

Integrated Solutions for MALDI-MS

NEW ProteoMass™
Guanidination Kit

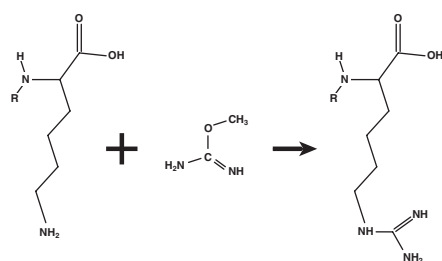
NEW Protease™
Profiler Kit

ProteoMass MALDI
Calibration Kits and
Individual Standards

Trypsin,
Proteomics Grade

Trypsin
Profile IGD Kit

NEW ProteoMass™ Guanidination Kit

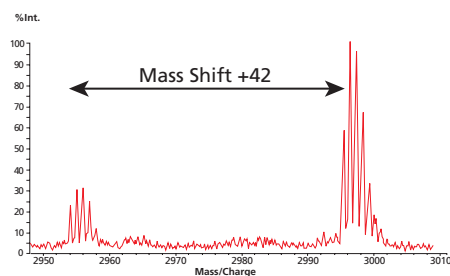


C-terminal lysine O-Methylisourea Homoarginine

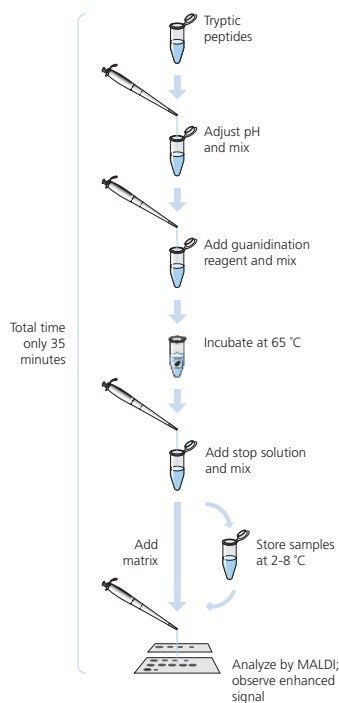
Dramatically improve sensitivity, increase sequence coverage and identify with greater confidence!

Boost your MALDI-MS sensitivity with the NEW ProteoMass Guanidination Kit! Peptides generated during proteolytic digestion with C-terminal Arginine residues are ionized preferentially over peptides with C-terminal Lysine residues, leading to compromised sequence coverage and limited confidence during peptide mass fingerprint analysis. The ProteoMass Guanidination Kit efficiently and conveniently converts C-terminal Lysine residues to homoarginine, increasing MALDI signal strength and producing enhanced sequence coverage.

Enhanced Ionization, Improved Signal to Noise



MALDI-TOF mass spectrum of the control peptide TNEIVEEQYPTQSLATLESQELGK*. This spectrum represents a 1:1 mixture of guanidinated and unguanidinated peptide.



Discover the advantages for yourself!

- **Identify more samples with greater accuracy and confidence**
- **Increase throughput and save time** – only 35 minutes to use the kit vs. 2 hours using traditional methods
- **Compatibility** – compatible with 1D or 2D PAGE gel bands or spots, as well as complex cell extracts

Ordering Information

Product Code	Description	Size
MS0100	ProteoMass Guanidination Kit	1 kit

To order these products, please contact Sigma-Aldrich at 800-325-3010 or sigma-aldrich.com.

MALDI Matrix Selection Guide and Ordering Information

Mass	Recommended Matrix	Acronym	Product Code	Size
Mass < 10 kDa	α-Cyano-4-hydroxycinnamic acid	CHCA	C 8982	10 x 10 mg
Mass > 10 kDa	3,5-Dimethoxy-4-hydroxycinnamic acid, Sinapinic Acid	SA	S 8313	10 x 10 mg
	2-(4-Hydroxyphenylazo) benzoic acid	HABA	54793	1 g, 5 g
	2,5-Dihydroxybenzoic acid	DHB	85707	250 mg, 1 g
IR-Laser	Succinic acid		14078	1 g, 5 g
UV-Laser	2,6-Dihydroxyacetophenone		37468	1 g, 5 g
UV-Laser	Ferulic acid		46278	1 g, 5 g
UV-Laser	Caffeic acid		60018	1 g, 5 g
Liquid Matrix	Glycerol		49771	1 ml, 5 ml
Liquid Matrix	4-Nitroaniline		72681	250 mg, 1 g

NEW Protease Profiler

Select the best protease for protein analysis!

Proteolysis and characterization of the digest peptides for identification, confirmation or deduction by mass spectrometry is a staple tool in proteomics. Proteases with cleavage sites of high specificity have the ability to generate predictable, consistent digest peptides, simplifying interpretation of mass spectra. Trypsin generates peptides in the useful mass range for mass spectrometry and is recognized as the most commonly used protease for protein identification. However, in instances where the trypsin may cleave at an active site or other feature of interest, a substitute protease may be the optimal choice. The Protease Profiler kit provides four proven alternative proteases in addition to Proteomics Grade Trypsin, an enzyme solubilization reagent and enzyme reaction buffer, all in a single convenient package. The kit allows flexibility to enable optimized digestion of target proteins with a variety of pre-qualified proteases.

Enzyme Selection Table

Enzyme	Specificity	Optimal pH	Average MW
Trypsin, Proteomics Grade	Carboxyl side of Arg and Lys	pH 8.0	23.3 kDa
Asp-N	Amine side of Asp and Cys	pH 6.0 - 8.5	24.5 kDa
Glu-C	Carboxyl side of Glu and Asp	pH 4.0 - 7.8	29.0 kDa
Lys-C	Carboxyl side of Lys	pH 8.5	28.0 kDa
Arg-C	Carboxyl side of Arg	pH 7.5 - 8.5	26.5 kDa

The Protease Profiler Kit is used for:

- **Characterization of protein structure** – Explore the primary structure of your protein of interest through digestion with enzymes of distinct specificities.
- **Double Enzymatic Digestion** – An initial digestion may result in peptide fragments greater than 5,000 Daltons, often beyond the optimum detection range for most MS systems/instruments. A second digestion using a protease with different specificity results in cleavage of the large peptides, generating smaller peptides suitable for MS.
- **Exploration of alternative proteases** – Trypsin may be incompatible with some protein samples; find the protease best suited to your protein of interest and improve the quality of your data.
- **In-Solution or In-gel Digestion** – Optimized protocols and reagents for both digest conditions are provided, enabling flexibility in your analysis.

Ordering Information

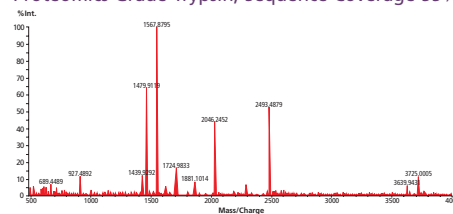
Product Code	Description	Size
PP0500	Protease Profiler Kit	1 kit
	Trypsin, Proteomics Grade (T 6567)	5 x 20 µg
	Asp-N Protease (P 3303)	2 µg
	Glu-C Protease (P 6181)	25 µg
	Lys-C Protease (P 3428)	5 µg
	Arg-C Protease (P 6056)	5 µg

Individual proteases are also available.

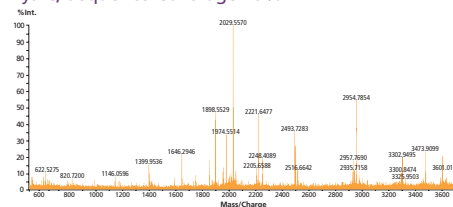
Components

Trypsin Proteomics Grade	20 µg
Asp-N Protease	2 µg
Glu-C Protease	25 µg
Lys-C Protease	5 µg
Arg-C Protease	5 µg
Enzyme Solubilization Reagent	1 ml
Enzyme Reaction Buffer	25 ml

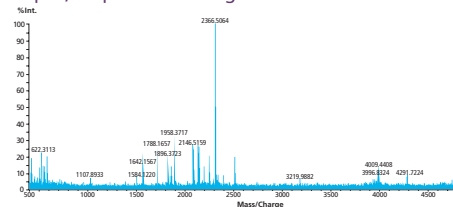
Proteomics Grade Trypsin, Sequence Coverage 55%



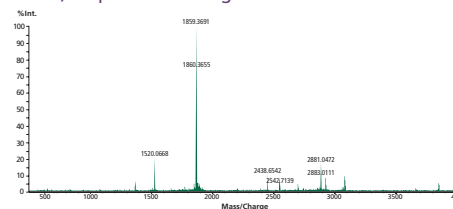
Lys-C, Sequence Coverage 49%



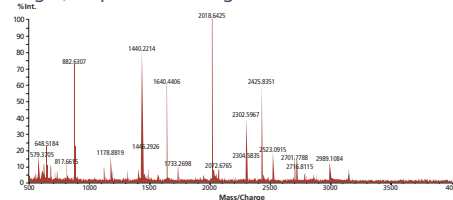
Asp-N, Sequence Coverage 29%



Glu-C, Sequence Coverage 40%



Arg-C, Sequence Coverage 17%



Explore alternative proteases. Each enzyme creates a distinct peptide map; choose the digest that best allows you to characterize your protein of interest. A 2 mg/ml solution of Bovine Serum Albumin was reduced with TBP and alkylated with iodoacetamide (Product Code PROT-RA). The BSA was digested with Proteomics Grade Trypsin, Lys-C, Asp-N, Glu-C, and Arg-C. Samples were incubated for 17 hours at 37°C. Samples were spotted in 10 mg/ml CHCA in 70% acetonitrile 0.03% TFA. MALDI-MS was performed in positive ion reflectron mode on a Kratos® Axima CFR®.

To order these products, please contact Sigma-Aldrich
at 800-325-3010 or sigma-aldrich.com.

ProteoMass™ MALDI Calibration Kits

The most flexible kits for routine MS calibration.

The expanding field of proteomics involves many unique aspects, particularly in terms of specific reagent needs for MALDI MS analysis – Sigma understands and meets these needs. The ProteoMass family of products includes conveniently packaged kits, highly purified matrices and solvents, and a wide range of well-recognized, pre-qualified calibrants. Developed and use-tested specifically for MALDI-MS, each ProteoMass reagent is stringently assayed to ensure optimal MALDI performance and compatibility. Great care is taken to certify the absence of salts and metal ions, improving the ionization efficiency of species of interest and avoiding the generation of ambiguous spectral adducts. Specialized packaging eliminates potential introduction of contaminant oils, ions or other substances. Corrosive solvents are provided ready-to-use to minimize handling and promote safety. Because your time is valuable, ProteoMass products also address your needs for expediency and efficiency – thorough processing and convenient packaging allow you to skip time-consuming purification and weigh-up steps, and enable you to focus on the acquisition of quality data.

Calibrate, tune and test sensitivity with ProteoMass MALDI Calibration Kits and individual reagents – the answers to your MALDI-MS reagent needs!

ProteoMass Formats and Components

Available in ProteoMass Kits or individually

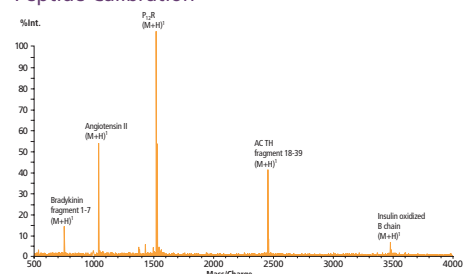
	Description	(M+H) ⁺	Components		
			Protein & Peptide Kit	Peptide Kit	Protein Kit
Matrices	α-Cyano-4-hydroxycinnamic acid		✓	✓	
	3,5-Dimethoxy-4-hydroxycinnamic acid		✓		✓
Calibrants	Bradykinin Fragment 1-7 (human)	757.3997 (monoisotopic)	✓	✓	
	Angiotensin II (human)	1,046.5423 (monoisotopic)	✓	✓	
	P ₁₄ R (synthetic peptide)	1,533.8582 (monoisotopic)	✓	✓	
	ACTH Fragment 18-39 (human)	2,465.1989 (monoisotopic)	✓	✓	
	Insulin oxidized B chain (bovine)	3,494.6513 (average)	✓	✓	
	Insulin (bovine)	5,730.6087 (monoisotopic)	✓	✓	
		5,734.51 (average)	✓		✓
	Cytochrome c (equine)	12,361.96 (average)	✓		✓
	Apomyoglobin (equine)	16,952.27 (average)	✓		✓
	Aldolase (rabbit muscle)	39,212.28 (average)	✓		✓
Solvents	Albumin (bovine serum) - BSA	66,430.09 (average)	✓		✓
	0.1% Trifluoroacetic acid (TFA) solution		✓	✓	✓
	Acetonitrile (ACN)		✓	✓	✓
	1% Trifluoroacetic acid (TFA) solution		✓	✓	✓

Ordering Information

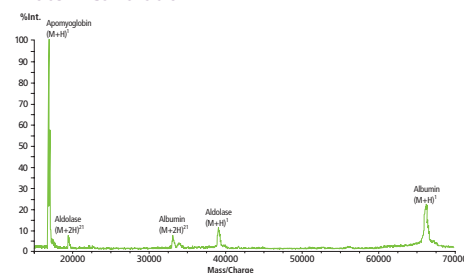
Product Code	Description	Size
MS-CAL1	ProteoMass Peptide & Protein MALDI-MS Calibration Kit	1 kit
MS-CAL1	ProteoMass Peptide MALDI-MS Calibration Kit	1 kit
MS-CAL3	ProteoMass Protein MALDI-MS Calibration Kit	1 kit
C 8982	α-Cyano-4-hydroxycinnamic acid	10 x 10 mg
S 8313	3,5-Dimethoxy-4-hydroxycinnamic acid	10 x 10 mg
B 4181	Bradykinin Fragment 1-7 (human)	5 x 10 nmol
A 8846	Angiotensin II (human)	5 x 10 nmol
P 2613	P ₁₄ R (synthetic peptide)	5 x 10 nmol
A 8346	ACTH Fragment 18-39 (human)	5 x 10 nmol
I 6154	Insulin oxidized B chain (bovine)	5 x 10 nmol
I 6279	Insulin (bovine)	5 x 10 nmol
C 8857	Cytochrome c (equine)	5 x 10 nmol
A 8971	Apomyoglobin (equine)	5 x 10 nmol
A 9096	Aldolase (rabbit muscle)	5 x 10 nmol
A 8471	Albumin (bovine serum) - BSA	5 x 10 nmol



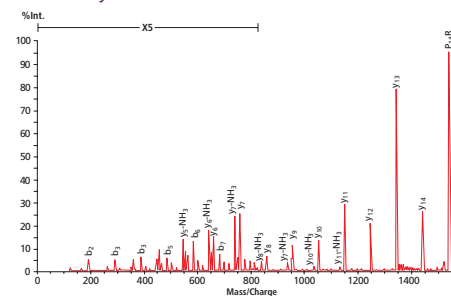
Peptide Calibration



Protein Calibration



PSD Analysis



Post source decay analysis of P₁₄R using α-cyano-4-hydroxycinnamic acid as the MALDI matrix. Data was acquired on a Kratos® AXIMA-CFR® system™ in positive ion reflectron mode.

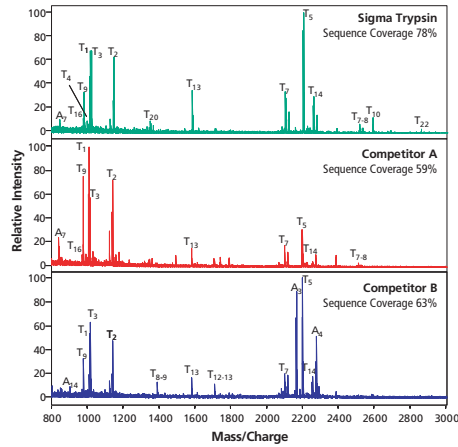
To order these products, please contact Sigma-Aldrich
at 800-325-3010 or sigma-aldrich.com.

Trypsin, Proteomics Grade

Superior Sequence Coverage Without Ambiguous Peaks!

Proteomics Grade Trypsin shows higher proteolytic efficiency than competitor's products, generating more tryptic peptides leading to greater sequence coverage of your proteins of interest. Mass spectra are significantly simplified due to the reduced number of interfering autolytic peaks and their ambiguous adducts. (Concerns over the lack of internal calibrant peaks at low mass may be addressed by calibrating on matrix peaks that routinely appear in the mass spectrum under normal circumstances.) Proteomics Grade Trypsin has been extensively purified from porcine pancreas to enable accurate and precise cleavage on the carboxylic acid side of Arg and Lys residues. The enzyme has been exhaustively processed by reductive methylation to minimize autolysis and chymotryptic activity quenched by TPCK (N-Tosyl-L-phenylalanine chloromethyl ketone) treatment. Further purification steps including affinity chromatography and lyophilization from dilute acid produce a highly-purified, high specific activity trypsin purposely suited for the demanding criteria of proteomics research, and is designed to function for either in-solution or in-gel digests. The enzyme is conveniently packaged in five 20 µg vials to ensure fresh enzyme is available for each use.

Sigma's Proteomics Grade Trypsin leads to greater sequence coverage



To compare trypsin from Sigma and two other suppliers, a sequence coverage experiment was performed. In each instance, 20 pmol of carbonic anhydrase was run on a 10% tris-glycine SDS-PAGE gel. The gel was stained with EZBlue Gel Staining Reagent (G 1041). Following destaining, the bands were excised and subject to tryptic digestion with the Trypsin Profile IGD Kit (PP0100). MALDI analysis was performed in positive ion reflectron mode using α -cyano-4-hydroxycinnamic acid (10 mg/ml in 70% ACN, 0.03% TFA) as the matrix. The sample was mixed 1:1 with the matrix and 1 µl was spotted onto the MALDI target.

Legend

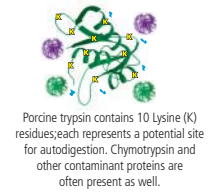
Tryptic Fragment	Amino Acids	(M+H) ⁺
T ₁	1-8	1013.4593
T ₂	9-17	1140.5451
T ₃	18-26	1018.4958
T ₄	27-35	1001.5268
T ₅	36-56	2198.2185
T ₇	58-75	2098.8776
T ₉	80-88	979.4849
T ₁₀	89-110	2582.1925
T ₁₃	113-125	1581.8178
T ₁₄	126-147	2253.1556
T ₁₆	158-166	973.5570
T ₂₀	212-223	1346.6990
T ₂₂	226-250	2852.4769

Missed Cleavages

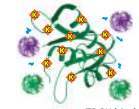
T ₇₋₈	58-79	2510.1622
T ₈₋₉	76-88	1390.7694
T ₁₂₋₁₃	112-125	1709.9128

Ordering Information

Product Code	Description	Size
T 6567	Trypsin, Proteomics Grade	5 x 20 µg



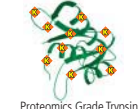
Total dimethylation of the ε-amino groups of lysine protects trypsin from autodigestion.



Affinity purification removes contaminants, improving activity and preventing ambiguous MALDI spectra.



Proteomics Grade Trypsin is dimethylated at each Lysine (K) residue, preventing autodigestion. Any residual inactivated Chymotrypsin molecules and other minor contaminants have been removed.



Proteomics Grade Trypsin is dimethylated at each Lysine (K) residue, preventing autodigestion. Any residual inactivated Chymotrypsin molecules and other minor contaminants have been removed.

Trypsin	Contaminants
Lysine Residue	Methyl Groups
Chymo-trypsin	TPCK

Trypsin Profile IGD Kit

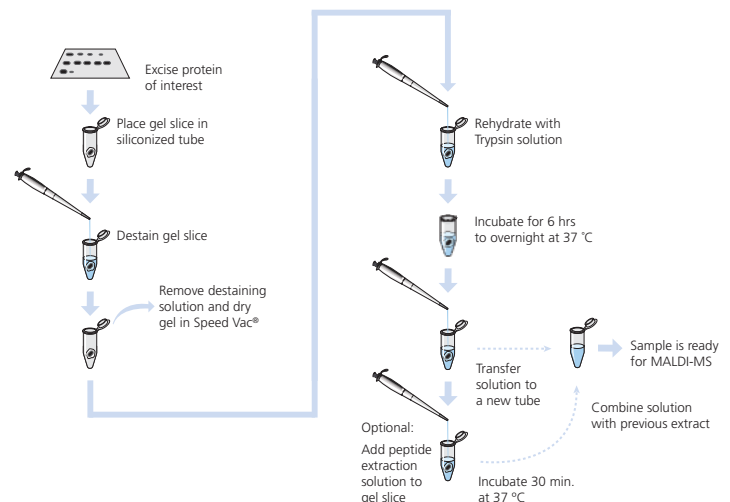
Fast, Efficient, Complete Digestion, from PAGE to MALDI.

The Trypsin IGD Kit enables fast, efficient, and complete in-gel tryptic digest of up to 100 excised protein spots. Digested proteins are ready for MALDI-MS and require no additional preparation. Because the Trypsin IGD Kit contains Proteomics Grade Trypsin, a higher sequence coverage and fewer ambiguous autolytic peaks are observed in MALDI spectra.

The Trypsin IGD Kit contains Proteomics Grade Trypsin and is optimized for polyacrylamide gels stained with Coomassie, SYPRO® Orange or Ruby dyes. If silver staining is used, ProteoSilver™ Plus, silver staining kit is recommended (Product Code PROT-SIL2).

Components

- Proteomics Grade Trypsin
- Destaining Solution
- Trypsin Reaction Buffer
- Biotech Grade Acetonitrile
- Trypsin Solubilization Reagent
- Peptide Extraction Solution



Ordering Information

Product Code	Description	Size
PP0100	Trypsin Profile IGD Kit	1 kit