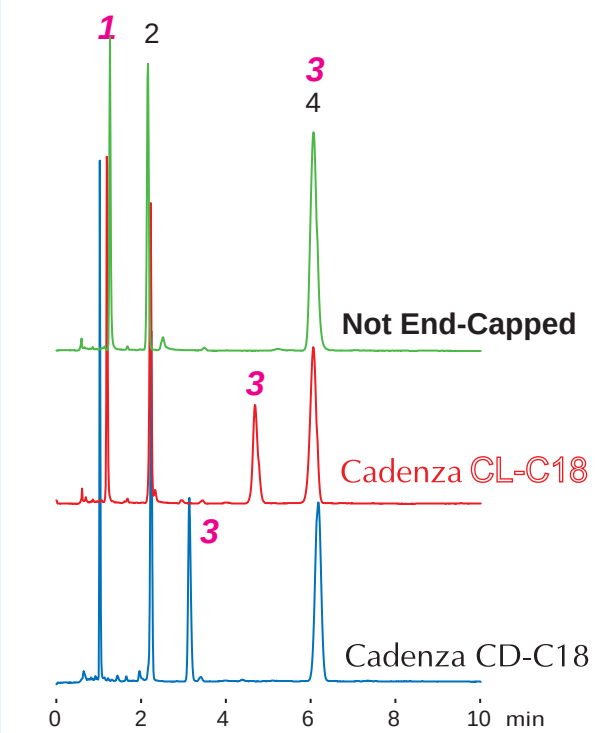
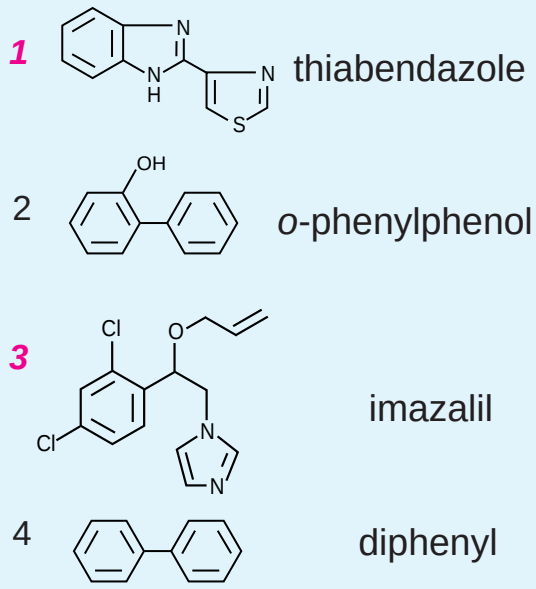
Cadenza CL-C18
Cadenza CD-C18

75 x 4.6 mm

Technical

Electrostatic interaction on CL-C18





75 x 4.6 mm, 20mM ammonium acetate /ACN = 40 /60, 1 mL/min, 37 deg.C, 260 nm

The difference between Cadenza CL-C18 and CD-C18 is the number of residual silanols (CL-C18 having more silanols than CD-C18). Both ODS packing materials are designed with the same silica, ODS ligand density, and first end-capping process. Information about solute / stationary phase interaction can be obtained by comparing results between these two phases.

The residual silanols on CL-C18 will affect solute retention / separation. For example, retention behavior for the compound imazalil (pKa = ca.6) is shown above.
Retention order of imazalil is largest on not end-capped ODS (same silica and ODS ligand density as CL-C18), then CL-C18 and CD-C18. Meanwhile, o-phenylphenol and diphenyl show the same retention on all 3 columns. The difference in solute - stationary phase interaction can be explained by the following:

1) Ionic interaction
Under neutral pH conditions, the imidazole group in imazalil may be ionized (positively charged). On the other hand, silanols from the packing material are dissociated (negatively charged). This results in ionic interaction between solute and stationary phase.

2) Electrostatic interaction
Polar atoms (such as Cl, N, and O in imazalil) interact with the silanol groups by electrostatic (dipole-dipole) interaction. Solutes containing these polar atoms are better retained on silanol rich ODS phases. In contrast, o-phenylphenol and diphenyl do not contain as many polar atoms. Retention time for these compounds is therefore the same on all 3 ODS phases.

Residual silanols can cause an increase in retention for polar solutes due to ionic / electrostatic interaction between solute and stationary phase. It can be very useful to change selectivity by using both CL-C18 and CD-C18.