

Increasing Sample Throughput Using CORTECS UPLC Columns

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

Abstract

This application brief demonstrates increased sample throughput on a CORTECS UPLC Column while maintaining separation performance.

Benefits

CORTECS UPLC Columns enable increased sample throughput while maintaining separation performance.

Introduction

In the world of liquid chromatography, a lengthy sample run-time can reduce overall laboratory productivity by monopolizing valuable instrument time and limiting the number of samples that can be processed. Decreasing sample analysis time to increase sample throughput can be challenging, as chromatographic attributes such as resolution or sensitivity are often sacrificed. With CORTECS UPLC Columns, sample throughput can increase while maintaining peak capacity.

Results and Discussion

CORTECS UPLC Columns offer high efficiency with the ability to maintain separation performance at higher flow rates due to advances in solid-core particle and packing technology. This allows chromatographers to increase the flow rate of their method, thereby shortening run-time and increasing throughput without compromising the quality of the separation. The analysis of sulfa drugs using a CORTECS UPLC C₁₈+ Column compared to the original separation on a fully-porous C₁₈ column is shown in Figure 1. The CORTECS UPLC C₁₈+ Column was run at twice the flow rate of the original separation, adjusting the gradient accordingly to account for the change in flow rate.

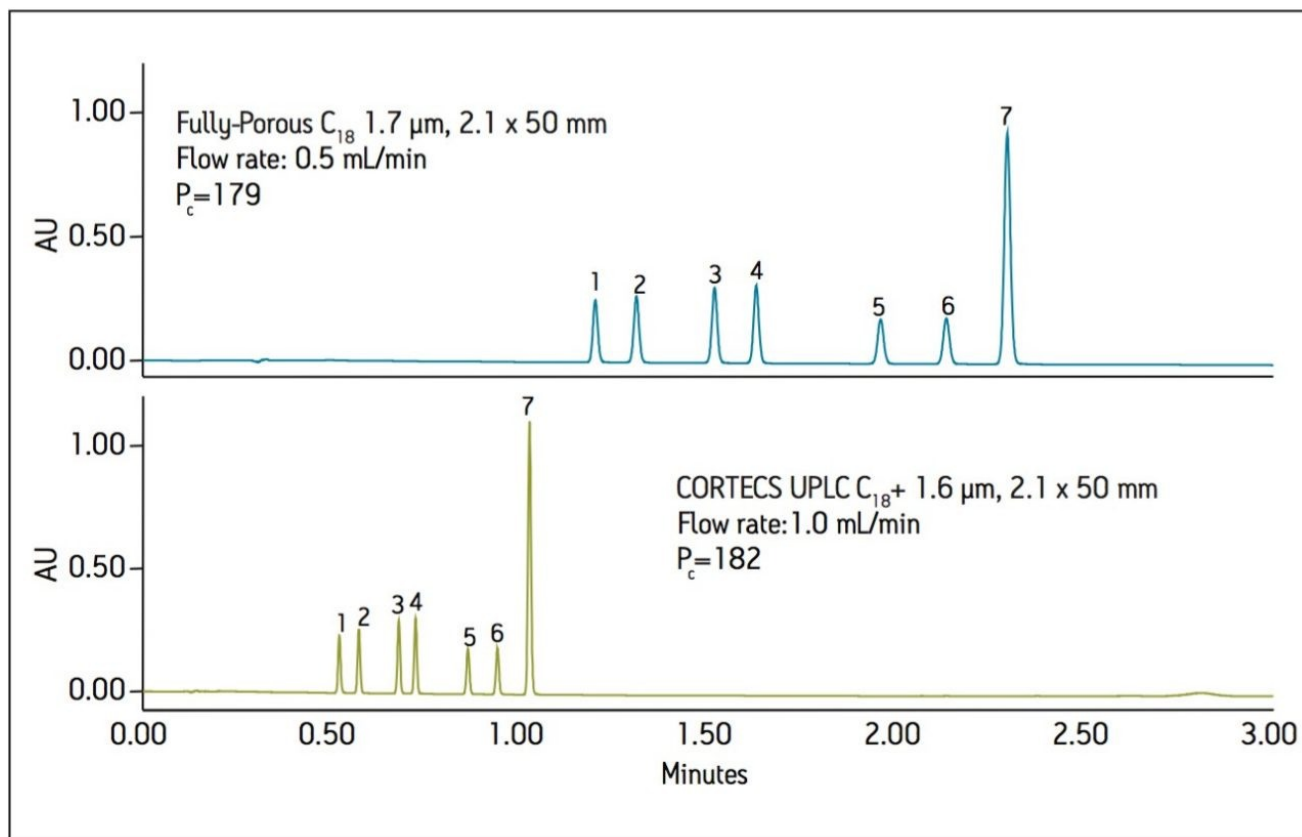


Figure 1. Separation of sulfa drugs, demonstrating the higher throughput capabilities of the CORTECS UPLC Columns. Compounds: 1) sulfathiazole, 2) sulfamerazine, 3) sulfamethazine, 4) sulfamethoxypyridazine, 5) sulfachloropyridazine, 6) sulfamethoxazole, and 7) sulfasoxazole. Peak capacity calculated using the equation $P_c = 1 + (t_g/P_w)$ where t_g equals gradient time, and P_w equals average peak width.

As Figure 1 demonstrates, the CORTECS UPLC C_{18+} Column can run at twice the flow rate while maintaining a peak capacity within 2%, compared to that of the original separation on the fully-porous column. In this example, the use of the CORTECS UPLC Column reduces sample analysis time by as much as 55%, more than doubling sample throughput.

Conclusion

Sample run-times can often be a limiting factor in a laboratory workflow. Waiting for a sample to be analyzed can delay further analyses, affecting laboratory productivity. While reducing sample analysis time is valuable, the quality of the separation should not be compromised. With the high efficiency of CORTECS UPLC Columns, samples can be analyzed more rapidly while still maintaining the peak capacity compared to the original

separation.

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