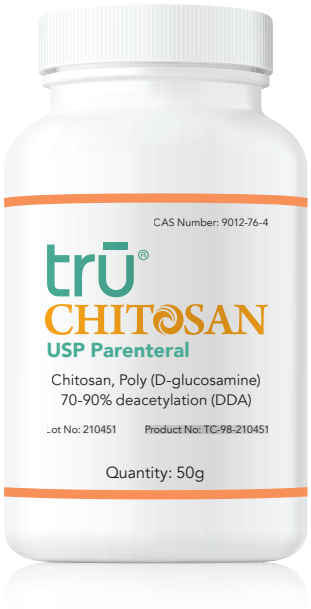
USP Parenteral

USP-NF Monograph Conformance
USP 232 Cutaneous, Oral & Parenteral Conformance
Endotoxin Content > 2 < 10 EU/ml (> 200 < 1000 EU/g)
Complete Chain of Custody/Certificate of Origin
Spectrum of NMR DDA & GPC Measured Molecular Weight

trū Chitosan's USP Parenteral is a superior chitosan for cutaneous, oral, and parenteral pharmaceutical delivery and internal medical device applications. trū Chitosan is extracted exclusively from shrimp exoskeleton raised in a captive, controlled environment free from pollution, disease, and antibiotics with an industry-first, complete chain of custody. trū Chitosan's USP Parenteral delivers the unsurpassed quality and consistent behavior required for pharmaceutical and medical device production. Why would you risk using anything less?



USP-NF Monograph & 232 Elemental Impurities–Limits; Drug Substance Impurities

The USP-NF Monograph and USP 232 are our respected guides to definition, analysis procedures, and impurity limits

cGMP Compliant

FDA inspected, current Good Manufacturing Practices guide production

Single Source Raw Material

Shrimp exoskeleton raw material from a single, captive, indoor, and controlled source

Consistent Behavior

Lot-to-lot consistency ensures predictable behavior for your medical application

FDA Registered Facility

Manufactured in an FDA registered and inspected facility with ISO 9001 Certification

Product of the USA

First and only producer of medical application chitosan in the United States

CHITOSAN MADE FROM A CONTROLLED SHRIMP PRODUCTION PROCESS.

Enabled by our captive breakthrough Tidal Basin® indoor aquaculture technology, our medical application chitosan is extracted and refined from pristine shrimp exoskeleton tissue with unprecedented quality and traceability. Our precisely controlled environment yields superior shrimp to produce superior chitosan that is low in endotoxins, heavy metals and other impurities making trū Chitosan the best choice for your production and research applications.

330 3rd Street | Balaton, MN 56115 | truchitosan.com

trū® CHITOSAN
an iterro® brand

trū® CHITOSAN

USP Parenteral

Product	trū Chitosan USP Parenteral
CAS number	9012-76-4
Product number	73510 >300 MWw
Product number	73520 >100 <300 MWw
USP-NF 197A	Forms a gelatinous mass
FTIR	Match reference
Color	White to slightly off-white
Appearance	Neat, micronized powder
Solubility	0.15% in acetic acid buffer
Appearance in solution	Clear in 1% acetic acid buffer

Characterization	USP Parenteral	Typical Assay
Degree of Deacetylation (DDA %)	≥70% to ≤90%	Report
GPC weight avg. Mw (kDa)	≥85% to ≤115% Label	Report
GPC number avg. Mw (kDa)		Report
PDI		4.20

METAL CONTENT (ppm)

Substance	USP-NF	USP 232 Parenteral	Typical Assay
Lead (Pb)	≤0.50	≤0.50	0.00
Mercury (Hg)	≤0.20	≤0.30	0.00
Cadmium (Cd)	≤0.20	≤0.20	0.00
Arsenic (As)	≤0.50	≤1.50	0.00

Substance	USP-NF	USP 232 Parenteral	Typical Assay
Nickel (Ni)	≤1.00	≤2.00	0.41
Chromium (Cr)	≤1.00	≤110.00	0.03
Iron (Fe)	≤10.0	n/a	1.33

IMPURITIES

Substance	USP-NF	Typical Assay
Loss on drying (Moisture)	≤5.00%	2.50%
Dry matter	≥95.00%	97.50%
Residue on ignition (Ash)	≤1.00%	0.30%

Substance	USP-NF	Typical Assay
Protein content	≤0.20%	<0.20%
Allergen (Tropomyosin)	n/a	<1 ppm

BIOLOGICAL ENUMERATION

Substance	USP-NF	Specifications	Typical Assay
Endotoxin EU/ml	Dosage relevant	>2 <10	0.02
Endotoxin EU/g	Dosage relevant	>200 <1000	0.04
Aerobic plate count	$\leq 10^3$ cfu/g	Pass	0.00

Substance	USP-NF	Specifications	Typical Assay
Mold & yeast (cfu/g)	$\leq 10^2$ cfu/g	Pass	0.00
Pseudomonas aeruginosa	Absent	Absent	Absent
Staphylococcus aureus	Absent	Absent	Absent

Analysis certified by Parimer Scientific and external laboratories. Unique Certificates of Analysis (COA) and Certificates of Origin (COO) are included with each lot.

PARIMER SCIENTIFIC