

Certificate of Analysis

FULL QUALITY CONTROL PANEL · COMPOUND ANALYTICAL REPORT

CERTIFICATE NO.

COA-2026-9501

Issued 09/11/2026 · Page 1 of 4

CLIENT	PREPARED FOR	SAMPLE & ACCESSION	ACC - 2026 - 9601	SAMPLE PHOTOGRAPH	AS RECEIVED
PeptaraLabs PeptaraLabs.io Client reference: on file Distribution: client confidential		ANALYTE / IDENTITY Glutathione LABELED CONTENT 600 mg MANUFACTURED 06/07/2026 DATE RECEIVED 08/28/2026	CAS NUMBER 70-18-8 SAMPLE MATRIX Lyophilized RETEST / EXPIRY 06/2028 DATE ANALYZED 09/10/2026	LOT NUMBER GTH-20260607-18 APPEARANCE Conforms / White Cake STORAGE -20 C, dark DISPOSITION RELEASED	 Photographic documentation withheld at the client's request. Identity and integrity confirmed by the analytical methods herein

CHROMATOGRAPHIC PURITY 97.12% Spec ≥ 95.0% ✓ PASS	IDENTITY Glutathione HPLC-RTM + LC-MS ✓ PASS	NET CONTENT 608.23 mg measured · label 600 mg REPORTED	BACTERIAL ENDOTOXIN 3.18 EU/mL · limit NMT 5 ✓ PASS	DISPOSITION RELEASED Full QC Panel complete
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1 RELEASE STATEMENT Authorized Disposition

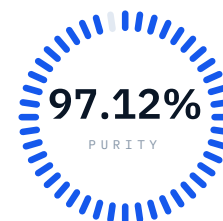
The submitted Glutathione (reduced, GSH) sample was evaluated under the Full Quality Control Panel covering identity, purity, net content, composition, sterility, bacterial endotoxin, elemental impurities, and targeted adulterant screening. Identity was confirmed by HPLC retention-time matching with a corroborating LC-MS base peak at m/z 308.0934 [M+H]⁺, and chromatographic purity of 97.12 percent exceeded the not less than 95.0 percent release criterion. Sterility returned No Growth, bacterial endotoxin measured 3.18 EU/mL against the not more than 5 EU/mL limit, and arsenic, cadmium, chromium, mercury, and lead were each within their per-element specifications, with fentanyl Not Detected at the screening cutoff. On the basis that all tested attributes meet their respective specifications, the laboratory supports a disposition of RELEASED for the material as received.

IDENTITY Confirmed ✓ PASS	PURITY 97.12% ✓ PASS	NET CONTENT 608.23 mg ✓ PASS	MOISTURE 1.8% w/w ✓ PASS	STERILITY No Growth ✓ PASS	ENDOTOXIN 3.18 EU/mL ✓ PASS	HEAVY METALS Conforms ✓ PASS
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2 PURITY, QUANTITATION & IDENTITY HPLC / HPLC-RTM

ANALYTE	SPECIFICATION	RESULT	UNIT	STATUS
Chromatographic Purity (HPLC)	≥ 95.0%	97.12	%	✓ PASS
Net Content	Report only	608.23	mg	REPORTED
Identity (HPLC-RTM)	Glutathione	Confirmed	—	✓ PASS
Adulterant / Fentanyl Screen	Immunoassay, 50 ng/mL	Not Detected	—	✓ PASS

Interpretation. The measured chromatographic purity of 97.12 percent exceeds the not less than 95.0 percent release criterion, indicating a homogeneous principal peak with a low related-substance burden dominated by the expected oxidation product, glutathione disulfide. Net content of 608.23 mg is the measured mass recovered from the unit and is reported against a nominal 600 mg label claim, confirming the vial delivers at least the labeled mass of active compound.



Specification ≥ 95.0% **PASS**
HPLC area %

Figure 1. Purity composition of the released dedicated unit by HPLC area normalization. Target compound 97.12%, total related substances 2.88%.

3 REPRESENTATIVE CHROMATOGRAM

Reversed-phase HPLC-UV

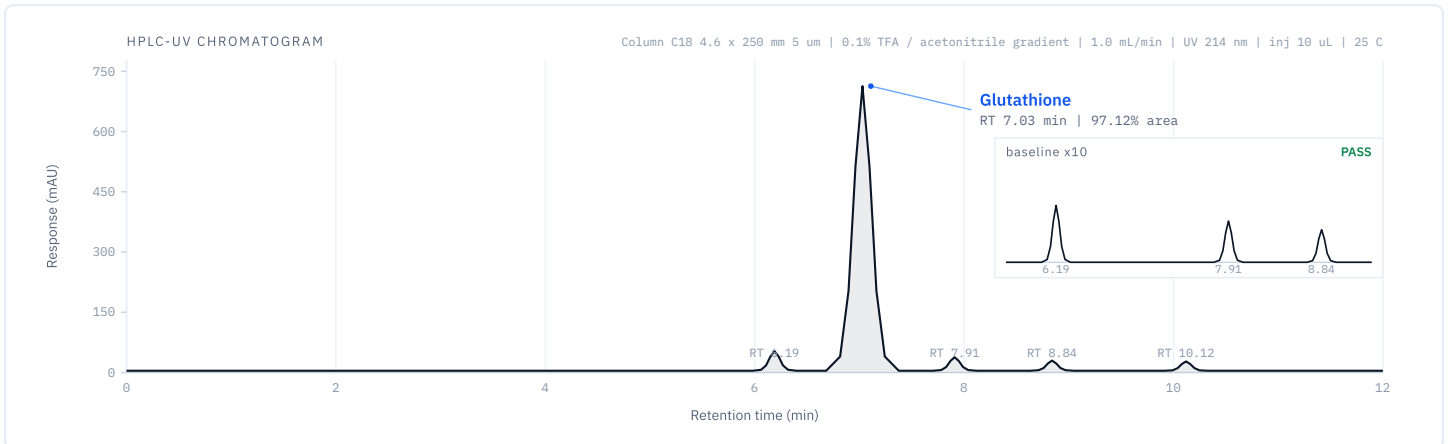


Figure 2. Representative reversed-phase HPLC-UV chromatogram (Conformity unit V1, near the batch mean). Trace related substances are shown magnified 10x in the inset. A sharp, symmetric principal peak with a low related-substance burden is consistent with high chromatographic purity.

PEAK	RT (MIN)	AREA (MAU·S)	AREA %	PLATES (N)	TAILING
Glutathione (principal)	7.03	4,856,000	97.12	8,600	1.05
Glutathione disulfide (RRT 0.88)	6.190	71,500	1.43	7,200	1.10
Cysteinylglycine (RRT 1.12)	7.910	38,000	0.76	6,900	1.12
gamma-Glutamylcysteine (RRT 1.26)	8.840	19,500	0.39	6,600	1.14
Unspecified impurity (RRT 1.44)	10.120	15,000	0.30	6,400	1.11
Total		5,000,000	100.00		

4 MASS CONFIRMATION

LC-MS, ESI positive

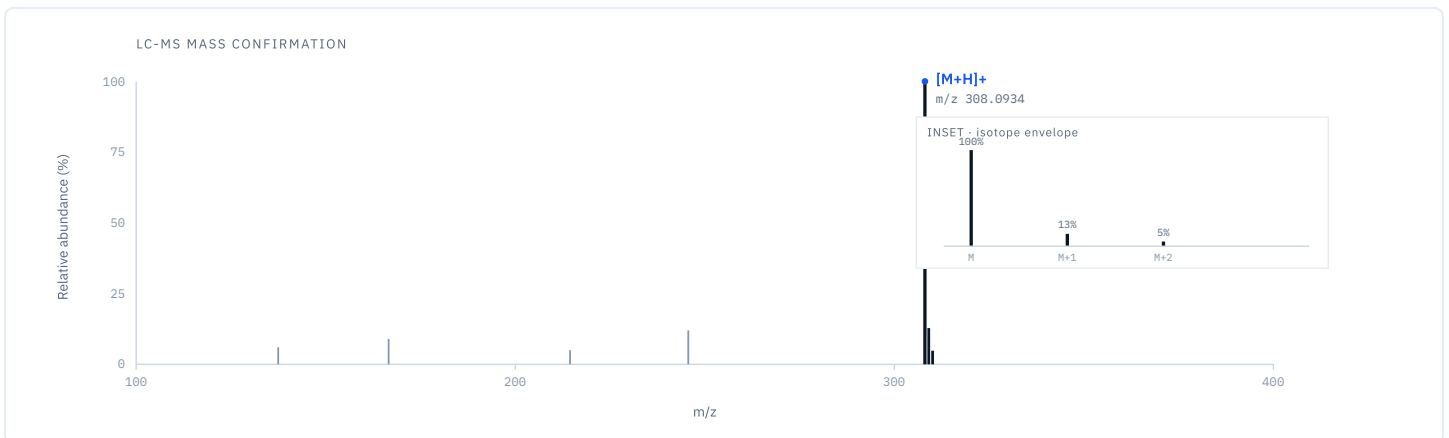


Figure 3. LC-MS mass confirmation (electrospray positive mode). Base peak [M+H]⁺ at m/z 308.0934 matches glutathione (C10H17N3O6S, MW 307.32 Da); the isotopic envelope [M+1] (12.8%) and [M+2] (4.8%) confirms identity.

5 CONFORMITY TESTING

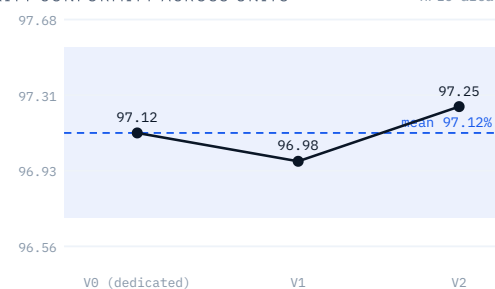
3 units · HPLC

SAMPLE	PURITY	NC (MG)	IDENTITY	RESULT
V0 (dedicated)	97.12%	608.4	Confirmed	✓ PASS
V1	96.98%	605.1	Confirmed	✓ PASS
V2	97.25%	611.2	Confirmed	✓ PASS
Mean	97.12%	608.23	—	—
Std Dev	0.140%	3.05	—	—

Interpretation. Across three independently tested units the purity standard deviation was 0.14 percent and net content standard deviation 3.05 mg, a low dispersion consistent with a homogeneous, well-controlled batch.

PURITY CONFORMITY ACROSS UNITS

HPLC area %



Lower spec limit 95.0% (off scale). SD 0.140%. All units conform.

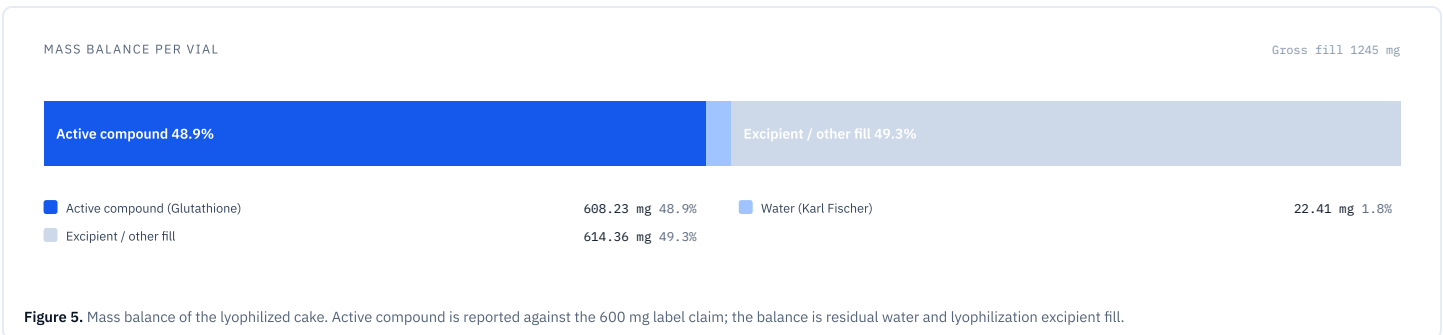
Figure 4. Purity conformity across tested units with mean and plus or minus 3 SD control band (SD 0.140%).

6 COMPOSITION, MOISTURE & COUNTERION

KF · IC · USP <467>

PARAMETER	METHOD	SPECIFICATION	RESULT	STATUS
Net Content	HPLC / AAA	Report only	608.23 mg	REPORTED
Water (Karl Fischer)	USP <921>	NMT 8.0% w/w	1.8%	✓ PASS
Counterion	Ion chromatography	Report only	None (free acid)	REPORTED
Residual Solvents	USP <467>	Not Detected	Not Detected	✓ PASS
Gross Fill Weight	Gravimetric	Report only	1245 mg	REPORTED

Interpretation. Karl Fischer titration returned 1.8 percent residual water and glutathione is presented as the free tripeptide with no counterion. The 1245 mg gross fill reconciles active compound, residual water, related substances, and lyophilization excipient fill.

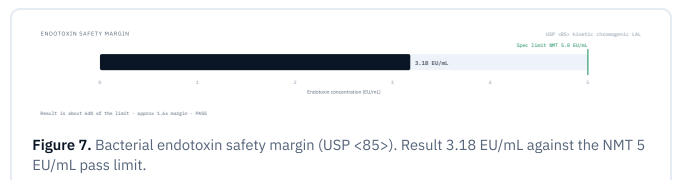
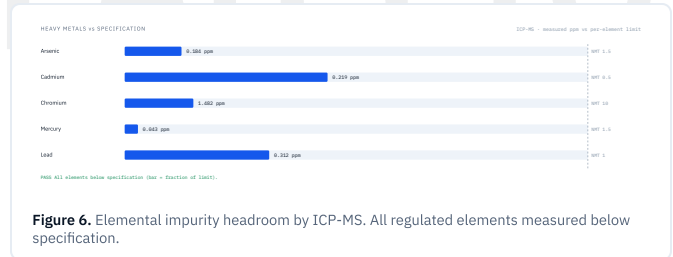


7 SAFETY & CONTAMINATION CONTROLS

ICP-MS · USP <71> · <85>

TEST	METHOD	SPECIFICATION	RESULT	STATUS
Arsenic (As)	ICP-MS	NMT 1.5 ppm	0.184 ppm	✓ PASS
Cadmium (Cd)	ICP-MS	NMT 0.5 ppm	0.219 ppm	✓ PASS
Chromium (Cr)	ICP-MS	NMT 10 ppm	1.482 ppm	✓ PASS
Mercury (Hg)	ICP-MS	NMT 1.5 ppm	0.043 ppm	✓ PASS
Lead (Pb)	ICP-MS	NMT 1 ppm	0.312 ppm	✓ PASS
Sterility	USP <71>	No Growth	No Growth	✓ PASS
Bioburden	USP <61>	Report / Low	< 10 CFU/g	✓ PASS
Bacterial Endotoxin	USP <85>	NMT 5 EU/mL	3.18 EU/mL	✓ PASS

Interpretation. By ICP-MS, arsenic, cadmium, chromium, mercury, and lead were each measured well below their specification thresholds. Sterility by membrane filtration returned No Growth with bioburden below the reporting limit, and bacterial endotoxin measured 3.18 EU/mL, within the not more than 5 EU/mL release limit.



8 FOR THE RECIPIENT

Plain-language summary

- ✓ **Purity 97.12 percent.** Almost everything measured is glutathione. Only 2.88 percent is trace related substances, past the 95 percent release bar.
- ✓ **You get at least the labeled amount.** Measured net content is 608.23 mg, at or above the 600 mg on the label.
- ✓ **It is genuinely glutathione.** HPLC retention time plus an LC-MS base peak at m/z 308.0934 confirm the identity, so this is not a substitute or a mislabel.
- ✓ **Sterility and endotoxin within specification.** Sterility shows No Growth and bacterial endotoxin is 3.18 EU/mL, within the not more than 5 EU/mL limit.
- ✓ **Screened for contamination.** Arsenic, cadmium, chromium, mercury, and lead were all below limits, and the fentanyl adulterant screen was Not Detected.
- ✓ **Water is low.** Residual water is 1.8 percent, expected for a freeze-dried preparation and already accounted for in the net content figure.

Purity (HPLC)

Percent of the main compound peak relative to all detected peaks.

Net content

Measured mass of the actual compound, separate from water and salt.

NMT

Not more than; an upper acceptance limit.

Not Detected

Below the method limit of quantitation (LOQ).

EU/mL

Endotoxin units per milliliter, a measure of bacterial toxin.

RRT

Relative retention time; an impurity position versus the main peak.

Counterion

The salt partner of the compound.

w/w

By weight, as a percent of total mass.

USP <71> / <85>

Standard chapters for sterility and bacterial endotoxin.

Karl Fischer

Titration method for measuring residual water (USP <921>).

Storage. Store the sealed lyophilized vial at -20 C, protected from light. Reconstituted solution is stable at 2 to 8 C; use within 30 days. **Reconstitution.** Add 2 mL bacteriostatic or sterile water down the vial wall, swirl gently, do not shake. **Handling.** Research use only; not for human or veterinary use.

9 ANALYTICAL METHODS & NOTES

Method principles

HPLC Purity and Net Content

Reversed-phase HPLC with UV detection separates the principal compound from related substances; purity is percent main-peak area and content is quantified against a calibrated reference. Acceptance: not less than the stated release limit.

LC-MS Mass Confirmation

Electrospray positive-mode mass spectrometry resolves the molecular ion and isotope or charge-state signature of the analyte.

Counterion by Ion Chromatography

Ion chromatography determines the counterion content by weight, characterizing the salt form.

Heavy Metals by ICP-MS

Inductively coupled plasma mass spectrometry quantifies elemental impurities against per-element limits.

Bioburden by USP <61>

Total aerobic microbial and yeast or mold counts establish microbial load prior to release.

Identity by HPLC Retention-Time Matching

Sample retention time is compared to a qualified reference standard under identical conditions; identity is confirmed on co-elution within the established window.

Water Content by Karl Fischer

Coulometric Karl Fischer titration per USP <921> quantifies residual moisture in the lyophilized cake. Acceptance: not more than 8.0 percent w/w.

Residual Solvents

Headspace GC per USP <467> screens process solvents against a not-detected threshold.

Sterility by USP <71>

Membrane filtration sterility test; No Growth is reported when no microbial recovery is observed across the incubation period.

Bacterial Endotoxin by USP <85>

Kinetic bacterial endotoxin test; acceptance is not more than 5 EU/mL per client specification.

DocuSigned by:



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Finn C.

Laboratory Director

Date of authorization: 09/11/2026

DS

FC

DocuSigned by:



11000101 01001110 01010010 10000010

Brennan C.

Quality Assurance

Reviewed against acceptance criteria: 09/11/2026

DS

BC



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Verification ID: **TLA-9501-GLUT-D374**



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