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Abstract

Study on Chemical Constituents and Qualitative & Quantitative Analysis of Rhizoma Coptidis

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Rhizoma coptidis (family Ranunculaceae), Huang-Lian in Chinese, is a famous Traditional Chinese Medicine. It is used in China as an antimicrobial in the treatment of dysentery, gastroenteritis as well as other inflammatory conditions. Furthermore, its anticancer activities had been a focus recently. Thus, it is potential to research and develop Chinese Traditional Medicine "Huang-Lian" to remedy the cancer. However, studies on chemical constituents and quality control of Rhizoma coptidis were limited, which cannot guarantee its safety and efficacy. Therefore, the chemical compositions and analytical method of Rhizoma coptidis will be studied in this thesis.

The thesis contained four chapters:

Chapter 1 reviewed on the chemical constituents, pharmacology and the quality control studies of Rhizoma coptidis.

Chapter 2 is focused on chemical studies of *Coptis chinensis* recorded in "China Pharmacopoeia" (2005 Ed.).

1. Seventeen compounds had been isolated from the ethanol extract of *Coptis chinensis* by various chromatographic methods. Their structures were elucidated using spectral and chemical methods as 8-oxyberberine (**1**), 8-oxocoptisine (**2**), 8-oxo-epiberberine (**3**), 6-([1,3]dioxolo[4,5-g]isoquinoline-5-carbonyl)-2,3-dimethoxy-benzoic acid methyl ester (**4**), corydaldine (**5**), noroxyhydrastineine

(**6**), 6,7-methylenedioxy-1(2H)-isoquinolinone (**7**), coptinin A (**8**), coptinin B (**9**), coptinin C (**10**), coptinin D (**11**), neocoptinin A (**12**), neocoptinin B (**13**), neocoptinin C (**14**), woorenoside II (**15**), woorenol (**16**) and ferulic acid (**17**).

2. Compounds **8~14** are new compounds and named as coptinin A~D and neocoptinin A~C, respectively. Compounds **1~7**, **15** and **16** were isolated from this plant for the first time.

The quality control method (both qualitative & quantitative analysis by CZE) for Rhizoma coptidis was developed in Chapter 3.

1. Optimization of extraction conditions: Pressurized liquid extraction (PLE) was used for extraction. The optimized conditions were: particle size, 80-100 mesh; solvent, 70% methanol; temperature, 150 °C; static extraction time, 10 min; pressure, 1500 p.s.i.
2. Optimization of CZE-UV conditions: A fused-silica capillary (64.5 cm × 75 μm I.D., 56 cm effective length) was used throughout the study. The effects of the experimental parameters of CZE had been optimized by using central composite design (CCD). The best separation of nine compounds could be obtained within 15 min using 60 mM borate buffer (pH 9.9) containing 22% acetontrile as modifier, while separation voltage was 20 kV and temperature was at 30 °C.
3. Result: A CZE method was developed for simultaneous determination of five alkaloids and four lignans in Rhizoma coptidis. The developed method is accurate, simple and reproducible.

Key words: Rhizoma coptidis, *Coptis chinensis*, lignans, isoquinoline alkaloids, quality control, CZE, CCD, PLE