

Application News

High Performance Liquid Chromatography

No.L365

High Speed, High Resolution Analysis (Part 15) Analysis of Ginsenosides in Ginseng

Ginseng is a widely used herbal medicine with a number of reported health benefits including stress reduction, building resistance to disease, and promoting concentration and memory function. Compounds called ginsenosides are believed to be the active constituents behind ginseng's efficacy. Analysis of ginsenosides by HPLC has traditionally been a relatively time-consuming process due to the

time required for separation of these structurally similar analytes as well as their separation from complex contaminants.

This Application News introduces an example of the analysis of ginsenosides in ginseng using the ultra fast LC system "Prominence UFLC" with the Phenomenex Synergi 2.5 μm Polar-RP high-speed, high-resolution column.

■ Analysis of Standard Solution

The structural formulas of the 5 ginsenosides that are the subject of determination in this analysis are shown in Fig.1. Here, separation of the ginsenosides Rg1 and Re in particular was conducted efficiently using the high-speed, high-resolution Phenomenex Synergi 2.5 μm Polar-RP (particle diameter 2.5 μm) column.

Fig. 2 shows the results of analysis of a solution (60% methanol aqueous solution) of the 5 ginsenosides, each present at 50 mg/L in the 2 μL sample, and Table 1 shows the analytical conditions.

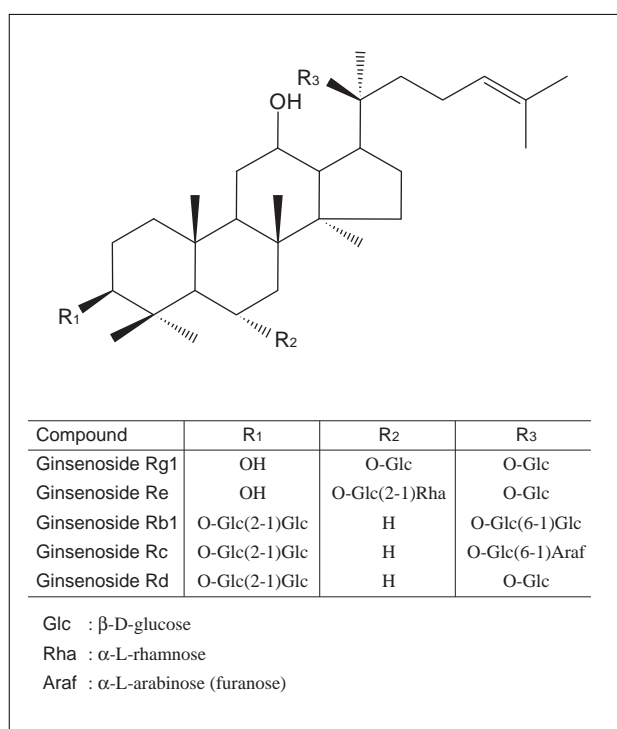


Fig.1 Structures of Ginsenosides

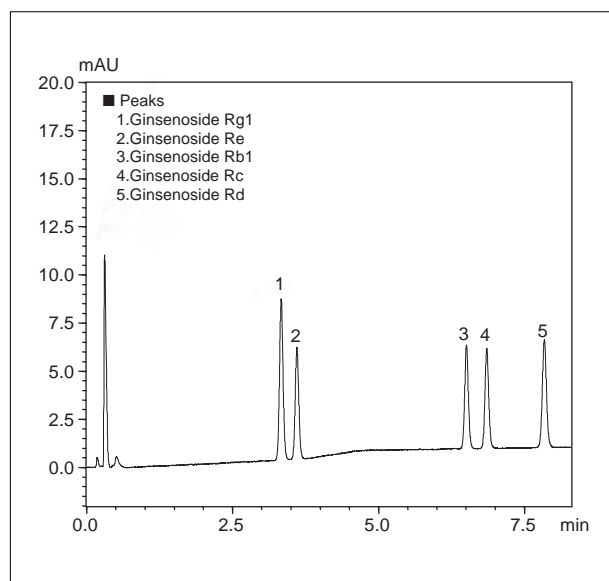


Fig.2 Chromatogram of a Standard Mixture of 5 Ginsenosides (50 mg/L each)

Table 1 Analytical Conditions

Column	: Synergi 2.5 μm Polar-RP 100 \AA (50 mm L. \times 2.0 mm I.D., 2.5 μm)
Mobile Phase	: A : Water B : Acetonitrile B.Conc 15 % (0 min) \rightarrow 20 % (3 min) \rightarrow 25 % (4 min) \rightarrow 30 % (8 min)
Flow Rate	: 0.6 mL/min
Injection Vol.	: 2 μL
Column Temp.	: 35 $^{\circ}\text{C}$
Detection	: SPD-20A at 203 nm
Flow Cell	: Semi-micro cell

■ Analysis of Powdered Ginseng

Fig. 3 shows the preparation procedure for herbal medicines as described in the Japanese Pharmacopeia. Fig. 4 shows the results of analysis of commercial ginseng powder, using a 2 μ L injection of the sample prepared using the process shown in Fig. 3.

Fig. 5 shows the procedure in which solid phase

extraction (SPE) is incorporated in the sample preparation procedure of Fig. 3, using a reversed phase sorbent cartridge (Phenomenex "strata-X"), and the results of that analysis are shown in Fig. 6. Compared to the results of Fig. 4, it is clear that the high-polarity contaminants are effectively removed during the SPE step.

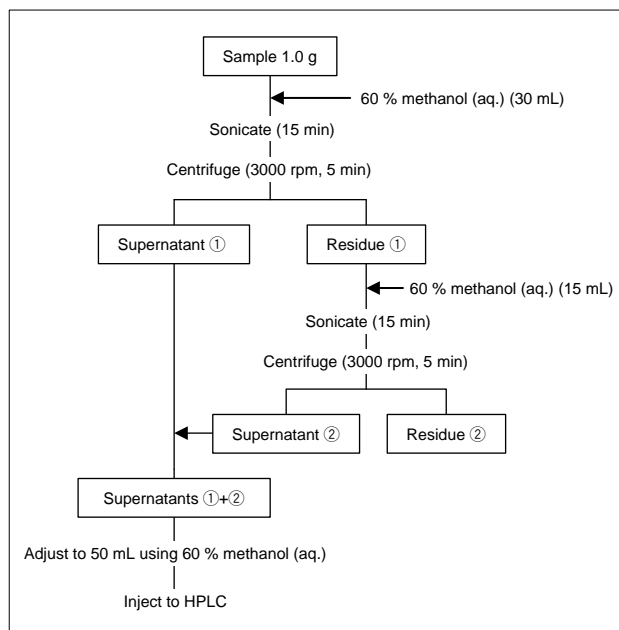


Fig.3 Sample Preparation 1

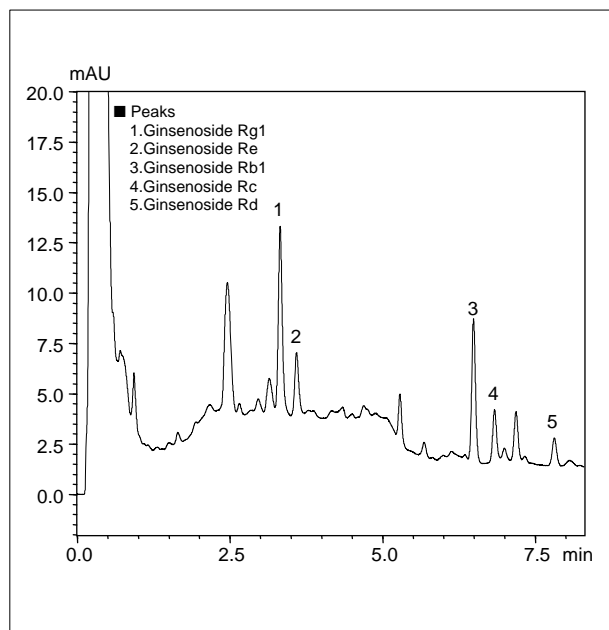


Fig.4 Chromatogram of Powdered Ginseng (using Sample Preparation 1)

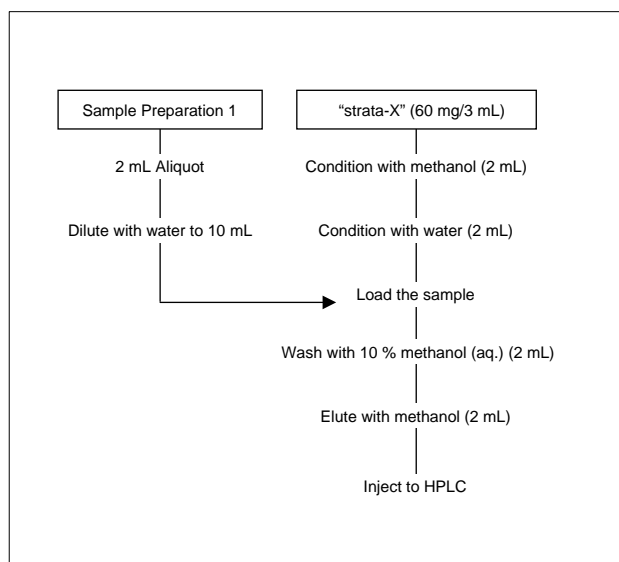


Fig.5 Sample Preparation 2

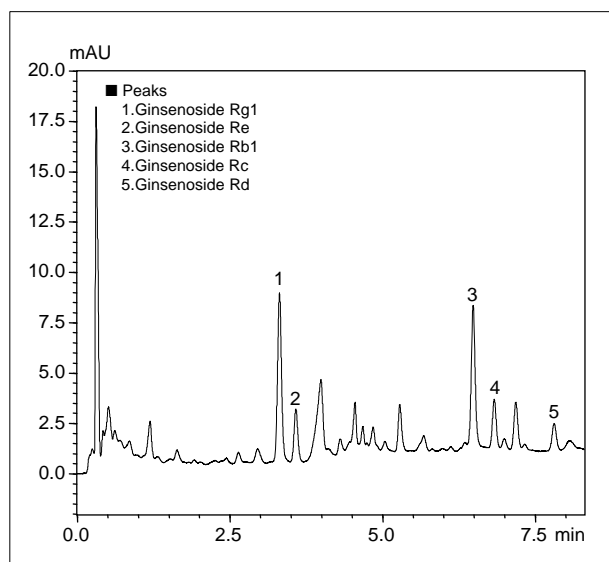


Fig.6 Chromatogram of Powdered Ginseng (using Sample Preparation 2)

[References]

The 15th Revision of the Japanese Pharmacopeia (Society of Japanese Pharmacopeia)

NOTES:

*This Application News has been produced and edited using information that was available when the data was acquired for each article. This Application News is subject to revision without prior notice.



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