	≤0.1%	<0.01%
Organic Volatile Impurities	Passes	Passes - see below
Methotrexate Content (anhydrous basis as $C_{20}H_{22}N_8O_5$ )	Not less than 98% and not more than 102.0%	99.2%

Related Substances: Passes - see below  
(R)-Methotrexate: 0.08%  
Heavy Metals: <20 ppm  
Color of Solution L: 87  
Related Compounds LC:  
-- Aminopterin: 0.01%  
-- Methopterin: 0.03%  
-- 4-Hydroxy-M-ptericoic Acid: 0.01%  
-- A-M-ptericoic Acid: 0.01%  
-- MTX-5-Monomethylester: 0.06%  
-- MTX-1-Monomethylester: 0.02%  
-- Unknown Single: 0.03%  
-- Total (with the exception of B, C, E): 0.2%  
-- Total: 0.2%  
Total Aerobic Microbial Count: <10 cfu/g  
Total Yeast and Mold Count: <10 cfu/g  
Pseudomonas aerug.: 0 cfu/g  
Staphylococcus aureus: 0 cfu/g  
Endotoxins (LAL): <0.120 EU/mg  
Residual Solvents:  
-- Acetone: <1 ppm  
-- Methanol: 2 ppm  
-- Dimethylformamide: 30 ppm



07/30/2012 - Christina Marotta  
MP Biomedicals, LLC.  
Technical Director

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