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Abstract

**EVALUATION ON QUALITY CONSISTENCY OF
ANGELICA SINENSIS AND *LIGUSTICUM CHUANXIONG*
USED IN CLINIC IN CHINA**

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The therapeutic effects of herbal medicine are depended on their stable quality of the raw materials, which may be affected by the locations, collection time and storage conditions of the herbs. Therefore, it is very important and necessary to evaluate the quality consistency of herbs used in clinic, which are major form used in clinical practices. In this paper, 56 samples of *Angelica sinensis* and 58 samples of *Ligusticum chuanxiong*, collected from 58 provincial hospitals in China, were qualitatively and quantitatively analyzed using HPLC and their quality consistency was evaluated using “Similarity Evaluation System for Chromatographic Characteristics of Traditional Chinese Medicine” (SES), Clustering Analysis and Principal Component Analysis. In SES analysis, the similar coefficients of *Angelica sinensis* and *Ligusticum chuanxiong* were distributed in the ranges of 0.989—0.744 and 0.999—0.909, respectively. However the RSDs of ferulic acid, coniferyl ferulate, E/Z-ligustilide, and E/Z-butyldenephthalide in 56 samples of *Angelica sinensis* and 58 samples of *Ligusticum chuanxiong* were distributed from 26.7% to 84.0% and 23.2% to 63.8%, respectively, which suggested that there were differences in quality of these herbal medicines.

Clustering Analysis based on the major compounds in the materials showed that both *Angelica sinensis* and *Ligusticum chuanxiong* samples were divided into two major groups with the sample numbers of each larger group were 40 and 37, and accounting for 71.4% samples of *Angelica sinensis* and 63.8% samples of *Ligusticum chuanxiong*,

respectively. The RSDs of ferulic acid + coniferyl ferulate, and Z-ligustilide of samples in the larger group of these two species were less than 40%.

Principal Component Analysis was also performed and 2D-projection plots of Principal Component Analysis for 56 samples of *Angelica sinensis* and 58 samples of *Ligusticum chuanxiong* showed the samples were also divided into different groups according to their distribution. Based on the samples located in the larger groups, RSDs of ferulic acid + coniferyl ferulate, and Z-ligustilide in 89.3% samples of *Angelica sinensis* and 60.3% samples of *Ligusticum chuanxiong* sample were less than 40%.

Considering the data mentioned above, RSDs of ferulic acid + coniferyl ferulate, and Z-ligustilide in, at least, 70% samples of *Angelica sinensis* and 60% samples of *Ligusticum chuanxiong* used in clinic in China were less than 40%, which is helpful to ensure the safety and efficacy of medication.

Decoction is the major administration form of Chinese herbs. Little Z-ligustilide could be extracted by water decoction, though ultrasonic extraction with methanol-formic acid (95:5) had good selectivity for weak polarity components in *Angelica sinensis* and *Ligusticum chuanxiong*. It is interesting that the RSD of this compound in water decoction was less than that in ultrasonic methanol-formic acid extracts. Coniferyl ferulate, at least could be partially transformed into ferulic acid during the decoction, was hardly detected in the water decoction extract. So the total amount of ferulic acid in *Angelica sinensis* and *Ligusticum chuanxiong* by decoction was higher than those extracted by ultrasonication, but its RSD of content in water decoction was higher.

Key wards: *Angelica sinensis*, *Ligusticum chuanxiong*, quality consistency, clinic