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Application News

No.L460

High Performance Liquid Chromatography

Analysis of Cold Medicine Using Newly Developed "Shim-pack MAqC-ODS Ⅰ" Column

In Application News No. L459, we introduced the simultaneous analysis of water-soluble vitamins using the Shim-pack MAqC-ODS Ⅰ column.
Use of the Shim-pack MAqC-ODS Ⅰ column makes it possible to achieve retention of highly polar basic compounds without the use of ion-pair reagents in the mobile phase, thereby permitting the application of gradient elution. As a result, improved sensitivity and time savings can be achieved in the simultaneous analysis of highly polar basic compounds and other substances.
Similarly to water-soluble vitamins, pharmaceutical substances also contain many basic compounds having high solubility in water. Here, using the Shim-pack MAqC-ODS Ⅰ column, we introduce an example of analysis focusing on substances that are typically included as active ingredients in over-the-counter cold medicines.

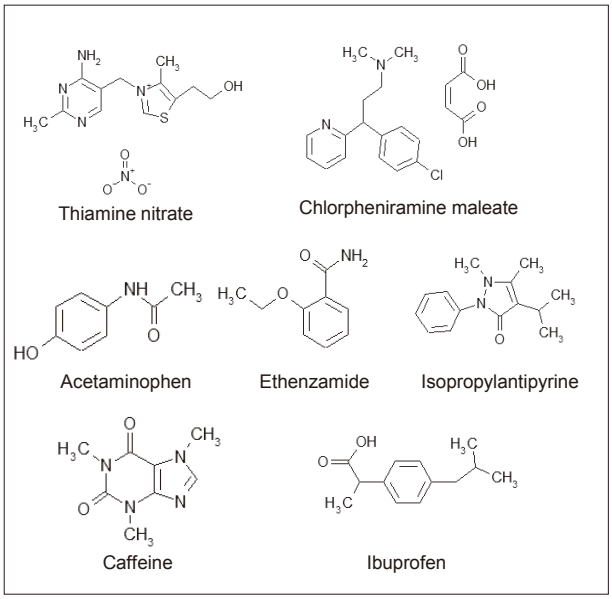


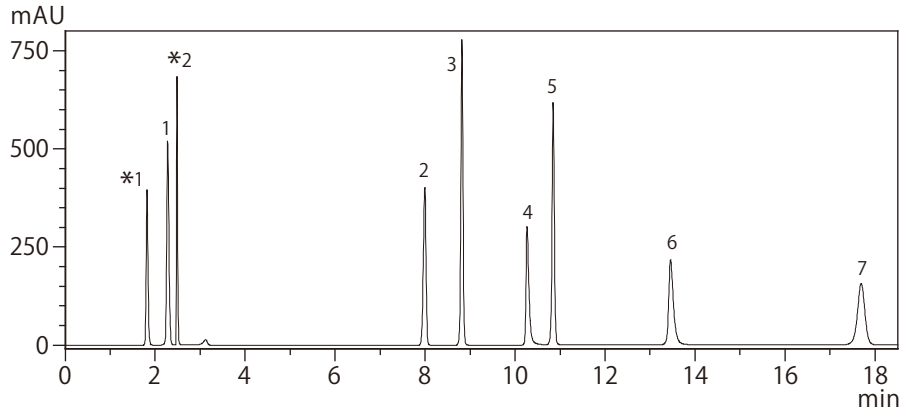
Fig. 1 Structural Formulas

Analysis of Standard Solution

The structural formulas for the typical pharmaceutical substances investigated here are shown in Fig. 1. They include thiamine nitrate, chlorpheniramine maleate, acetaminophen, ethenzamide, isopropylantipyrine, caffeine, and ibuprofen.
The analytical conditions are shown in Table 1, and an example of a chromatogram obtained from analysis of a standard mixed solution of these substances is shown in Fig. 2. The standard mixed solution consisted of each substance dissolved in a solution consisting of mobile phase A/acetonitrile = 1/1, at equal concentrations of 100 mg/L.

Table 1 Analytical Conditions

Column	: Shim-pack MAqC-ODS Ⅰ (150 mm L. × 4.6 mm I.D., 5 µm)
Mobile Phase	: A) 20 mmol/L phosphate (sodium) buffer (pH 2.5) B) Acetonitrile
Time Program	: B Conc. 1 % (0 min) → 1 % (2 min) → 50 % (8 min) → 50 % (18 min) → 1 % (18.01 min → 23 min)
Flowrate	: 1.0 mL/min
Column Temp.	: 40 ˚C
Detection	: SPD-M20A at 220 nm
Injection Vol.	: 10 µL



■ Peaks
1. Thiamine
2. Acetaminophen
3. Caffeine
4. Chlorpheniramine
5. Ethenzamide
6. Isopropylantipyrine
7. Ibuprofen

*1 Nitric acid
*2 Maleic acid

Fig. 2 Chromatogram of a Standard Mixture of 7 Active Ingredients

Analysis of Over-the-Counter (OTC) Cold Medicine

The sample preparation procedures that were used for analysis of over-the-counter cold medicines are shown in Fig. 3, and the results of analysis using the Shim-pack MAqC-ODS Ⅰ column are shown in Fig. 4. The analytical conditions were the same as those listed in Table 1.

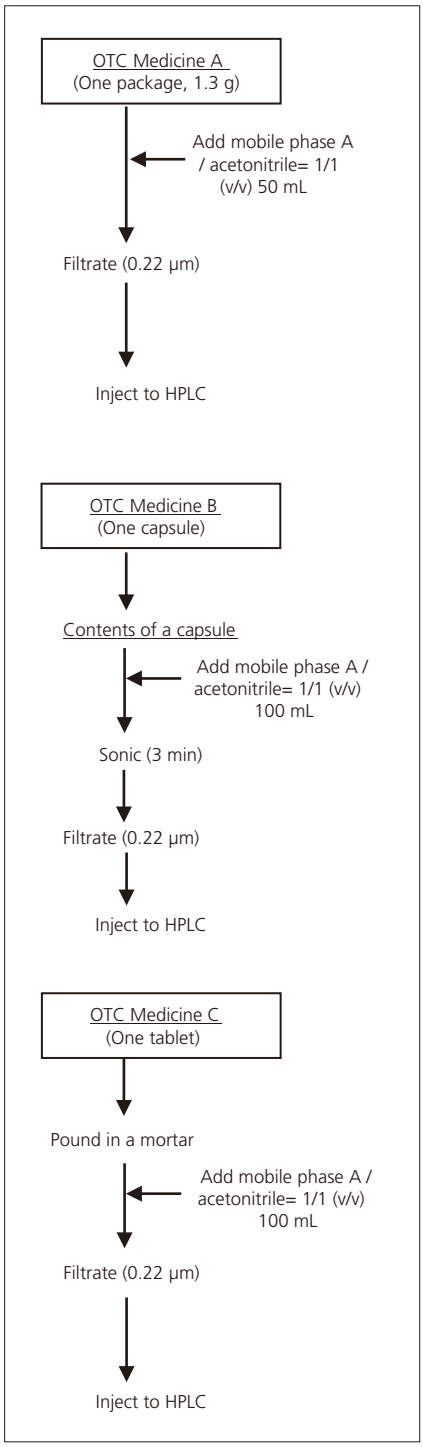


Fig. 3 Sample Preparation Procedure

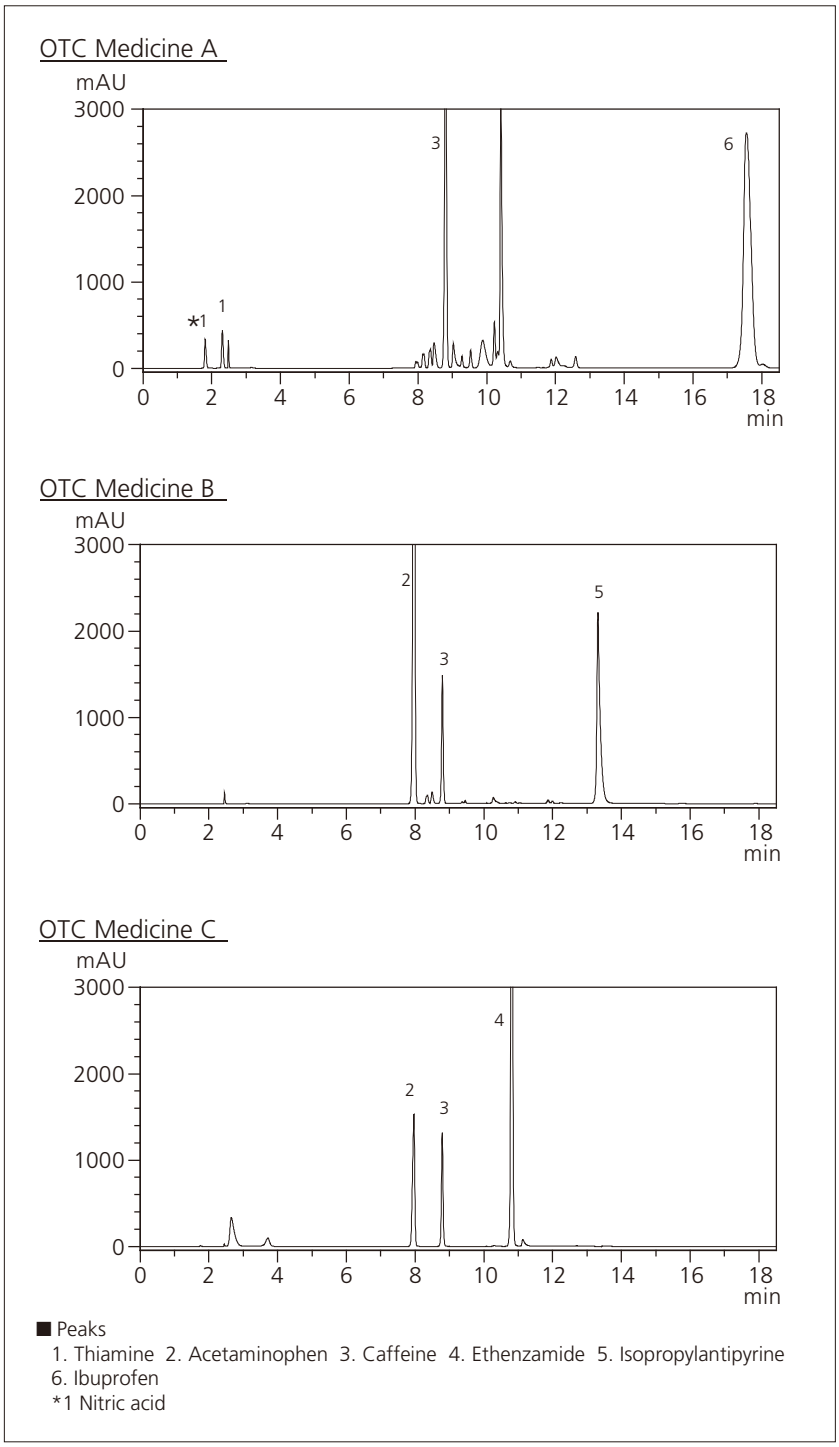


Fig. 4 Chromatograms of Cold Medicines (Upper: OTC Medicine A, Middle: OTC Medicine B, Lower: OTC Medicine C)

The Shim-pack MAqC-ODS Ⅰ was developed jointly with Eisai Co., Ltd.

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