

Alternate Selectivity for Bases in UPLC using a Non-Endcapped Silica Stationary Phase

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A non-endcapped C₁₈ stationary phase bonded to a 1.8 μm high strength silica (HSS) particle substrate was developed to provide different selectivities in UltraPerformance Liquid Chromatography (UPLC® technology) separations. ACQUITY UPLC® HSS C₁₈ SB (Selectivity for Bases) columns provide alternate selectivity for bases under acidic conditions, and provide an additional UPLC method development tool.

Introduction

Waters ACQUITY UPLC HSS columns contain the only 100% silica particles designed, tested, and intended for use in applications up to 15,000 psi (1,000 bar). The most recent addition to this family of chemistries is the ACQUITY UPLC HSS C₁₈ SB column, which is designed to provide different selectivity for basic compounds when compared to traditional high coverage, fully endcapped C₁₈ chemistries. Example separations were developed for a mixture of basic drugs and some tricyclic antidepressants.

Experimental

System: Waters ACQUITY UPLC System with PDA detector
Columns: Indicated on figures; all columns tested in the 2.1 × 50 mm format

Mobile Phase: A: 10 mM NH₄COOH, pH 3.0 B: MeOH (basic drug mixture) **OR** ACN (tricyclic antidepressants)

Gradient: Indicated in figure captions

Flow Rate: 0.4 mL/min (basic drug mixture) **OR** 0.5 mL/min (tricyclic antidepressants)

Results and Discussion

Figure 1 shows the separation of seven different basic drug compounds on four sub-2 μm chemistries. Note the differences in selectivity between the four columns. This is best seen with the labetalol and quinine peaks (switch in elution order on the HSS C₁₈ SB column), and with verapamil and diltiazem, which are almost baseline resolved on the HSS C₁₈ SB chemistry. Second, the HSS C₁₈ SB column provides more retention for some extremely polar bases like aminopyrazine and pindolol.

This is further illustrated in the isocratic separation of tricyclic antidepressants (Figure 2). The HSS C₁₈ SB column retains these compounds much longer than the fully endcapped C₁₈ stationary phase. In addition, it provides alternate selectivity and better resolves all compounds when compared to a competing non-endcapped C₁₈ column.

Conclusions

Due to the increase in surface silanol interactions, the ACQUITY UPLC HSS C₁₈ SB column provides different selectivity under acidic conditions, especially for bases. When combined with the increased speed, sensitivity, and resolution of UPLC technology, this additional bonded phase provides another powerful tool for rapid and robust method

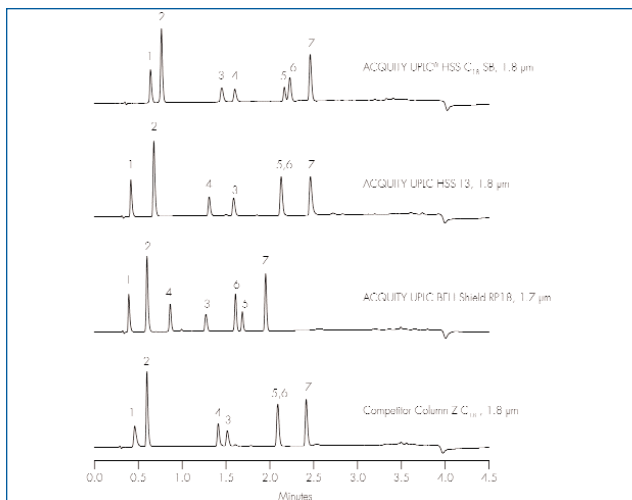


Figure 1. UPLC separation of seven basic drugs. All columns were in the 2.1 × 50 mm format. Gradient from 30-85% B in 3 min, hold at 85% B for 0.5 min, reset. UV 260 nm. Compounds (1) aminopyrazine, (2) pindolol, (3) labetalol, (4) quinine, (5) verapamil, (6) diltiazem, (7) amitriptyline.

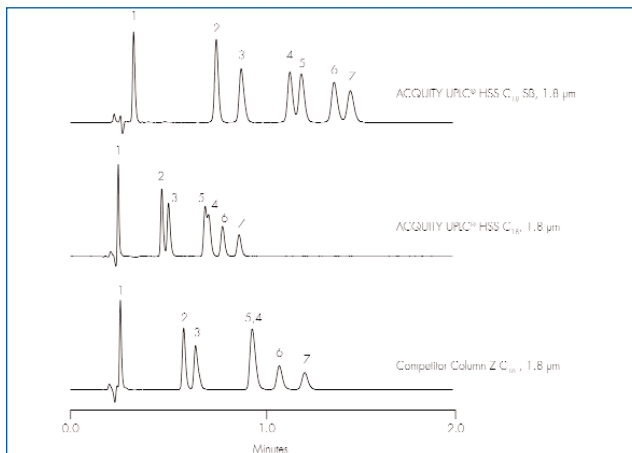


Figure 2. UPLC separation of tricyclic antidepressants. All columns were in the 2.1 × 50 mm format. Isocratic separation at 40% B. UV 254 nm. Compounds (1) trimethoprim, (2) nordoxepin, (3) doxepin, (4) nortriptyline, (5) imipramine, (6) amitriptyline, (7) trimipramine. development.

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