



Orochem Technologies, Inc.

Separation of the Enantiomers of Ibuprofen on Epitomize™ Chiral Phase CSP-1C

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The Epitomize™ CSP-1C chiral stationary phase uses cellulose tris-(3,5-dimethylphenylcarbamate) as the chiral receptor and is offered in a variety of particle sizes including 1.7, 3, 5, 10, 20, 50, 100, and 300 microns. In this application, the enantiomers of ibuprofen in its free acid form [α -methyl-4-(isobutyl)phenylacetic acid, see Figure 1] have been separated using an Epitomize CSP-1C column packed with a 5-micron diameter, spherical chiral stationary phase.

Experimental

The CSP-1C, 5 micron column configuration was 4.6 mm ID x 250 mm long. The mobile phase was 1% 2-propanol in n-heptane containing 0.1% TFA and the flow rate was 1.0 mL/min. The pressure drop observed was 620 psi (43 bar). The injection volume was 20 μ L.

Results

The chromatogram in Figure 2 shows the baseline separation of racemic ibuprofen, and Figure 3 shows the standard for the pure (S)-(+)-enantiomer, which denotes the order of separation. The retention time of the (R)-(-)-enantiomer was 10.3 min, the retention time of the (S)-(+)-enantiomer was 11.9 min, and the separation value for the racemate was 1.22.

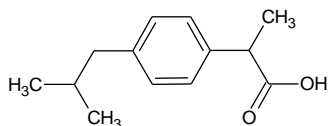


Figure 1: Ibuprofen.

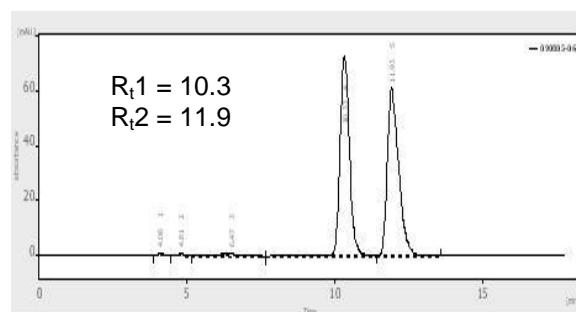


Figure 2: Separation of racemic ibuprofen on Epitomize CSP-1C, 5 μ m at a flow rate of 1.0 mL/min.

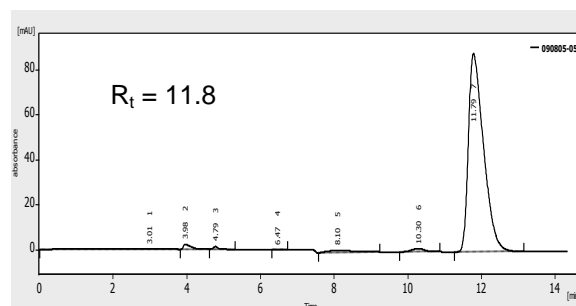


Figure 3: Chromatogram of (S)-(+)-ibuprofen on Epitomize CSP-1C, 5 μ m at a flow rate of 1.0 mL/min.

Conclusion

The enantiomers of ibuprofen were separated using an Epitomize CSP-1C, 5 μ m column. This separation may be directly scaled up to commercial volumes using the CSP-1C stationary phase in a simulated moving bed chromatograph. The availability of CSP-1C in larger particle sizes permits the use of low pressure (less than 300 psi) SMB. Low pressure SMB, or LP-SMB, is a lower-cost alternative to high-pressure SMB units. Currently LP-SMB units are available that offer production rates from hundreds of grams per day to over 50 kilograms per day.