

Performance of XSelect™ Premier Peptide VanGuard FIT Columns for Reversed-phase Peptide Separations

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This is an Application Brief and does not contain a detailed Experimental section.

Abstract

Waters MaxPeak™ Premier reversed-phase columns are equipped with MaxPeak High Performance Surface (HPS) hardware that is designed to minimize undesired analyte/column hardware surface interactions. In this technology brief, we show that the use of the Premier Peptide VanGuard™ FIT (Fully Integrated Technology) Guard Cartridge, that contains the same reversed-phase chemistry as contained in the analytical column, has no significant impact on the quality of peptide separations.

Goal

To demonstrate that the MaxPeak Premier Peptide VanGuard FIT Integrated Guard Cartridge does not significantly impact on the quality of peptide separations when compared to the same premier peptide reversed-phase analytical column with no guard device.

Introduction

Previously, VanGuard FIT Columns have been shown to extend the lifetime of analytical columns by preventing particulates and chemical fouling without compromising the desired separation.¹

The MaxPeak Premier Peptide VanGuard FIT Cartridges are equipped with MaxPeak HPS hardware that is designed to minimize the analyte-column surface interaction. These Guard Cartridges are designed to work with MaxPeak Premier RP analytical columns that contain particles with the same surface chemistry.

Experimental

Figure 1 shows the separation of a MassPREP™ Peptide Standard Mix (p/n: [186002337 <https://www.waters.com/nextgen/global/shop/standards--reagents/186002337-massprep-peptide-mixture.html>](https://www.waters.com/nextgen/global/shop/standards--reagents/186002337-massprep-peptide-mixture.html) or [186002338 <https://www.waters.com/nextgen/global/shop/standards--reagents/186002338-massprep-peptide-mixture-5-pk.html>](https://www.waters.com/nextgen/global/shop/standards--reagents/186002338-massprep-peptide-mixture-5-pk.html)) on an XSelect Premier Peptide CSH™ C₁₈ 130 Å, 2.5 µm Column (2.1 x 150 mm, p/n: [186009906 <https://www.waters.com/nextgen/global/shop/columns/186009906-xselect-premier-peptide-csh-c18-column-130a-25--m--21-x-150-mm-1.html>](https://www.waters.com/nextgen/global/shop/columns/186009906-xselect-premier-peptide-csh-c18-column-130a-25--m--21-x-150-mm-1.html)) with and without the XSelect Premier Peptide CSH C₁₈, 2.5 µm VanGuard FIT Cartridge (2.1 x 5 mm, p/n: [186010718 <https://www.waters.com/nextgen/global/shop/columns/186010718-xselect-premier-peptide-csh-c18-column-130-a-25--m--21-x-5-mm-va.html>](https://www.waters.com/nextgen/global/shop/columns/186010718-xselect-premier-peptide-csh-c18-column-130-a-25--m--21-x-5-mm-va.html)). Both the chromatograms (Figure 1a) and the peak capacity (Figure 1b) are highly similar. As predicted, the retention time is slightly longer for the separation on the XSelect Premier Peptide Column that contained the Premier VanGuard FIT Cartridge.

1A

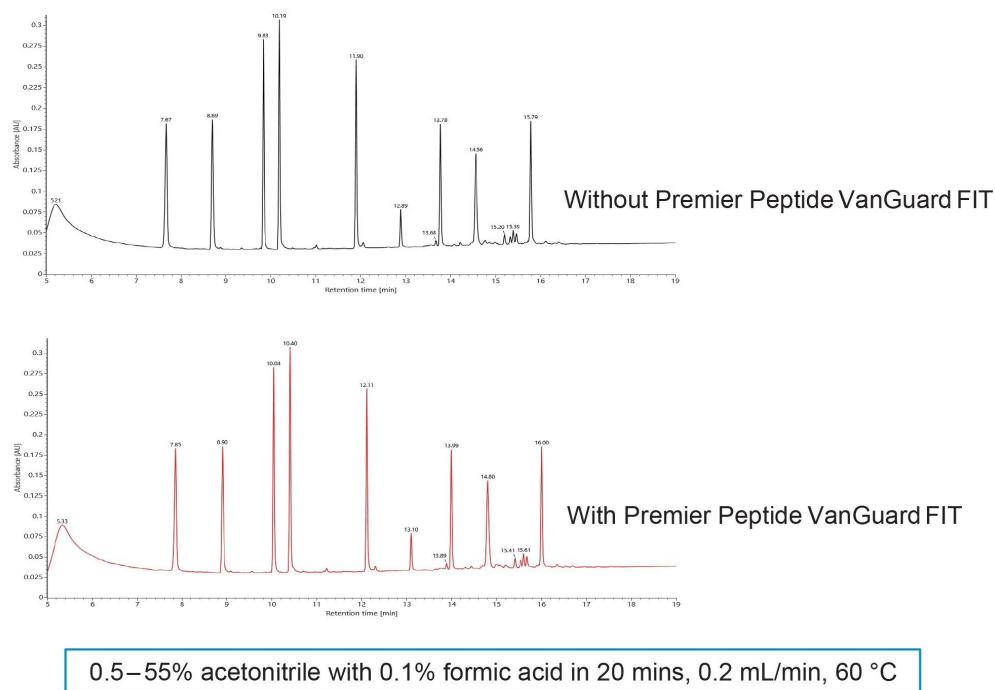


Figure 1. Separation of a MassPREP Peptide Standard Mix on an XSelect Premier Peptide CSH C₁₈ 130 Å, 2.5 µm Column (2.1 x 150 mm) with and without the XSelect Premier Peptide CSH C₁₈, 2.5 µm VanGuard FIT Cartridge (2.1 x 5 mm).

a. Reversed-phase chromatograms, UV detection at 214 nm;

1B

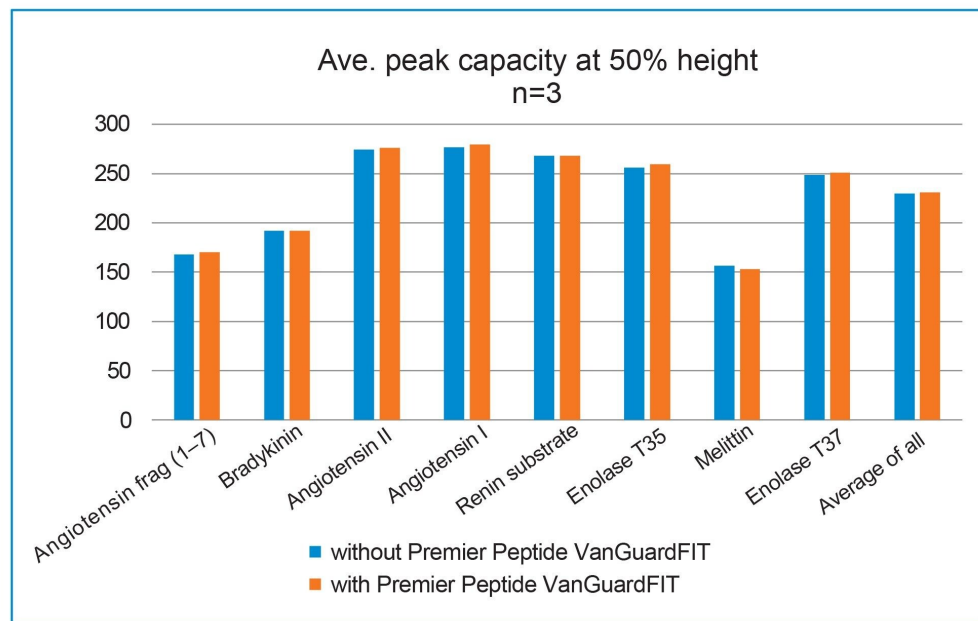
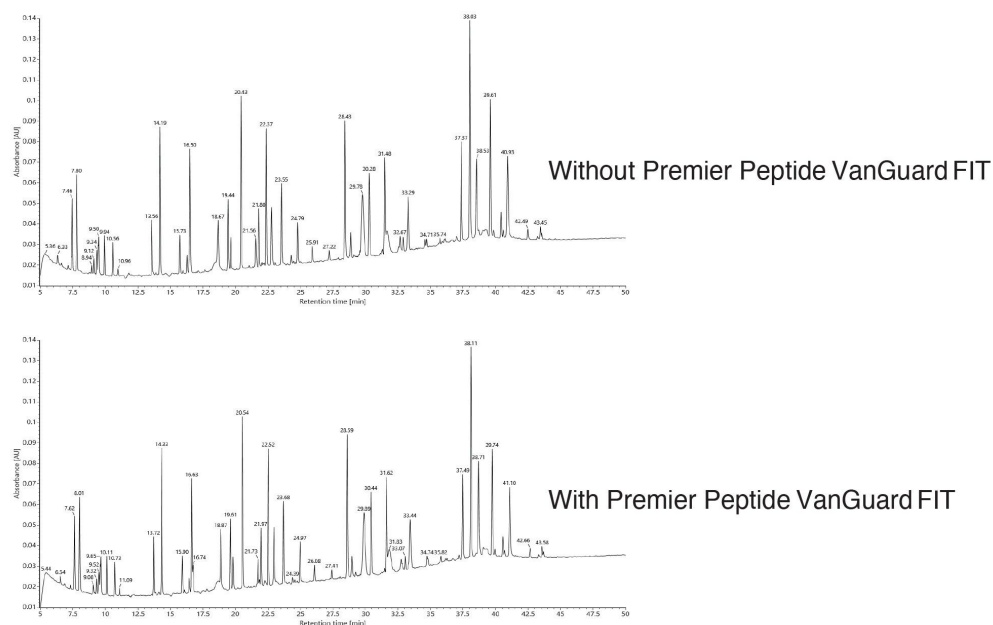


Figure 1b. Peak capacity comparison.

Figure 2 shows the separation of a mAb Tryptic Digestion Standard (p/n: 186009126 < <https://www.waters.com/nextgen/global/shop/standards--reagents/186009126-mab-tryptic-digestion-standard.html>>) on an XSelect Premier Peptide CSH C₁₈ 130 Å, 2.5 µm Column (2.1 x 150 mm) with and without the XSelect Premier Peptide CSH C₁₈, 2.5 µm VanGuard FIT Cartridge (2.1 x 5 mm). Again, the chromatograms look highly similar (Figure 2a), and the retention time of the ten most abundant peaks correlate very well (Figure 2b).

2A



0.5–50% acetonitrile with 0.1% formic acid in 60 mins, 0.2 mL/min, 60 °C

Figure 2. Separation of a mAb Tryptic Digestion Standard on an XSelect Premier Peptide CSH C₁₈ 130 Å, 2.5 µm Column (2.1 x 150 mm) with and without the XSelect Premier Peptide CSH C₁₈, 2.5 µm VanGuard FIT Cartridge (2.1 x 5 mm).

a. Reversed-phase chromatograms, UV detection at 214 nm;

2B

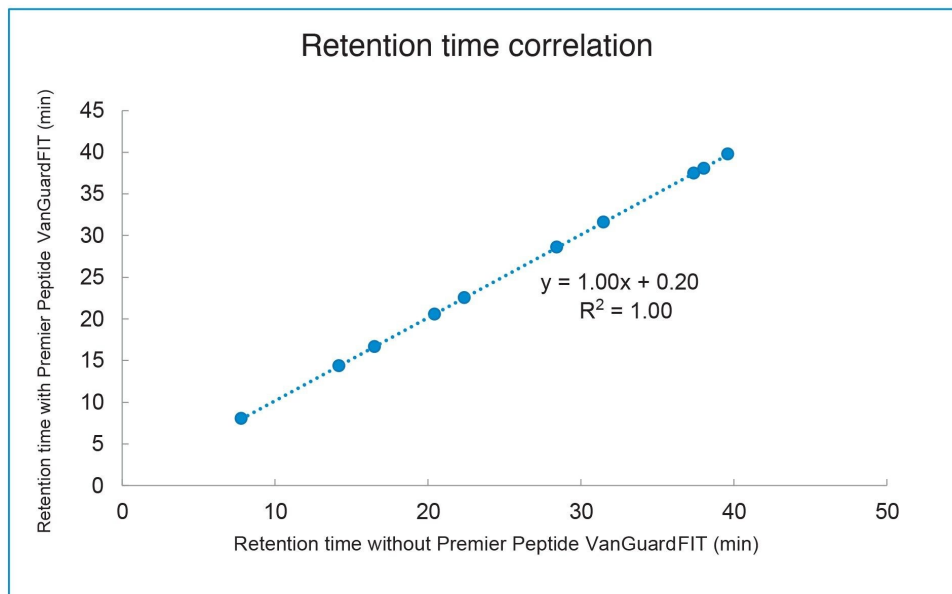


Figure 2b. Retention time correlation of the ten most abundant peaks.

Conclusion

The XSelect Premier Peptide VanGuard FIT (Fully Integrated Technology) Cartridge has no significant impact on the quality of the peptide separation (peak capacity, resolution, selectivity) on the analytical column that contains the same reversed-phase chemistry. Available MaxPeak Premier Peptide VanGuard FIT Cartridge chemistries include CSH C₁₈ 130 Å, BEH™ C₁₈ 130 Å, BEH C₁₈ 300 Å, and HSS T3 C₁₈ 100 Å. XSelect Premier Oligo VanGuard FIT Cartridges are also available to be used for the XSelect Premier Oligo BEH C₁₈ 130 Å analytical columns. Small particle size version of the above RP chemistries (ACQUITY™ Premier Peptide and ACQUITY Premier Oligo VanGuard FIT) are available.

References

1. Shiner S., Delano M., Lauber M., Rzewuski S., Warren B., McLaughlin J., and Byrd S. VanGuard FIT: A

Breakthrough in Guard Column Performance for Challenging Chromatographic Separations. Waters Technology Brief, 2019, [720006500](#).

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