

CIM Convective Interaction Media®

TECHNICAL NOTE

TN003 Influence Of The Flow Rate On The Separation Efficiency Of CIMac™ SO3 Analytical Column

CIMac™ SO3 Analytical Column is a strong cation exchanger based on a monolithic support. This material provides many advantages over conventional stationary phases for the separation of biomacromolecules, such as: low back-pressure, flow-unaffected chromatographic properties and a high resolution power due to a convective flow transport within open large-diameter (1.5 µm) channels.

The efficiency of this column for separation of a sample containing six different proteins is presented in Figure 1.

Figure 1: Gradient elution of a mixture of six proteins on CIMac™ SO3 Analytical Column at flow rates 0.5, 1.0 and 2.0 mL/min.

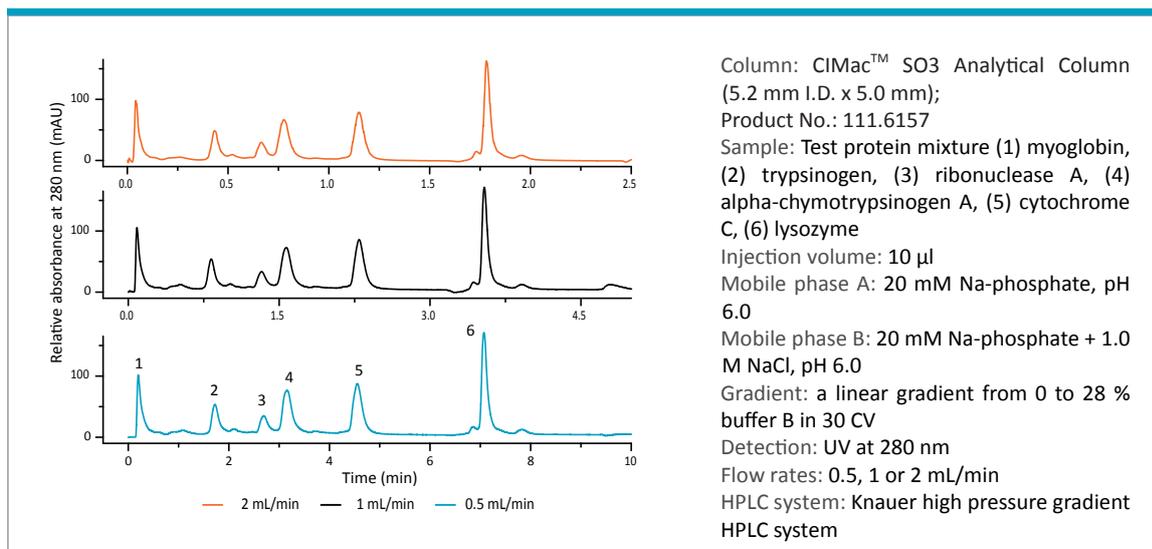
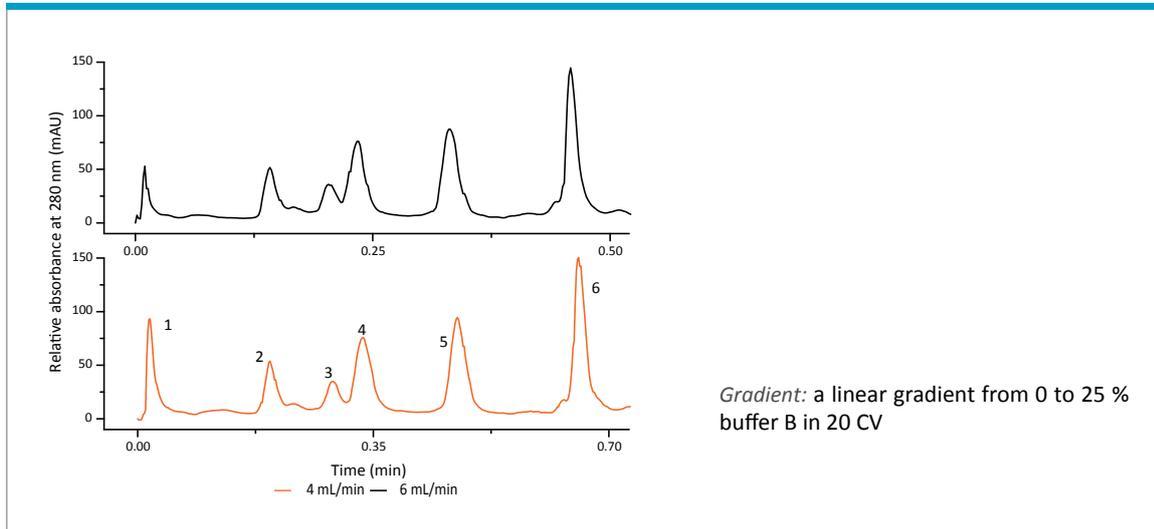


Table 1: Resolution between α -chymotrypsinogen A and cytochrome C at selected flow rates.

Flow rate [mL/min]	Resolution between α -chymotrypsinogen A and cytochrome C
0.5	4.26
1.0	4.09
2.0	4.09

To demonstrate the feasibility of monolithic columns under extremely high flow rates (40 to 60 CV/min), the separation of the same protein mixture was performed at even higher flow rates (at 4.0 and 6.0 mL/min); see Figure 2. The gradient conditions were also slightly modified - a steeper gradient was applied, all other conditions were the same as described in Figure 1.

Figure 2: Gradient elution of a mixture of six proteins on CIMac™ SO3 Analytical Column at flow rates 4.0 and 6.0 mL/min.



RESULTS

Changing the flow rate from 0.5 mL/min to 2 mL/min did not alter the chromatographic performance (in terms of resolution and peak shape) of CIMac™ SO3 Analytical Column for the separation of the mixture of proteins. A baseline separation for 5 out of 6 proteins in less than 30 s was achieved by further increasing the flow rate to 4 or even to 6 mL/min and concurrent minor modification of the gradient.



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CIM® technology is covered by US patents 4889632, 4923610, 4952349 and 5972218. Other patents pending.