[TECHNOLOGY BRIEF]

Exact Control of Solvent Composition with the ACQUITY UPLC H-Class Quaternary Solvent Manager

GOAL

To determine the smallest adjustment in solvent composition available for controlling peak retention time with the quaternary solvent manager pumping module of the ACQUITY UPLC® H-Class System.

The ACQUITY UPLC H-Class quaternary pump delivers solvent compositions adjustable in increments of 0.1% with predictable effect on retention time.

BACKGROUND

The exact control of solvent composition, blending of mobile phase components, and total flow rate are required to tune a separation for optimal resolution and peak identification using retention time.

It is, therefore, necessary to measure the ability of a system to accurately deliver compositions differing by a small percentage. With this information, confident development of robust methods is possible.

THE SOLUTION

The ACQUITY UPLC H-Class System is based on a low pressure mixing, four-solvent pumping system that offers flexibility in solvent choice and delivery. To demonstrate how solvent composition and delivery can effect peak retention, a USP compendial method established for telmisartan and related compound A is used. Figure 1 shows the USP separation of telmisartan standard and related compound A run at organic composition set at 70%, according to USP assay guidelines.

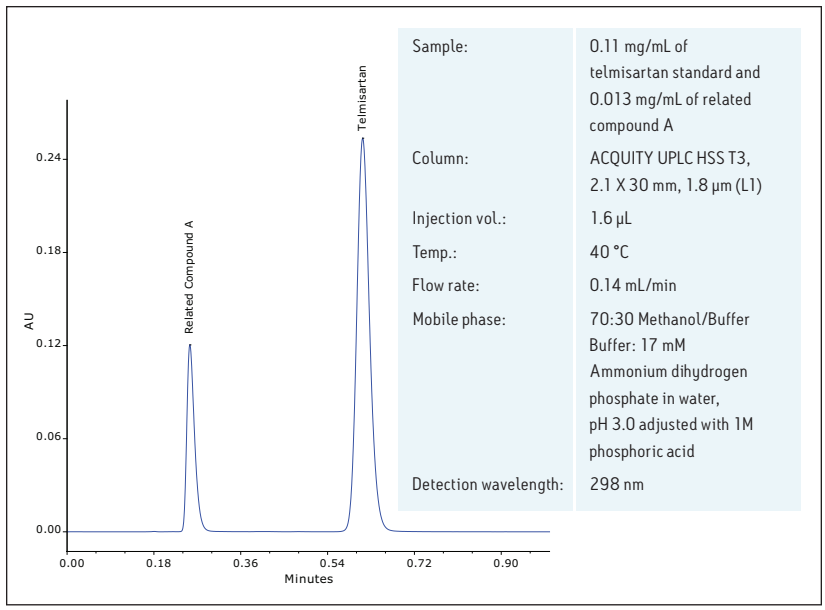
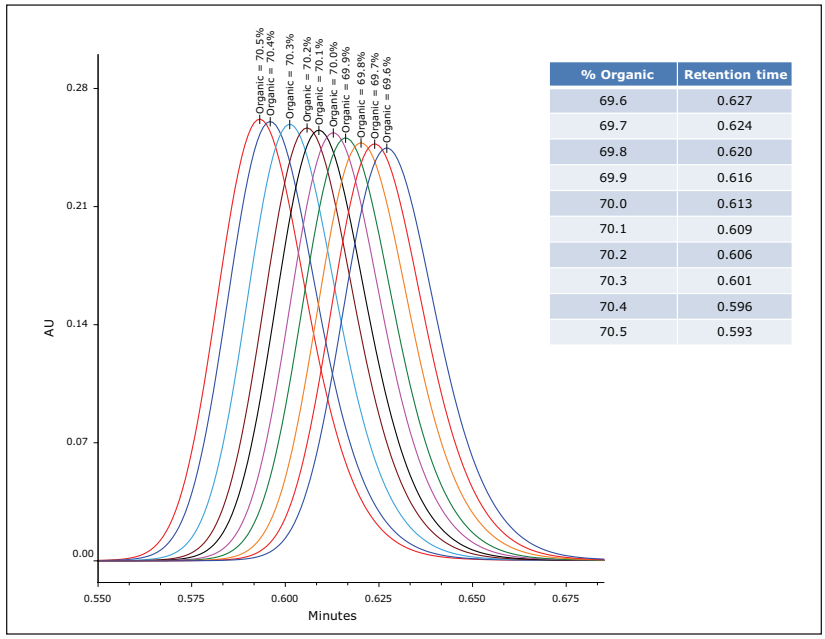


Figure 1. Telmisartan standard and related compound A separation run with 70% organic solvent.

Waters
THE SCIENCE OF WHAT'S POSSIBLE.™

The percentage of organic solvent delivered is increased in 0.1% increments. The example shows the effect on retention time from 69.6% organic to 70.5% organic in an isocratic separation. Change in 0.1% organic increments results in a corresponding shift in the standard peak retention time. Figure 2 clearly demonstrates that changing the organic solvent delivered by 0.1% increments impacts the standard peak elution.



% Organic	Retention time
69.6	0.627
69.7	0.624
69.8	0.620
69.9	0.616
70.0	0.613
70.1	0.609
70.2	0.606
70.3	0.601
70.4	0.596
70.5	0.593

Figure 2. Influence of 0.1% adjustment of solvent composition on peak elution.

SUMMARY

Control of flow rate, composition, and mixing are important characteristics of an LC pump. The four-solvent pumping unit of the ACQUITY UPLC H-Class System offers flexibility, and the ability to deliver solvent mixtures that differ by 0.1% composition. This capability can serve as a powerful tool to help identify optimal conditions for separating analytes in sample mixtures that are extremely sensitive to very small changes in organic composition.

Waters

THE SCIENCE OF WHAT'S POSSIBLE.™

Waters and ACQUITY UPLC are registered trademarks of Waters Corporation. The Science of What's Possible is a trademark of Waters Corporation. All other trademarks are the property of their respective owners.

©2012 Waters Corporation. Produced in the U.S.A.
July 2012 720004405EN AO-PDF

Waters Corporation
34 Maple Street
Milford, MA 01757 U.S.A.
T: 1 508 478 2000
F: 1 508 872 1990
www.waters.com