

VARIAN, INC.

VariPep™ Peptide Solution

THE COST-EFFECTIVE SOLUTION FOR THE PRODUCTION OF SYNTHETIC PEPTIDES



NOTICE: This document contains references to Varian. Please note that Varian, Inc. is now part of Agilent Technologies. For more information, go to **www.agilent.com/chem**.

Targeted to the Production of Synthetic Peptides...

VariPep™ – Varian's Peptide Solution

Varian, Inc. has designed a portfolio of products to enable you to manage the cost and efficiency of high volume synthetic peptide production, from µg to g scale.

The VariPep Solution for synthetic peptide production brings you proven, reliable, technologies in a simplified format.

Solutions for Synthesis

From the extensive range of StratoSpheres™ resins for high throughput organic synthesis, those resins designed specifically for solid phase peptide synthesis have been selected for VariPep – Varian's Peptide Solution. The StratoSpheres proprietary production process gives highly controlled loading, ensuring the maximum number of full length peptide sequences and providing more product per synthesis.

Solutions for Analysis & Purification

VariTide™ RPC is a high efficiency, single, 'universal', HPLC column for the analysis and purification of all synthetic peptides, replacing the need for multiple column stock.

VariPure™ IPE (Ion Pair Extraction) is a novel, flow-through media for the fast removal of acidic ion pairing agents from your HPLC fractions and conversion of peptide salts to their freebase form. This simple system requires no capital equipment.



Features of Varian's Peptide Solution include:

- Reliable supply
- Exceptional batch to batch reproducibility
- No leachables/extractables from your synthesis and purification media to contaminate your peptide product
- Minimized inventory of resins, columns and ion pair extraction devices

With the benefit of:

- Eliminating production delays by agreed delivery dates
- Easily maximized product yield, using the same protocol for each batch
- Better product quality with no contamination of your peptide
- Reduced storage requirement and maximized cash flow

StratoSpheres™: Highest Quality Supports for Peptide Synthesis

Features of StratoSpheres Resins include:

- StratoSpheres particles are manufactured to a tightly controlled specification
- StratoSpheres particles are manufactured using a proprietary manufacturing technique, which ensures exceptional control of loading and reproducibility



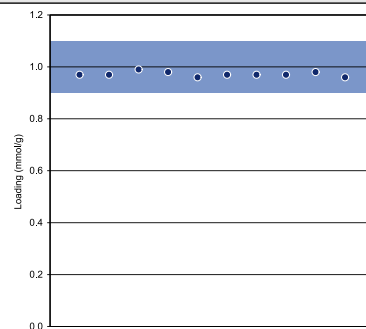
With the benefit of:

- Consistent, reliable performance, synthesis after synthesis
- Fewer failure sequences giving more peptide per synthesis with lower consumption of amino acids, reducing raw material costs.

Reproducibility

This plot shows the exceptional loading reproducibility of 10 batches of PL-CMS Resin (1.0 mmol/g 75-150 µm), manufactured over a period of years.

Resin: StratoSpheres
PL-CMS Resin 1.0 mmol/g
75-150 µm Batch



StratoSpheres supports are available for both Fmoc and Boc synthesis strategies for the production of C-terminal peptide acids and peptide amides. A range of synthesis supports conveniently pre-loaded with the first amino acid, is also available.

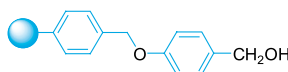
Product Range

Peptide Acids

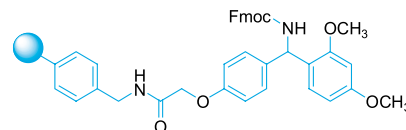
Peptide Amides

Fmoc

PL-Wang Resin



PL-Rink Resin

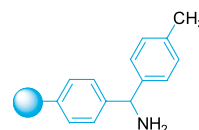


Boc

PL-CMS Resin



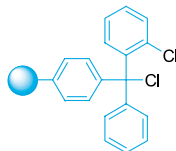
PL-MBHA Resin



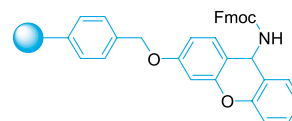
PL Cl-Trt-Cl and PL-Sieber synthesis supports are available for producing peptides which are cleaved under mild conditions with the protecting groups still attached.

Protected Fmoc

PL Cl-Trt-Cl Resin



PL-Sieber Resin



Ordering Information

Product	Specifications	Qty	Item Number	Qty	Item Number
PL-Wang Resin*	1% DVB, 0.9 mmol/g, 75-150 µm	5 g	PL1463-1799	25 g	PL1463-3799
PL-CMS Resin*	1% DVB, 1.0 mmol/g, 75-150 µm	5 g	PL1461-1799	25 g	PL1461-3799
PL-Rink Resin*	1% DVB, 0.7 mmol/g, 75-150 µm	5 g	PL1467-1799	25 g	PL1467-3799
PL-MBHA Resin*	1% DVB, 1.1 mmol/g, 75-150 µm	5 g	PL3484-1799	25 g	PL3484-3799
PL Cl-Trt-Cl Resin	1% DVB, 1.4 mmol/g, 75-150 µm	5 g	PL3473-1799	25 g	PL3473-3799
PL-Sieber Resin	1% DVB, 0.6 mmol/g, 75-150 µm	5 g	PL3483-1799	25 g	PL3483-3799

* Also available with all natural amino acids attached

For details of the full range of StratoSpheres resins, please refer to the website at www.varianinc.com/stratospheres

VariTide™ RPC – A 'Universal' RP-HPLC Column for Synthetic Peptides

Varian has introduced a single, 'universal', column for the analysis and purification of synthetic peptides to maximize throughput and improve purification economics. This one column replaces the range of media which would previously have been required for different peptide sizes and eluents, simplifying column choice and minimizing column inventory.

VariTide RPC is a high efficiency, small particle packing, with a pore size optimized for high capacity across the peptide size range, from 5 to 60 amino acids. The column is designed for use across the pH range, making it suitable for the analysis and purification of acid or basic and hydrophilic or hydrophobic peptides, using acid/neutral/basic eluents.

Essential Characteristics of VariTide RPC for the Peptide Market include:

- Separations run at elevated temperature and pH, and under acidic, neutral and basic conditions
- Robustness and Durability
- Single, easy to use, 'universal' column

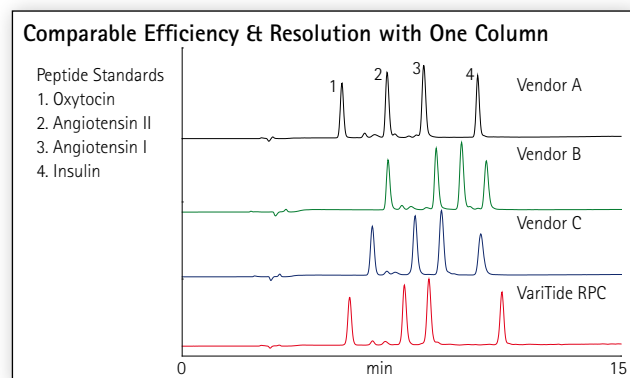


Figure 1.
The efficiency and resolution of VariTide RPC is better than, or comparable to, industry-standard RP columns with the conventional 0.1% TFA eluent.

Column: VariTide RPC, 250 x 4.6 mm
Eluent A: 0.1% TFA in 20% ACN
Eluent B: 0.1% TFA in 50% ACN
Gradient: 0-100% B in 15 mins
Flow Rate: 1.0 mL/min
Detector: UV, 220nm

Ordering Information

Item Number	Description	Dimensions
PL1512-5A05	VariTide RPC	250 x 4.6 mm
PL1012-5A05	VariTide RPC	250 x 10 mm
PL1E12-5A05	VariTide RPC	250 x 21.2 mm
PL1412-4A05	VariTide RPC	100 g
PL1412-6A05	VariTide RPC	1 kg

Three pre-packed column sizes are available:

- 250 x 4.6 mm column dimension for analytical and µg prep
- 250 x 10 mm column dimension for small scale prep
- 250 x 21.2 mm column dimension for mg to g scale

For laboratories using Dynamic Axial Compression (DAC)/Static Axial Compression (SAC) column hardware, VariTide RPC loose media is supplied.



With the benefit of:

- Improved efficiency and resolution to give higher purity product in a single run
- Long column lifetimes which provide more purification cycles per column for improved economics
- Simplified purification with fewer columns required, increasing the number of peptides produced.

Purify at High pH using the Same 'Universal' Column

HPLC screening runs of a crude peptide produced by solid phase synthesis. Chromatogram A was produced using 0.1% TFA as the ion pairing agent and a gradient from 5 to 50% ACN. Chromatogram B was obtained using a gradient of 5 to 50% ACN in 20mM Ammonium carbonate, pH 9.5. Both linear gradients were run over 30 minutes and for this screening run, the mobile phase linear velocity was 360 cm/h.

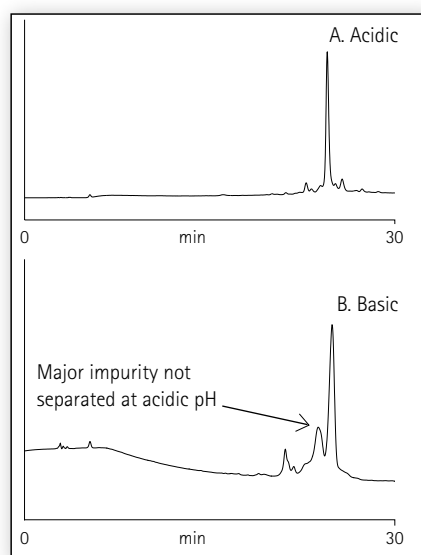


Figure 2.
As the complexity of the synthetic peptides increases, alternative conditions are needed either to solubilize the peptide or to resolve the closely related sequences. Using the same VariTide RPC column, analysis and purification can also be accomplished at high pH.

VariPure™ IPE Ion Pair Extraction

Post reversed-phase purification, a finishing process may be required to remove acidic ion pairing agents, such as TFA, from the HPLC fraction and/or peptide.

Varian has designed VariPure IPE as a high performance, economic, acid removal material. To eliminate the need for expensive capital equipment, the media is supplied in convenient, pre-packed SPE tubes. Acids, such as TFA, are removed by passing the fraction under gravity through the SPE device.

The particle size, capacity and device geometry have been matched to provide sufficient residence time to achieve effective ion pair extraction. The resulting fraction is free of any charged or inorganic species.

VariPure IPE Advantages

- VariPure IPE is a spherical, polymeric, particle with a narrow particle size distribution. This provides high capacity with a uniform flow, using only small volumes
- For acid labile peptides, removal of the ion pairing agent prevents degradation of the peptide during subsequent work up

Simple, Effective Performance

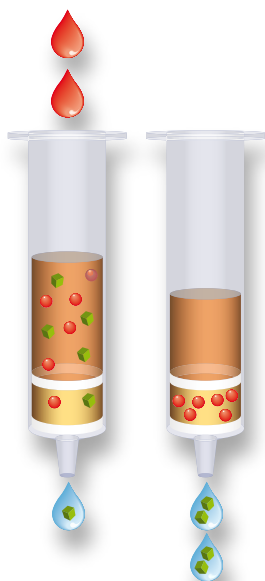


Figure 1. shows the selective removal of TFA (red) from an HPLC mobile phase containing peptide (green) using the VariPure IPE device.



With the benefit of:

- Minimized cost
- Higher yield of purified peptide

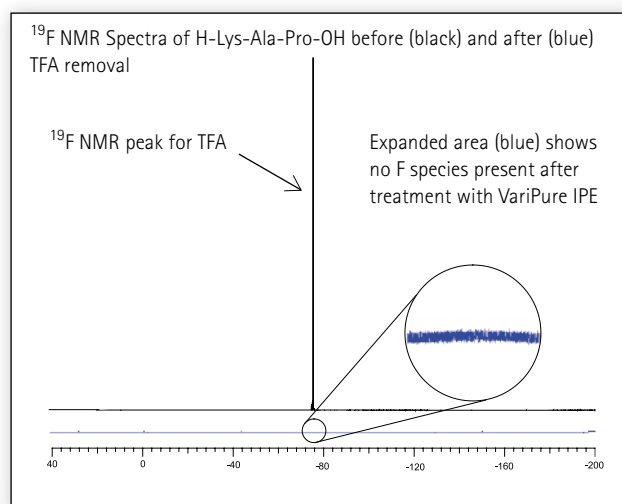


Figure 2. illustrates the absence of Fluorine after treatment with VariPure IPE.

Ordering Information

Item Number	Description	Quantity
PL3540-D603VP	VariPure IPE	50 x 3 mL tubes (100 mg each)
PL3540-C603VP	VariPure IPE	50 x 6 mL tubes (500 mg each)
PL3540-P603VP	VariPure IPE	25 x 20 mL tubes (1 g each)
PL3540-3603VP	VariPure IPE	25 g

HPLC Equipment Portfolio from Varian, Inc.

Varian can guide you through the complexities of the analysis and purification of biomolecules, as it is the only company to provide instrumentation, columns and media and technical expertise to take you from discovery to full scale manufacturing.

Analytical Instrumentation & Consumables

Varian manufactures a comprehensive range of analytical HPLC equipment and columns for use in peptide applications, including nano, capillary and micro columns and LC/MS instrumentation. Visit our Web site for further details at www.varianinc.com.

Research & Small Scale Production Systems

Load & Lock™ Columns for High Performance Purification

The innovative Load & Lock columns and packing station provide an economic alternative to 1", 2" and 3" pre-packed prep columns. Columns can be packed in Dynamic Axial Compression mode and operated in Static Axial Compression mode, with multiple columns packed using one packing station. Improved separation efficiency is provided by water-jacketed columns, for oligonucleotide purification.

Scale-Up 1 Format for High Efficiency Separations

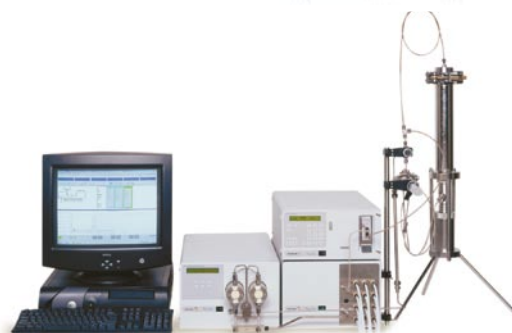
Varian offers high performance, high efficiency laboratory prep systems using small particle HPLC materials - including VariTide RPC and Pursuit XRs - to reliably deliver mg to g quantities of product.

Scale-Up 2 Format for High Throughput Separations

Varian's scale-up 2 format systems are designed for prep/process chromatography in overload conditions to economically deliver mg to kg quantities of product.

Skid Systems for Maximum Productivity

Varian offers a range of systems for prep/process chromatography for large scale pharmaceutical and bio-molecule production. Larger particle size reversed phase - PLRP-S and Microsorb™ - and ion exchange - including PL-SAX and PL-SCX - media are used to efficiently deliver kg to multi kg quantities of product



Forging Partnerships to Provide Applications Solutions



As a customer-focussed company, Varian, Inc. has recognized the requirement for a generic solution for the synthesis, analysis and purification of synthetic peptides.

Varian has integrated innovative technologies from Polymer Laboratories, manufacturer of quality products for synthetic peptide production and now part of Varian, Inc., to create its VariPep Peptide Solution.

Polymer Laboratories has been manufacturing polystyrene/divinylbenzene (PS/DVB) particles since 1976. Its media and resin production is tightly controlled and monitored within a stringent quality system, ensuring product reproducibility from batch to batch throughout the entire product range.

An innovative approach to product development has resulted in a range of world-class commercial and custom products spanning the synthesis, identification and purification of small to large biomolecules. Polymer Laboratories' particle products include oligonucleotide and solid phase synthesis supports and clinical diagnostic particles, through to high performance separation media. Polymer Laboratories' customers include leading global pharmaceutical and bioscience companies, many of whom use these particles in cGMP production.

- 1976 PS/DVB particle production commences
- 1976 PLgel/PL aquagel-OH gel permeation/size exclusion chromatography media
- 1984 PLRP-S reversed phase media
- 1986 Preparative HPLC media
- 1986 PL-SAX/PL-SCX strong anion/cation exchange media
- 1988 Diagnostic latex particles
- 1992 StratoSpheres solid phase synthesis supports
- 1995 PL Hi-Plex ligand exchange media
- 1997 ISO 9001 Accreditation
- 1999 Process scale HPLC media
- 2001 Drug Master File, Type II, for PLRP-S
- 2002 New, state of the art, particle production facility
- 2003 PL-WAX/PL-WCX weak anion/cation exchange media
- 2005 LodeStars superparamagnetic particles



Advantages of this Partnership include:

- State of the art manufacturing facility
- Large volume production
- ISO 9001:2000 accredited manufacturing
- Global sales and support organization

With the benefit of:

- Product reproducibility
- Continuity of supply
- Product that works, every time
- Rapid delivery times and local experts

Integrating Polymer Laboratories' particle expertise with Varian's global infrastructure and customer service makes Varian your single source supplier.



VARIAN



Polymer Laboratories

Now a part of Varian, Inc.

VARIAN, INC.

VariPep™ Peptide Solution

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Varian, Inc. – Supporting Customers Worldwide

All products are eligible for on-demand support from a worldwide network of specialists who can assist with any need.

Varian, Inc. offers:

- Comprehensive programs that include a full range of services – including applications support and training.
- Factory-qualified Field Support Representatives and Specialists, specifically chosen for each installation.
- Global support teams strategically located around the world.

To learn more about Varian's industry leading customer support, visit our Web site at www.varianinc.com/support/.

Varian, Inc. – serving markets worldwide

Biosciences

Pharmaceuticals

Clinical Research and Forensics

Food and Agriculture

Chemical Analysis

Environmental

Fuels and Energy

Material Sciences

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Other sales offices and dealers throughout the world check our Web site.

www.varianinc.com

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