Improved Productivity with Isco Redi*Sep*® Normal Phase Flash Columns

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Chromatography Application Note AN06

Application Overview

This application note summarizes the comparison of Isco Redi*Sep* Normal Phase flash columns to readily available flash cartridges which are commonly used in conjunction with stainless steel compression modules. Isco's columns are available in 4, 12, 40, and 120 gram sizes. Cartridges are available in 4.5, 9, 47, 100, and 211 grams dry silica weight versions. The following presents the comparison of Redi*Sep* 4 and 12 gram columns to 4.5 and 9 gram flash cartridges.

Figure 1:

Observations

Column Visibility

Isco Redi*Sep* Normal Phase flash columns have translucent casing to allow organic synthesis chemists to determine when the column is equilibrated and when it has dried at the conclusion of the run. Solvent waste is minimized because chemists can see exactly when equilibration occurs. Stainless steel compression modules do not allow observation. In addition, the compression modules must be disassembled to change columns (instead of luer lock or simply selecting another channel). The casing required to use the cartridges is clumsy, messy, and expensive.

Flow Rates

Flash cartridges only allow for very slow flow rates. There are several disadvantages to slow flow. Peak shapes are rough because of increased residence time of bubbles in the flowcell and the time necessary to elute a peak is greater, causing peaks to become unnecessarily wide. The slow flow rate does not increase resolution. Finally, with a slower flow rate it simply takes much more time to perform a separation.

Column Performance

Resolution

Resolution is measured by baseline resolution in the valley between the peaks and distance from peak to peak. This is similar between the columns but the flash cartridges seem to tail excessively and do not fully reach baseline (see Figures 1 and 2). Also, note that the slow flow rate causes the peaks to become choppy and unnecessarily wide in appearance.

In comparing Redi*Sep* columns to flash cartridges, plate counts are similar when columns of similar sizes are compared. This is the logical result as simple silica packing should be very consistent between lots and manufacturers.

Retention Time

Operation of both systems was according to manufacturers recommended flow rates. The Redi*Sep* columns flow rate is much higher and separation occurs much faster than with the flash cartridges. The time to elute both peaks is 11 minutes with a flash cartridge and less than 3 minutes with a Redi*Sep* column. That is approximately three runs on the Redi*Sep* column in the time required for a single flash cartridge run.

General Method

The columns were run under identical conditions with the exception of flow rate. The compounds separated are acetophenone and methoxyacetophenone. The isocratic mobile phase solvent system is 85% hexane in A and 15% ethyl acetate. All columns were run on an Isco Combi*Flash*® Sq 16x and data collected with PeakTrak™ 2000.

Analytical Results

To summarize, the performance of the Isco columns is very similar in nature but is not hindered by slow flow rates of the cartridge system. This faster flow rate allows the organic synthesis chemist to perform a separation in much less time. Several separations can be performed on the Isco system in the time it takes for a single run on the flash cartridges system. Of course, the Isco system can also be operated in complete absence of the chemist while the flash cartridge system requires much more attention.

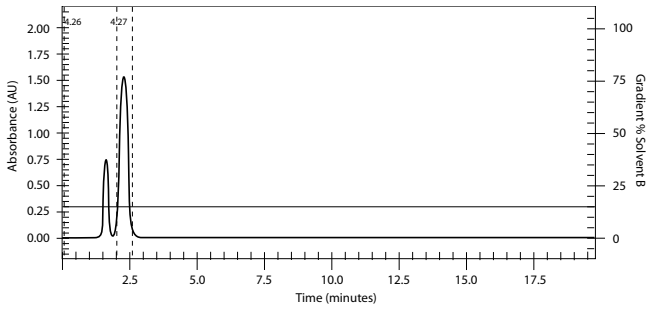

Figure 2: Redi*Sep* 4g column run

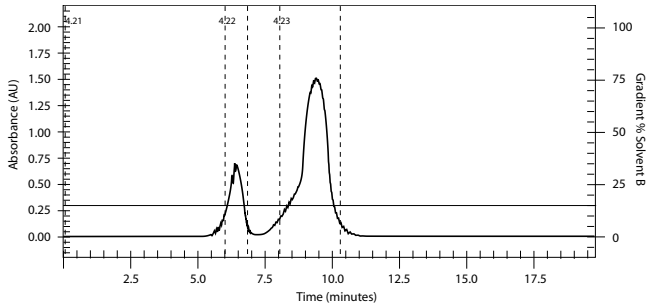

Figure 3: Comparable run using flash cartridge

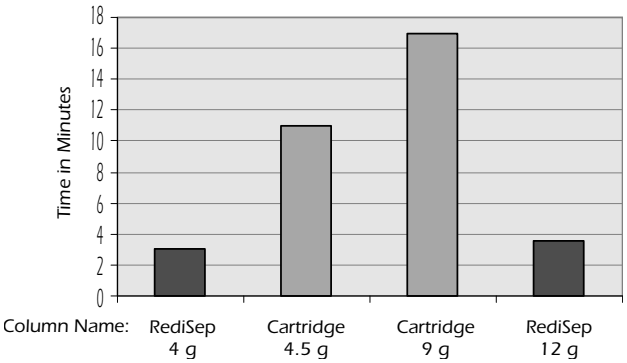

Figure 4: Time required to elute equivalent sample

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