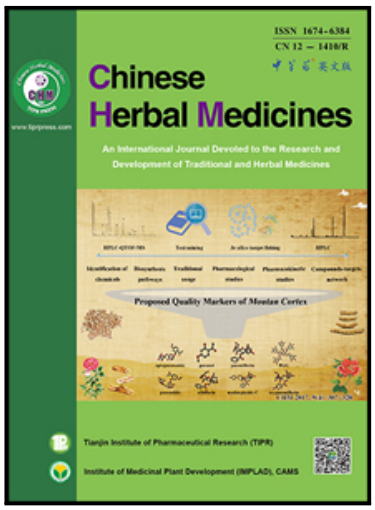

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Comparative Chemical Characters of *Sparganii Rhizoma* from Different Regions in China

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ABSTRACT

Objective To compare the chemical characters of Sparganii Rhizoma from different areas via chromatographic analysis and to establish a sensitive LC/MS method for quality assessment of Sparganii Rhizoma. **Methods** Under the optimised HPLC-PDA chromatographic conditions, twenty batches of Sparganii Rhizoma were analyzed by HPLC fingerprints. Principal component analysis (PCA), orthogonal projections to latent structures discriminant analysis (OPLS-DA) and hierarchical cluster analysis (HCA) were performed based on all peak areas of Sparganii Rhizoma fingerprints. Meanwhile, part of common peaks were subsequently quantified by UFLC-QTRAP-MS. **Results** The similarity values of HPLC fingerprints fluctuated in a wide range of 0.511-0.973, which showed variable differences of chemical characters among Sparganii Rhizoma from twenty habitats. PCA, OPLS-DA and HCA indicated that samples could be divided into five groups with different chemical characters, which generally corresponded with their geographical distributions. A total of 31 peaks in HPLC fingerprints were marked, and eight of them were identified and quantified. The quantitative result was generally in agreement with the classifications based on HPLC fingerprints, which indicated that Sparganii Rhizoma samples from eastern China mostly contained more contents including phenolic acids and flavonoids. **Conclusion** This study not only proved that there are relationships between geographic distributions and internal chemical compositions of plants, which could provide evidence to the traditional Chinese medicine concept “geo-authentic”, but also supplied a sensitive and rapid simultaneous quantitive method for the quality estimation of Sparganii Rhizoma.

***Key words*:** chemical characters; geographic distribution; simultaneous determination; *Sparganii Rhizoma*

1. Introduction

Sparganii Rhizoma, the dried tuber of *Sparganium stoloniferum* Buch.-Ham., is mainly distributed in Jiangsu, Zhejiang, Jiangxi, Guangxi, Anhui, Henan, and Hunan provinces in China (Figure 1). It is a traditional Chinese herbal medicine used to improve the blood circulation as well as to relieve pain (Pharmacopoeia Committee of P. R. China, 2015). Nowadays, it is not only a kind of traditional herbal medicine used in China, but also the scientists in other countries such as America, Korea, and

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Abbreviations: UFLC, ultra-fast liquid chromatography; PDA, photodiode array; RSD, relative standard deviation; ESI, electrospray ionisation; MRM, multiple reaction monitoring; Q1, the precursor ion; Q3, the product ion; DP, declustering potential; CE, collision energy; CXP, collision cell exit potential; EP, entrance potential; CUR, curtain gas; CAD, collision gas; GS1, ion source gas 1; GS2, on source gas 2; IS, ion spray voltage; PCA, principal component analysis; OPLS-DA, orthogonal projections to latent structures discriminant analysis; HCA, hierarchical cluster analysis.