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Abstract

Chemical comparison and quality control for rhizoma (Jianghuang) and
radix (Yujin) of *Curcuma longa* L.

by

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The rhizoma and radix of "*Curcuma longa* L." are traditionally used as two Chinese medicines, Jianghuang and Yujin, respectively (There are other origins of "Yujin", herein, it is only mean the radix of *Curcuma longa* L.). Curcuminoids and essential oil are considered as main fractions of *Curcuma longa*. Recent research showed that *Curcuma longa* has effects on anti-oxidant, anti-tumor, anti-inflammation and hepatoprotection.

As recorded in China pharmacopoeia 2005, curcumin is used as the marker for quality control of Jianghuang, and total volatile oil should not be less than 7%. Yujin has no quantitative items for its quality control. Therefore, comparison of chemical components in volatile oil from Jianghuang and Yujin is very important for quality control of the two Chinese medicines. The thesis contained four chapters:

Chapter 1 is a review of *Curcuma longa*, including the research of chemical components, pharmacology and its quality control.

Chapter 2 is focused on the isolation and purification of components in Jianghuang oil. Four pure compounds α -turmerone, β -turmerone, γ -turmerone and δ -turmerone were obtained, which were confirmed by UV, MS and NMR. The purity of them are 96%, 98%, 98% and 95%, respectively.

A quality control method for Jianghuang and Yujin was developed in Chapter 3.

1. Optimization of extraction: Pressurized liquid extraction (PLE) was used for extraction. The optimized conditions: solvent, methanol; temperature, 140 °C;

particle size, 0.15-0.20 mm; static extraction time, 5 min; pressure, 1000 p.s.i.; static cycle, 1 and 60% of the flush volume.

2. GC-MS condition: The column temperature was at 80 °C for injection, then programmed at 20 °C·min⁻¹ to 120 °C, then at 1 °C·min⁻¹ to 130 °C and held for 5 min, then at 4 °C·min⁻¹ to 160 °C, finally, at 20 °C·min⁻¹ to 280 °C. Split injection (2 µl) was conducted with a split ratio of 10:1 and high purity helium was used as carrier gas of 1.0 ml·min⁻¹ flow-rate.
3. Results: Eight compounds were identified based on their MS data. Their contents in Jianghuang and Yujin from five different origins were determined.

Chemical comparison between Jianghuang and Yujin was performed in Chapter 4. The results showed that Yujin has low contents of ar-curcumen and ar-turmerone. Cluster analysis showed that Jianghuang and Yujin were divided into two groups based on 4 compounds ar-curcumen, ar-turmerone, α-turmerone and β-turmerone. Therefore, ar-curcumen, ar-turmerone, α-turmerone and β-turmerone could be used as markers for quality control of Jianghuang and Yujin.

Key words: Jianghuang, Yujin, GC-MS, quality control, PLE