



RE: Elemental Impurities - L-Citrulline, USP, JP, bioCERTIFIED (TM) (Cat# C9719)

To Whom It May Concern:

Thank you for your interest in Spectrum high quality chemicals.

The above material complies with the USP<232>, <233> Elemental Impurities and the ICH Q3D Elemental Impurities Guideline. The following elemental impurities are likely to be present:

Elemental Impurity		Class	Expected Concentration
Cadmium	Cd	1	< 0.5 ppm
Lead	Pb	1	< 0.5 ppm
Arsenic	As	1	< 1.4 ppm
Mercury	Hg	1	< 0.5 ppm
Cobalt	Co	2A	Lot Specific Analysis
Vanadium	V	2A	Lot Specific Analysis
Nickel	Ni	2A	Lot Specific Analysis
Thallium	Tl	2B	Lot Specific Analysis
Gold	Au	2B	Lot Specific Analysis
Palladium	Pd	2B	Lot Specific Analysis
Iridium	Ir	2B	Lot Specific Analysis
Osmium	Os	2B	Lot Specific Analysis
Rhodium	Rh	2B	Lot Specific Analysis
Ruthenium	Ru	2B	Lot Specific Analysis
Selenium	Se	2B	Lot Specific Analysis
Silver	Ag	2B	Lot Specific Analysis
Platinum	Pt	2B	Lot Specific Analysis
Lithium	Li	3	Lot Specific Analysis
Antimony	Sb	3	Lot Specific Analysis
Barium	Ba	3	Lot Specific Analysis
Molybdenum	Mo	3	Lot Specific Analysis
Copper	Cu	3	Lot Specific Analysis
Tin	Sn	3	Lot Specific Analysis
Chromium	Cr	3	Lot Specific Analysis

Elements indicated as "Not tested" are not intentionally added to the manufacturing process.

Other elemental impurities considered by USP <232>, <233> and ICH Q3D which are not addressed in the above mentioned table are not likely to be present. These

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substances are not used in the production process, are not intentionally added or known to be present in the above mentioned material.

This information is subject to change and is intended for risk assessment only. It is responsibility of the end user to evaluate suitability of any chemical for the intended use as well as to assess compound-specific limits of daily intake of metal impurities. For lot-specific information, please refer to the respective Certificate of Analysis.

If you have any further questions, please contact us by telephone at 1(800)772-8786 Option 2, or by email at TechServices@spectrumchemical.com.

Sincerely,

Technical Services
Spectrum Chemical Mfg. Corp.

This document has been produced electronically and is valid without a signature.

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