

Investigation of Chiral Separation Conditions of Omeprazole by Unified Fluid Chromatography Methods Scouting System

Introduction

In the synthesis of medicinal drugs and agrichemical fields, synthetic compounds with optical activity are continuing to gain more attentions. These compounds can show the same physical chemical properties, but show different biological activity.

It has been reported that using only one enantiomer of the optical isomer can enhance the medicinal effects and reduce the side effects when the biological activity varies between the enantiomers.

Our Methods Scouting System makes it simple for users to search and select the appropriate measurement conditions using various solvents and columns for both chiral and achiral separations.

Supercritical fluid chromatography (SFC) is well known for quick separations, easy solvent replacement, easy sample treatment after preparation, decreasing solvent cost over HPLC and simple scale-up from analytical to preparative.

In this application, method scouting of omeprazole, used as acid suppressant, with three modifiers and six columns is carried out by using UFC (Unified Fluid Chromatography) and Method Scouting Program, which is optional program of ChromNAV Ver.2.

Keyword: Omeprazole, SFC, UFC, ChromNAV Ver.2, Method Scouting Program, i-CHIRAL 6, Chiral separation

Experimental Condition

Column: CHIRALPAK IA, IB, IC, ID, IE and IF/SFC
(i-CHIRAL 6), (4.6 mmI.D. x 150 mmL, 5 mm)

Eluent: CO₂/modifier (60/40)

Modifier: 1) methanol
2) acetonitrile/ethanol (80/20)
3) methyl tert-butyl ether(MTBE)/ethanol (80/20)

Flow rate: 3.0 mL/min

Column temp.: 40 °C

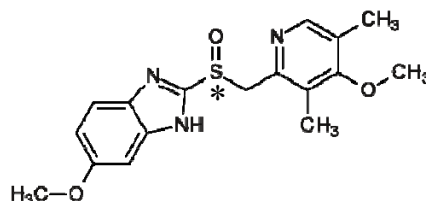
Wave length: UV: 300 nm, CD: 275 nm

Back pressure.: 15 MPa

Injection volume: 5 µL

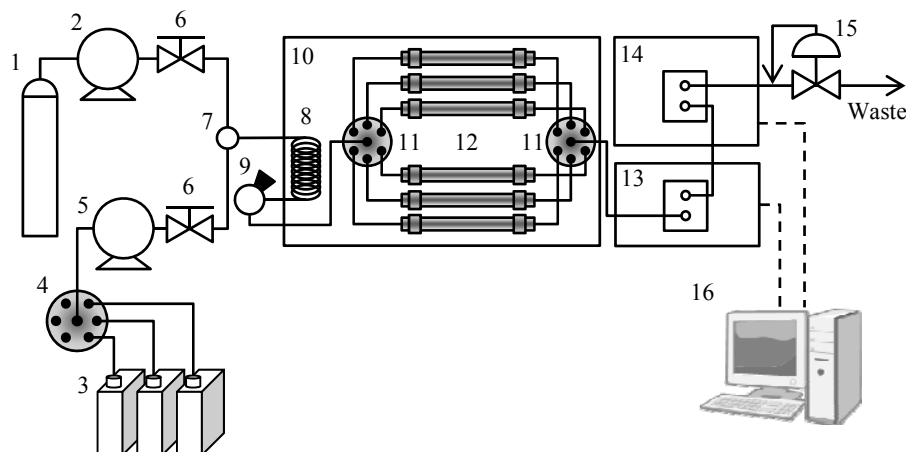
Standard: 1.0 mg/mL omeprazole in methanol

Structure



Omeprazole

Schematic diagram



1: CO₂ Cylinder, 2: CO₂ pump, 3: Modifier solvents, 4: Solvent switch valve, 5: Modifier pump, 6: Stop valve, 7: Mixer, 8: Pre-heat coil, 9: Autosampler, 10: Column oven, 11: Switching valve, 12: Columns (i-CHIRAL 6), 13: PDA detector, 14: Circular dichroism detector, 15: Back pressure regulator, 16: Chromatography data system (ChromNAV Ver.2)

Result

Figure 1 and 2 show the ChromNAV software results Previewer of Method Scouting by UV (PDA) detector and CD detector. This view provides easy viewing of all screening conditions and quick determination of the best for further optimization if needed.

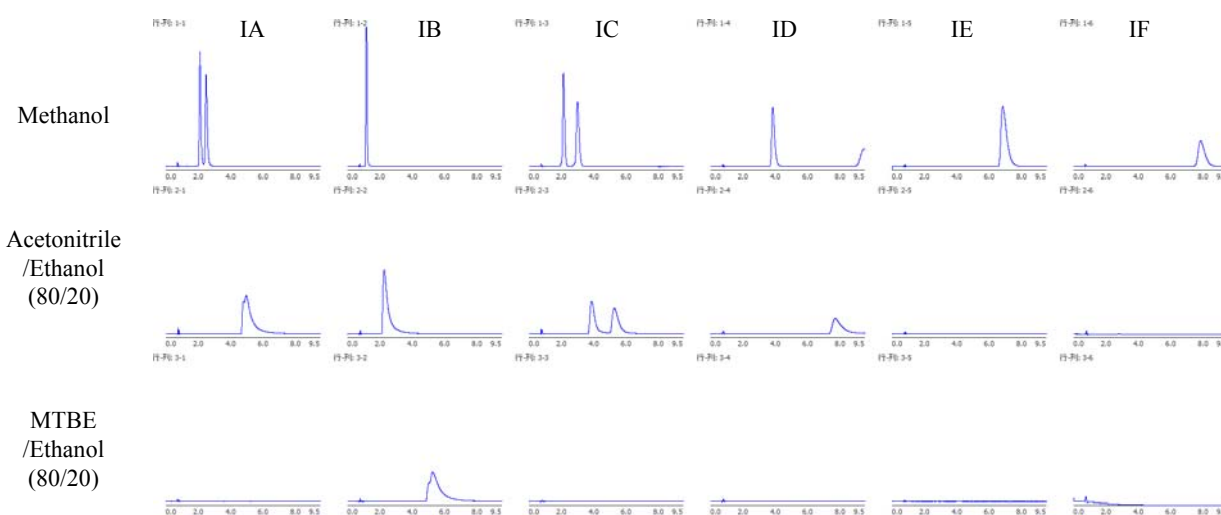


Fig. 1 Result of Method Scouting (UV detector)

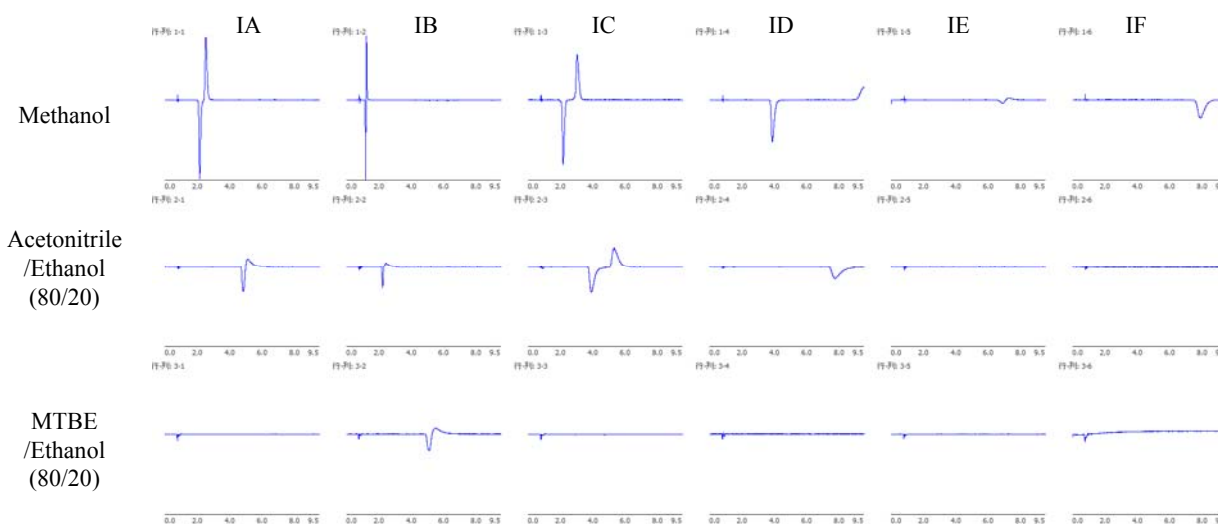


Fig. 2 Result of Method Scouting (CD detector)

Table 1 shows the degree in separation of omeprazole. As shown in the table, methanol and CHIRALPAK IC is suited to this measurement.

Modifier \ Column	IA	IB	IC	ID	IE	IF
Methanol	2.02	N.S.	3.38	N.E.	N.S.	N.E.
Acetonitrile/Ethanol (80/20)	N.S.	N.S.	2.26	N.E.	N.E.	N.E.
MTBE/Ethanol (80/20)	N.E.	N.S.	N.E.	N.E.	N.E.	N.E.

N.S.: Not Separated, N.E.: Not Eluted

Table 1 Degree in separation