

Certificate of Analysis

TSI USA LLC

135 W Main
Missoula Montana 59802 United States

Sample Name:	Glucosamine HCl (2)	Eurofins Sample:	10241182
Project ID	TSI_HEALTH-20210126-0001	Receipt Date	29-Jan-2021
PO Number	CVD	Receipt Condition	Ambient temperature
Lot Number	GLH180521	Login Date	26-Jan-2021
Sample Serving Size		Date Started	02-Feb-2021
		Sampled	Sample results apply as received
		Online Order	16360-14D2E068

Analysis	Result
Loss on Drying *	
Loss On Drying	<0.1 %
Method Name	Glucosamine Hydrochloride
pH	
pH	4.15
Page Number	5045
Residue On Ignition *	
Page No.	5045
Ash	<0.1 %
E. coli *	
Escherichia Coli	Absent /10 g
Yeast and Mold Count *	
Combined Yeast and Mold Count	< 10 CFU/g
Preparatory Testing of Nutritional and Dietary Supplements *	
Yeast and Mold Suitability	PASS
E. coli Suitability Result	Pass**
Elements by ICP Mass Spectrometry	
Arsenic	<0.0100 ppm (on Dry Basis)
Cadmium	<5.00 ppb (on Dry Basis)
Lead	<5.00 ppb (on Dry Basis)
Mercury	<5.00 ppb (on Dry Basis)
Assay (Glucosamine HCl - USP/NF) *	
Result	101.8% Dried Basis
Identification A - Infrared Absorption (Glucosamine HCl - USP/NF) *	
Result	Conforms
FT-IR Spectra	

* This analysis or component is not ISO accredited.

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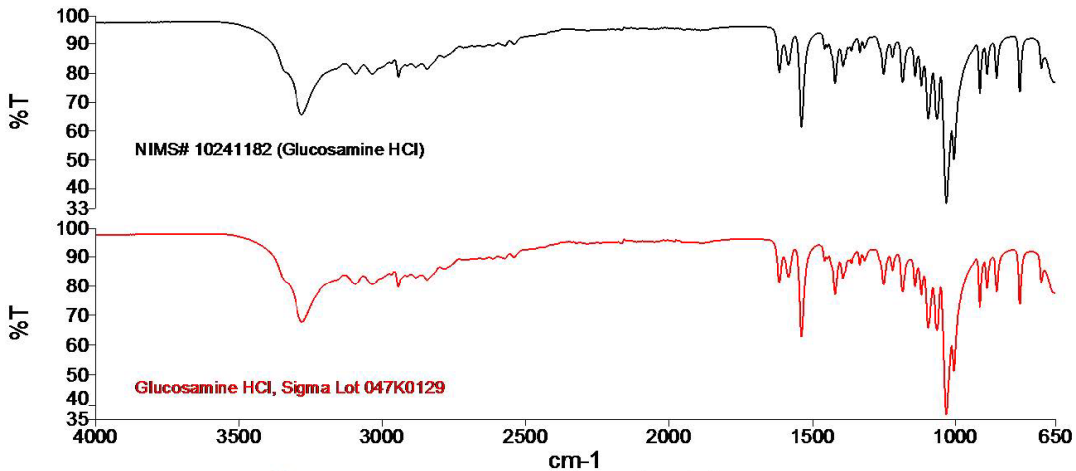
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Analysis	Result
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Identification A - Infrared Absorption (Glucosamine HCl - USP/NF) *



Name	Description
— NIMS# 10241182 (Glucosamine HCl)	by bpotts, Sunday, February 07 2021
— Glucosamine HCl (08Feb11)	Sigma Lot 047K0129

Identification B - Chloride (Glucosamine HCl - USP/NF) *	
Identification	Conforms
Identification C - HPLC (Glucosamine HCl - USP/NF) *	
Result	Conforms
Specific Rotation (Glucosamine HCl - USP/NF) *	
Specific Rotation	+72.7 Degrees (on Dry Basis)
Sulfate (Glucosamine HCl - USP/NF) *	
Sulfate	<0.24 %

Method References	Testing Location
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Assay (Glucosamine HCl - USP/NF) (M_CHROM_S)	Food Integrity Innovation-Madison 3301 Kinsman Blvd Madison, WI 53704 USA
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Method References

Testing Location

Assay (Glucosamine HCl - USP/NF) (M_CHROM_S)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

United States Pharmacopeia, 43rd Revision - National Formulary 38th Edition. USP Convention. Rockville, MD (2019). (Modified).

E. coli (USPE2022)

Eurofins Micro Lab - Madison

6304 Ronald Reagan Ave Madison, WI 53704 USA

USP Current revision, Chapter 2022.

To satisfy the requirements of the USP, the Preparatory Test must be completed on each matrix.

**Based on the results of the preparatory test, conditions stipulated are adequate for detecting the presence of the specified microorganism.

Elements by ICP Mass Spectrometry (ICP_MS_S)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

Official Methods of Analysis, Method 2011.19 and 993.14, AOAC INTERNATIONAL, (Modified).

Paquette, L.H., Szabo, A., Thompson, J.J., "Simultaneous Determination of Chromium, Selenium, and Molybdenum in Nutritional Products by Inductively Coupled Plasma/Mass Spectrometry: Single-Laboratory Validation," Journal of AOAC International, 94(4): 1240 - 1252 (2011).

Identification A - Infrared Absorption (Glucosamine HCl - USP/NF) (ID_IR)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

United States Pharmacopeia, 43rd Revision - National Formulary 38th Edition. USP Convention. Rockville, MD (2019). (Modified).

Identification B - Chloride (Glucosamine HCl - USP/NF) (M_CHM_ID_S)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

United States Pharmacopeia, 43rd Revision - National Formulary 38th Edition. USP Convention. Rockville, MD (2019). (Modified).

Identification C - HPLC (Glucosamine HCl - USP/NF) (M_CHROM_S)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

United States Pharmacopeia, 43rd Revision - National Formulary 38th Edition. USP Convention. Rockville, MD (2019). (Modified).

Loss on Drying (LOD_S)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

United States Pharmacopeia, 43rd Revision - National Formulary 38th Edition. USP Convention. Rockville, MD (2019). (Modified).

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Method References

Testing Location

pH (PHAL_S)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

Official Methods of Analysis of AOAC INTERNATIONAL. 18th Ed., Method 981.12, AOAC INTERNATIONAL. Gaithersburg, MD.

Food Chemical Codex 7th Ed., The United States Pharmacopeia Convention (2010) Appendix II.

United States Pharmacopeia, 32nd Rev.-National Formulary 27th Ed., USP Convention, Inc., Rockville, MD (2009) General Chapter 791.

United States Pharmacopeia, 43rd Revision - National Formulary 38th Edition. USP Convention. Rockville, MD (2019). (Modified).

Preparatory Testing of Nutritional and Dietary Supplements (USPE_PT)

Eurofins Micro Lab - Madison

6304 Ronald Reagan Ave Madison, WI 53704 USA

Preparatory Testing of Nutritional and Dietary Supplements (USPM_PT)

Eurofins Micro Lab - Madison

6304 Ronald Reagan Ave Madison, WI 53704 USA

Residue On Ignition (ROI_S)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

United States Pharmacopeia, Twenty-ninth Revision, <281>, United States Pharmacopeial Convention, Inc.: Rockville, Maryland (2005).

United States Pharmacopeia, 43rd Revision - National Formulary 38th Edition. USP Convention. Rockville, MD (2019). (Modified).

Specific Rotation (Glucosamine HCl - USP/NF) (SPEC_ROT_S)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

United States Pharmacopeia, 43rd Revision - National Formulary 38th Edition. USP Convention. Rockville, MD (2019). (Modified).

Sulfate (Glucosamine HCl - USP/NF) (M_SO4LMT_S)

Food Integrity Innovation-Madison

3301 Kinsman Blvd Madison, WI 53704 USA

United States Pharmacopeia, 43rd Revision - National Formulary 38th Edition. USP Convention. Rockville, MD (2019). (Modified).

Yeast and Mold Count (USPM2021)

Eurofins Micro Lab - Madison

6304 Ronald Reagan Ave Madison, WI 53704 USA

USP Current revision, Chapter 2021.

To satisfy the requirements of the USP, the Preparatory Test must be completed on each matrix.

**Based on the results of the preparatory test, the detection limit stipulated is adequate for the enumeration of the specified microorganisms.

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Testing Location(s)	Released on Behalf of Eurofins by
<p>Food Integrity Innovation-Madison</p> <p>Eurofins Food Chemistry Testing Madison, Inc. 3301 Kinsman Blvd Madison WI 53704 800-675-8375</p>	<p>Edward Ladwig - President Eurofins Food Chemistry Testing Madison</p> <div data-bbox="1292 583 1542 693"></div> <p>2918.01</p>



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