

Short Commentary

Discriminate Rhizome and Fibrous Root of *Coptis chinensis* Based on HPLC Fingerprint and Multivariate Statistical Analysis

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In this study, the content of berberine, the main active analytical component in the different parts (the rhizome and the fibrous root known as Huanglian and Huanglianxu in Chinese) of *Coptis chinensis* was determined by HPLC quantitative analysis. The HPLC fingerprints of the Huanglianxu and Huanglian were developed, 14 common peaks of the HPLC fingerprints were analyzed by OPLS-DA, HCA, SA, and PCA. The berberine content and the similarity value of Huanglian was much higher than Huanglianxu. Moreover, on the basis of 14 common peaks, the differences and similarities between Huanglian and Huanglianxu were compared from the overall metabolic spectrum. The results also showed that the difference between Huanglian and Huanglianxu is obvious, and the different parts have obvious aggregation trend respectively. Berberine plays the most important role in the identification of Huanglian and Huanglianxu. The analysis results of quantitative analysis, PCA, SA, OPLS-DA and HCA are mutually supportive and consistent.

Research Purpose and Background

Coptis chinensis has been used as one of the most important drugs in TCM for thousands years [1,2]. It has significant effects in detoxification, clearing heat, dispelling fire, lowering blood sugar, anti-cancer [3,4]. With the increase of clinical application and economic benefits, the by products of *Coptis chinensis* such as fibrous roots, stems and leaves are also gradually entering the market, which causing quality of medicine inferior, and affects the efficacy, safety [5].

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The fibrous roots of *Coptis chinensis* can account for one third of the output of the whole medicinal material, but the pharmacopoeia stipulates that the fibrous roots must be removed when harvesting [6]. How to distinguish fibrous root from rhizome and how to make rational use of these fibrous roots are the key issues for the comprehensive utilization of *Coptis chinensis* [6]. At present, the research on the similarity and difference between Huanglian and Huanglianxu mainly focuses on the content of one or more alkaloid [7,8], and lacks the comparison of the differences between them from the level of overall metabolic components. To ensure the quality of medicinal materials and the safety of consumers, it is necessary to develop an objective and comprehensive method to identify them from the whole metabolic profiles level.

Summary Outlook

In a recent study, our team found that there are obvious differences between Huanglian and Huanglianxu. Based on HPLC fingerprint the multivariate statistical analysis was successfully used in the identification of the different parts, and the identification markers with statistical significance were screened out.

We should pay more attention to the metabolic process of the differential markers of medicinal materials to provide the basis for the production and cultivation of *Coptis chinensis*, which is helpful to the quality control of *Coptis chinensis*.

Our team will further use HPLC-MS method to identify each component in the rhizome and fibrous root, so we can combine qualitative analysis and quantitative analysis to achieve a comprehensive identification of them. We would calculate the equivalent of the active compositions of Huanglianxu, and effectively adjust the dosage of Huanglianxu according to the actual needs to replace Huanglian, so as to solve the problem of resource shortage of *Coptidis*.

In recent years, chemical methods based on chromatographic fingerprints and quantitative detection have been recognized as powerful tools [9]. Although progress has been made in quality control, there are still many difficulties in determining which chemical composition best reflect the correlation with the desired biological activity [9]. We believe that with the technological progress, we would use biological fingerprints combined with chromatographic fingerprints to evaluate the quality and identify the different parts of *Coptidis*.

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