Enantiomeric Purification Utilizing Supercritical Fluid Chromatography (SFC)

Purification of Flavanone
Using Alcyon SFC CSP Amylose-C

YMC CO., LTD.

(A150129AE)

Features of Alcyon SFC column

- Available in chiral and achiral stationary phases
- Faster separation with high resolution
- Excellent durability
- Great reduction of solvent consumption

SFC preparative separation of Flavanone

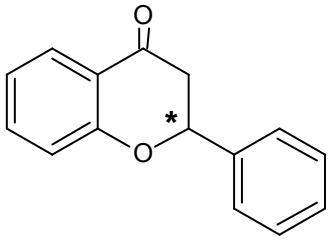
Conditions

HPLC

Column	: CHIRAL ART Amylose-C 5 μm, 250X20 mmI.D.
Eluent	: *n*-hexane/ethanol (90/10)
Flow rate	: 20 mL/min
Detection	: UV at 220 nm
Injection	: 3 mL (20 mg/mL)
Temperature	: ambient

SFC

Column	: Alcyon SFC CSP Amylose-C 5 μm, 250X20 mmI.D.
Eluent	: CO_2/ethanol (80/20)
Flow rate	: 60 mL/min
Detection	: UV at 280 nm
Injection	: 1.5 mL (20 mg/mL)
Temperature	: 30 ℃
Back Pressure	: 15 MPa

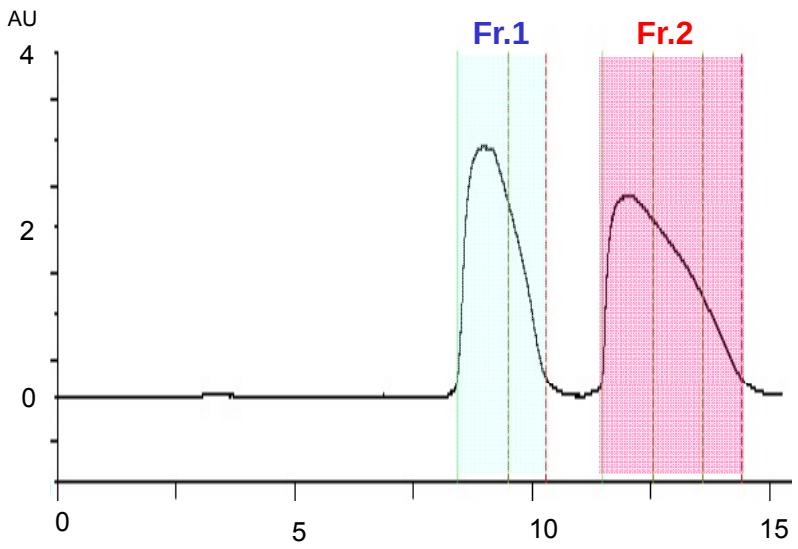


Flavanone

SFC preparative separation of Flavanone

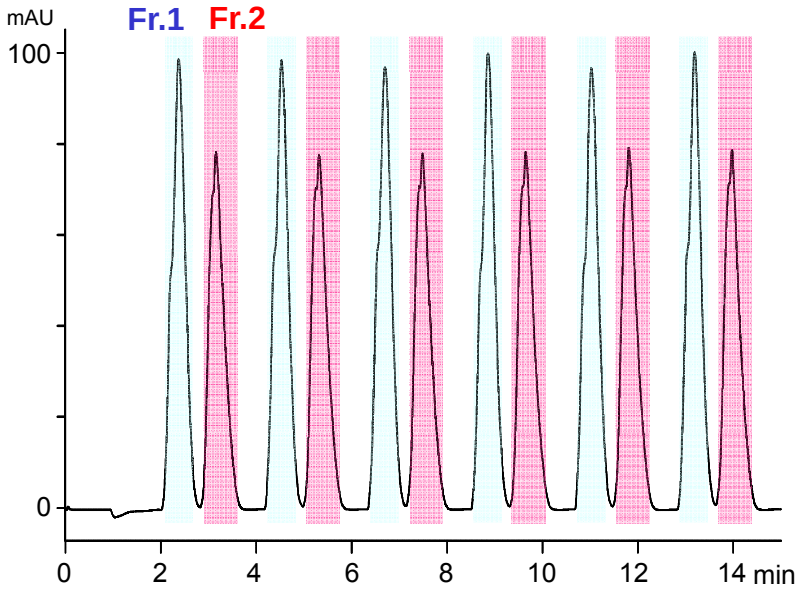
Preparative chromatograms

HPLC



HPLC	Fr.1	Fr.2
Enantiomeric purity	100 % ee	99.7 % ee
Yield	95.7%	93.7%

SFC



SFC	Fr.1	Fr.2
Enantiomeric purity	100 % ee	99.8 % ee
Yield	94.5%	95.6%

Cost effective purification using SFC

		HPLC		SFC	
Column : 250 X 20mmI.D.		Fr.1	Fr.2	Fr.1	Fr.2
Enantiomeric purity	(%ee)	>99.9	99.7	>99.9	99.8
Yield	(%)	95.7	93.7	94.5	95.6
Productivity*1	(mg product / hr)	172	169	340	344
Fractionated liquid volume	(L solvent / g product)	1.15	2.88	0.39	0.57
Solvent consumption	(L solvent / g product)	about 7		about 2	
Cost factor*2		1		0.417	

*1 Calculated based on injections of every 2.5 minutes on SFC, and of every 9.0 minutes on HPLC.

*2 Calculated based on costs of solvents/CO_2 and waste disposal. Cost on SFC is calculated when the cost on HPLC is fixed as 1.

Effective of SFC preparative method compared to HPLC preparative method

- Productivity of SFC is twice as high as that of HPLC.
- Fraction volume on SFC is reduced by 33%, and as a result, solvent is easily removed at post-purification process.
- Solvent consumption on SFC is reduced by 25%SFC.
- Total purification cost on SFC is less than half of that on HPLC purification.