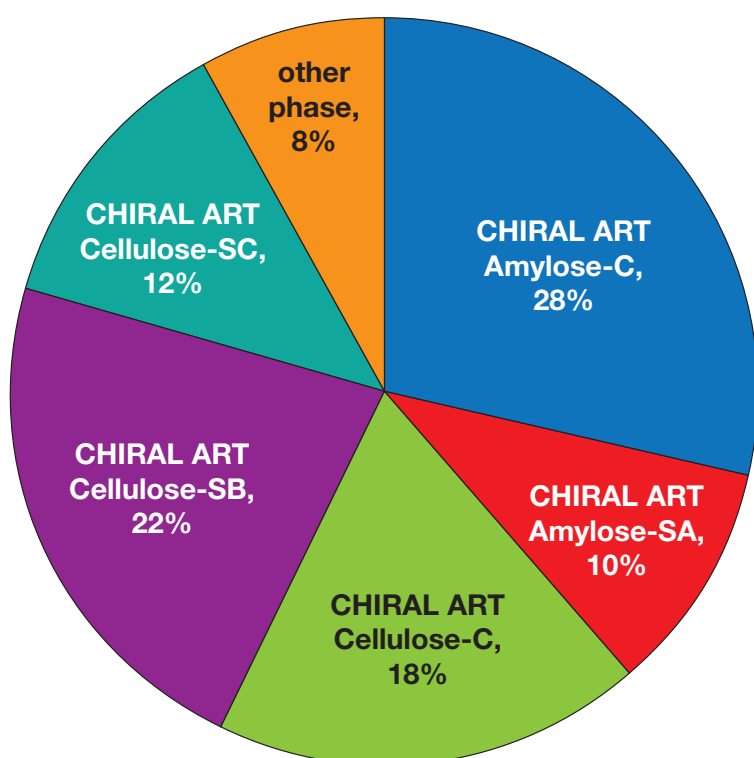


Robust and Efficient Purification of Enantiomers Using Novel Polysaccharide-Type Chiral Stationary Phases

Analysis of the hit ratio of chiral selectors for various compounds

There are 5 different chiral stationary phases available from YMC which can cover more than 90% of all chiral racemic separations.



- Hit criteria: $R_s > 1.5$
- Hit database: compiled from 125 samples supplied for contract service

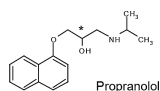
Product name	Base material	Particle size [µm]	Chiral selector	Type	Usable pH range	Pressure limit
CHIRAL ART Amylose-C	Porous silica	3	Amylose tris (3,5-dimethylphenylcarbamate)	Coated	—	4350 psi (30 MPa)
CHIRAL ART Cellulose-C		5 10 20	Cellulose tris (3,5-dimethylphenylcarbamate)			
CHIRAL ART Amylose-SA	Porous silica	3	Amylose tris (3,5-dimethylphenylcarbamate)	Immobilised	2.0 – 9.0	4350 psi (30 MPa)
CHIRAL ART Cellulose-SB		5 10 20	Cellulose tris (3,5-dimethylphenylcarbamate)			
CHIRAL ART Cellulose-SC		3 5 10 20	Cellulose tris (3,5-dichlorophenylcarbamate)			

Date: 16/08/2016

Author: Michael Ostendorf

Robust and Efficient Purification of Enantiomers Using Novel Polysaccharide-Type Chiral Stationary Phases

Scale-up study of purification of Propranolol on CHIRAL ART Cellulose-SB



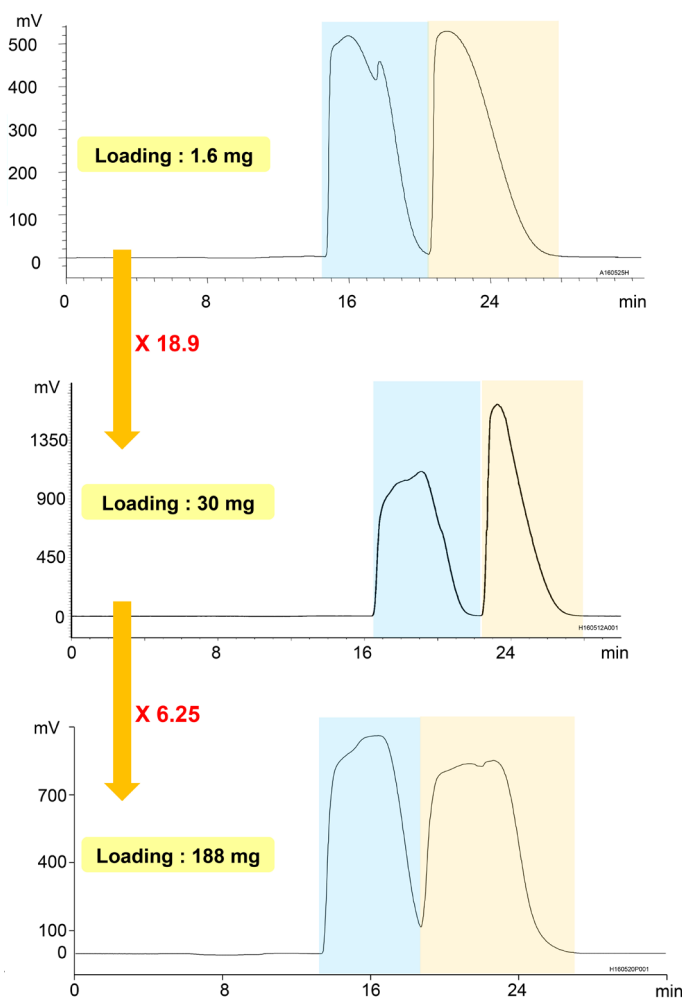
Chiral stationary phase: **Cellulose-SB**
 Eluent: *n*-hexane / 2-propanol / DEA (80/20/0.1)
 Flow rate: shown for each scale in boxes below
 Detection: UV at 237 nm
 Temperature: ambient

Analytical
 5 μ m, 250 x 4.6 mm ID
 at 0.5 mL/min
 linear velocity: 0.5 mm/s

Semi-preparative
 5 μ m, 250 x 20 mm ID
 at 9.5 mL/min
 linear velocity: 0.5 mm/s

Preparative
 10 μ m, 250 x 50 mm ID
 at 59 mL/min
 linear velocity: 0.5 mm/s

Preparative column was packed with Dynamic Axial Compression.



	Analytical 250 x 4.6 mm ID		Semi-preparative 250 x 20 mm ID		Preparative 250 x 50 mm ID	
	1 st peak	2 nd peak	1 st peak	2 nd peak	1 st peak	2 nd peak
Enantiomeric excess	> 99.9%ee	99.3%ee	99.9%ee	99.8%ee	99.1%ee	99.3%ee
Recovery	99%	99%	97%	99%	99%	94%

The maximum loading amount was determined at 1.6 mg for 250 x 4.6 mm ID whilst maintaining enantiomeric excess for the individual fractions > 99%.

The theoretical loading amount of 30 mg for 250 x 20 mm ID and 188mg for 250 x 50 mm ID is possible as shown by their chromatograms and the recovery amounts and enantiomeric excess values for the individual fractions.

The Dynamic Axial Compression Column self-packed with CHIRAL ART Cellulose-SB 10 μ m can be easily and linearly scale-up to purification.