



Abstract

The Agilent 1120 Compact LC is the system of choice for conventional, analytical scale liquid chromatography. It is an intergrated LC designed for ease of use, performance and reliability. It is ideally suited for the routine analysis of Traditional Chinese Medicines (TCMs) on account of its capability to achieve highly precise retention times and peak areas, and low detection limits for the analyzed compounds. This Application Note shows the chromatograms obtained with optimizd methods for the most well-known TCMs ginseng and American ginseng, which show different peak profiles and different concentrations of certain saponins.





Introduction

Traditional Chinese Medicines (TCMs) have a long history of use and their therapeutic effects are well known in China and other countries. Ginseng, perhaps the most well-known TCM, has long been used as a tonic, anti-fatigue, sedative and anti-gastric ulcer drug. It is also widely used in different TCM preparations. Another well-known TCM, American ginseng, has similar therapeutic effects as ginseng but there are also some differences because of the different saponin contents.

According to the method in the pharmacopeia of the People's Republic of China¹, ginseng must be analyzed by HPLC to determine the ginsenosides Rg1, Re and Rb1. Similar requirements exist for the determination of these ginsenosides in American ginseng. These requirements make the determination of the ginsenosides Rg1, Re and Rb1 in ginseng and American ginseng important for quality control of TCM raw materials and final preparations.

In this study an HPLC analysis method was developed using the Agilent 1120 Compact LC for the determiniation of ginsenosides in ginseng and American ginseng.

Experimental

Equipment

- Agilent 1120 Compact LC comprising gradient pump with integrated degasser, autosampler with vial tray, column oven and variable wavelength detector, see figure 1
- Agilent HC-C18(2), high carbon load, 150 x 4.6 mm, 5 µm particle size column
- Agilent EZChrom Elite Compact software



Figure 1 Agilent 1120 Compact LC

Samples and sample preparation

Ginseng and American ginseng were purchased from a local TCM store and samples prepared as follows. 1 g of powder was weighed and dissolved in 50 mL of water saturated n-butanol. The solution was treated ultrasonically for 30 minutes and centrifuged for 5 minutes at 300 rpm. The solvent was evaporated and the residue dissolved in 5 mL methanol. The final solution was filtered through a 0.20 µm membrane before injection.

Chromatographic conditions

- Mobile phase: A: Water, B: ACN
- Gradient: 0 min, 19 %B;
 35 min, 19 %B; 55 min, 29 %B;
 70 min, 29 %B; 100 min, 40 %B
- Flow rate: 1.0 mL/min
- Injection volume: 10 µL
- Column temperature: 40 °C
- Detection wavelength: 203 nm

Results and discussion

The chromatogram of the ginseng separation is shown in figure 2. The method used to obtain this chromatogram was the same as the method specified in the pharmacopeia of People's Republic of China. The chromatogram shows excellent separation of all the target compounds. The ginsenosides Rg1 and Re are well separated, demonstrating that the Agilent 1120 Compact LC is well suited for this analysis.

The chromatogram of the American ginseng separation is shown in figure 3. The chromatogram shows excellent separation of the target ginsenosides.

From the chromatograms of ginseng and American ginseng, it can be seen that the profiles of the two samples as well as the concentrations of the ginsenosides are different. For complex TCM samples such as ginseng and American ginseng, the Agilent 1120 Compact LC is a reliable tool to obtain good results in routine analysis work.



Figure 2 Chromatogram of ginseng analyzed with the CHP method on an Agilent 1120 Compact LC system.



Figure 3

Chromatogram of American ginseng analyzed on an Agilent 1120 Compact LC system.

Conclusion

Although Traditional Chinese Medicines are complex natural products, this study demonstrated that the Agilent 1120 Compact LC was capable of analyzing the active components and achieving excellent separation performance. The results proved that the Agilent 1120 Compact LC is ideal for routine quality control testing of complex TCM samples.

Reference

1.

Pharmacopeia of the People's Republic of China, Volume I, **2005**.

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