

Abstract

Angelica Sinensis (Danggui) is one of the most important traditional Chinese medicines which has been used for tonifying blood, treating irregular menstruation and amenorrhoea for over 2000 years in China. Nowadays, it is also used for treatment of nephrotic syndrome, chronic bronchitis, bone injuries, inflammation, anemia and cardiovascular diseases.

Several types of compounds including phthalides, terpenes, aromatic compounds and polysaccharides have been isolated and identified from Danggui. Its main chemical constituents, Z-ligustilide (Z-lig), E-ligustilide (E-lig), Z-butylidenephthalide (Z-bp), E-butylidenephthalide (E-bp), 3-butylphthalide, senkyunolide A, senkyunolide I, senkyunolide I, senkyunolide H and ferulic acid (FA) are thought to be the biologically-active components of Danggui.

In order to evaluate the quality of danggui, it is important to have a rapid, direct and accurate method for the identification and quantification of active components. Many analytical methods such as HPLC-UV, GC-MS, LC-MS and immobilized liposome chromatography have been previously developed for the identification of components of Danggui. Nowadays, HPLC is most frequently used in the analysis of danggui and its prescription. However, when compared with GC-MS, HPLC has lower resolution, lower sensitivity and more time-consuming. GC-MS is a good tool to identify and quantify danggui constituents, but in previously studies, GC-MS was only used as an identification tool, or just to quantify one compound (Z-lig). The use of HPLC in the quantifying of 2 compounds (Z-lig and FA) was published previously. Furthermore, all the published HPLC-UV, GC-MS and LC-MS methods did not simultaneously detect and quantify bp, lig and FA. In the present study, a method using GC-MS was developed to accurately quantify Z-lig, E-lig, Z-bp, E-bp and FA. Other 11 compounds found in dangguai were also identified by GC-MS and semi-quantified by comparing with the standard curves of Z-lig.

On the other hand, ASE conditions were optimized. Finally, comparisons were made between ASE, Ultrasonic extraction and steam distillation.

In this study, 14 Chinese danggui samples (*Angelica sinensis*), 2 Japanese danggui

(*Angelica acutiloba*), 1 Korea danggui (*Angelica gigas*) and 1 *Ligusticum chuanxiong* Hort were obtained and used in the studies. All danggui samples have clarity geographical source, but there haven't pharmacology supporting data. Therefore, hierarchical clustering analysis was used to classify different kinds of danggui and the classify result show good correlation with different source of danggui samples.

The fingerprint of danggui was established in order to identify Chinese danggui herbs. At last, total amount of 5 active compounds (Z-lig, E-lig, Z-bp, E-bp and FA) were determined to evaluate the quality of Chinese danggui.

Key words: Dangguai (*Angelica sinensis*), quality evaluation, fingerprint, GC-MS, accelerated solvent extractor.