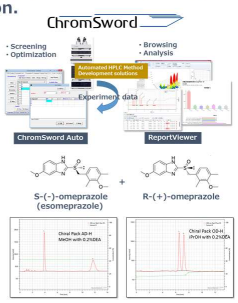
www.chromsword.co.jp
info@chromsword.co.jp

Automated Method Developmet for Chiral Seperation by SFC

ChromSword Japan Co. Ltd. / info@chromsword.co.jp

Summary

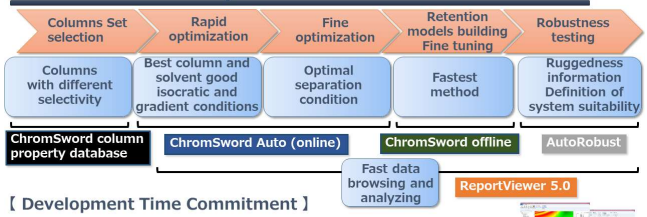
- Racemic mixture of Omeprasol were used as application sample for the method development of SFC chiral separation.
- SFC instrument, column and solvent condition were Agilent 1260 series SFC /HPLC hybrid system with a switching valve and a multi-wavelength detector (MWD), 5 columns and 3 modifiers respectively.
- ChromSwordAuto® supports three modes of automated method development, screening, rapid optimization and fine optimization.
- The SFC various conditions were easily and quickly screened by ChromSwordAuto® to find out the best columns, solvents and buffer combinations for fine separation of each peak.



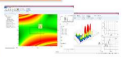
Back Ground

- SFC (Supercritical Fluid Chromatography) is recently focused on the one of more powerful instruments for various research and development processes in pharmaceutical, chemical, food, agricultural and environmental fields.
- Especially the SFC method development for analyzing and purifying chiral compounds is a critical step to increase productivity and to improve chemical quality as chiral compounds are highly demanded in the drug development.
- In this process, it is more tremendous need than HPLC to rapidly develop the chromatographic condition by SFC for chiral compounds to detect and analysis chemical impurities.
- The automated method development of chiral compounds using ChromSword Auto with SFC by own AI (Artificial Intelligence) algorithm oriented solvents and column screening is presented.

Automated Development Process of ChromSword



【 Development Time Commitment 】



- Optimization of separation of target compounds: 1-48 h/sample
- Screening columns and solvents/pH: 5 min- 1 h/column/solvent/pH
- Impurities profiling, separation of the max. number of compounds: 6-48 h/sample
- Robustness test: 10-36 h
- Analytical development report: 1-5 min/project

Method

ChromSword

【Software】

- ChromSword Auto >> Automated method development
- ReportViewer >> Data fast browsing, Analyzing and Design space
- OffLine simulation >> Manual Simulation for method optimizing

【General Condition】

- HPLC : Agilent 1260 series SFC/HPLC Hybrid system
  Column switching valve, Multi Wavelength Detector
- Column : 5 Chiral Columns (150 mm, 4.6 mm)
- Modifier : MeOH, EtOH and i-PrOH with 0.2% DEA

【Samples】

S-(-)-omeprazole (esomeprazole) + R-(+)-omeprazole

Method screening flow of 5 columns and 3 modifiers

①Rapid optimization of each condition (15x3~5 runs for 15h)

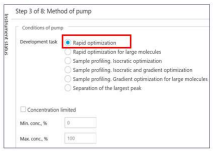
【5 Columns】
- Kromasil CHI DMB
- Kromasil CHI TBB
- Chiralpack OJ-H
- Chiralpack OD-H
- Chiralpack AD-H

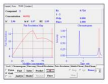
X

【3 Modifiers】
- MeOH with 0.2%DEA
- EtOH with 0.2%DEA
- iPrOH with 0.2%DEA

- 4ml/min (CO2-Modifiers)
- 40°C column temperature
- 300nm

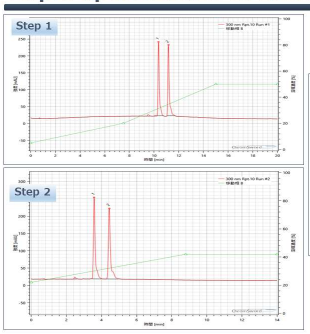
【Optimization mode】



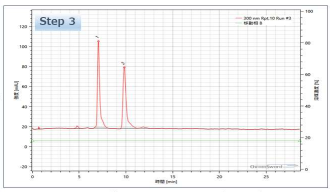


②Further optimization by OffLine simulation

Rapid optimization of each column in 3-5 Runs(1h)

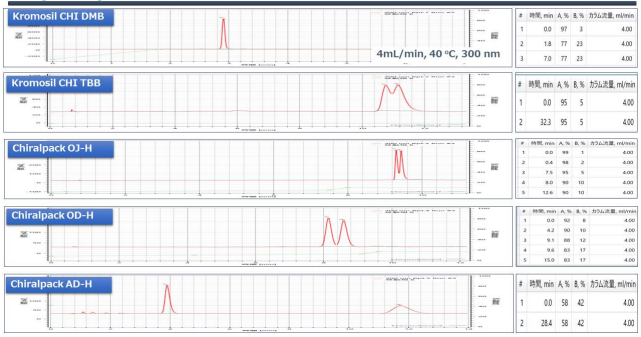


Chiralpack AD-H
CO2/iPrOH with 0.2%DEA
4mL/min, 40 °C, 300 nm,

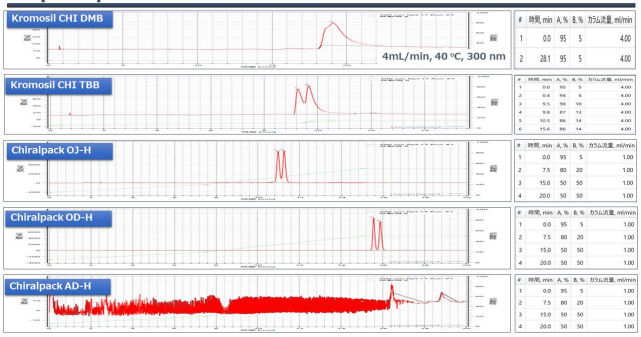


S-(-)-omeprazole (esomeprazole) + R-(+)-omeprazole

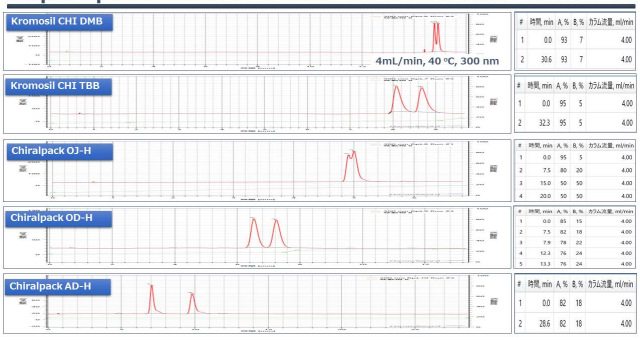
Rapid optimization of 5 columns with MeOH+0.2%DEA



Rapid optimization of 5 columns with EtOH+0.2%DEA

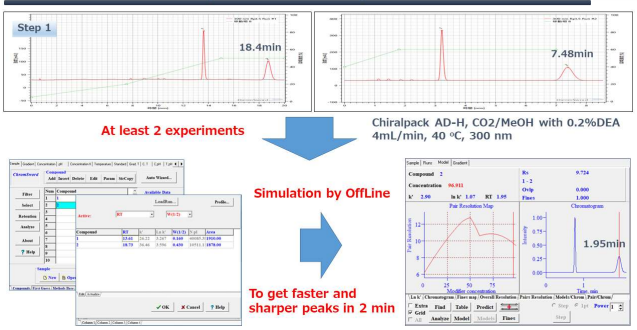


Rapid optimization of 5 columns with iPrOH+0.2%DEA



Further method optimization by OffLine simulation

Off line



ChromSword
ChromSword Japan Co., Ltd.