

University of Macau

Abstract

**QUALITATIVE AND QUANTITATIVE STUDIES ON
NUCLEOTIDES OF GANODERMA BY
HPLC-DAD-ESI-MS**

by Gao JianLi

Thesis Supervisor: Dr. Yu ZhiLing

Prof. Wang YiTao

Chinese Medicinal Science

Lingzhi (reishi, ganoderma) is widely used in China, Japan, Korea and other East Asian countries. With a history of 2000 years, Lingzhi is considered to be a valuable health-maintaining food. Thanks to the new cultivation and liquid state fermentation technologies, the output of Lingzhi increased rapidly, and the effect of Lingzhi is widely recognized.

More and more new researches of LZ on pharmacology, chemistry and cultivation were published. Most of the studies were focused on pharmacodynamic study of polysaccharide and triterpene. Studies on quality control of Lingzhi were limited. Quality control is an important topic of Lingzhi, if it would be accepted worldwide. In this thesis, an analytical method was developed to assay nucleotides in LZ by HPLC-DAD-ESI-MS. It provided a useful analysis method, not only for scientific purposes but also for industrial applications. The researches included:

1. HPLC-MS method was developed for the analysis of Lingzhi firstly. An analytical method was established for the determination of 9 nucleotides, which are present in the fruiting body of Lingzhi. The mobile phase was a linear gradient of 5 mM Ammonium acetate- methanol.
2. By comparing two extraction methods, including ASE and sonication, sonication was chosen as the method to prepare the analysis samples.

3. The repeatability, stability, calibration graph, LOD, precision, and recovery of the method were evaluated. The employed method was proved stable to analyze nucleotides in Lingzhi.

4. The contents of nucleotides in different part of Lingzhi mushroom were determined. The results can offer useful information for utilizing Lingzhi. The nucleotide contents in other funguses were also analyzed to compare the contents of the 9 nucleotides.

The result suggested that eleven nucleotides and nucleic bases presented in Ganoderma, including uridine, uracil, cytidine, thymine, thymidine, guanine, guanosine, adenine, adenosine, hypoxanthine and inosine. The content of uridine is the highest in Lingzhi, and followed by cytidine, guanosine and adenosine. The thymine and thymidine are limited. Further more, the content of nucleotide in Lingzhi is more than its corresponding base. At the same time, the sensitivity of the uracil and uridine was low in ESI mass detector.

The studies also showed that the content of nucleotide in Zizhi is less than that in Chizhi, especially cytidine. Thymine and thymidine contained in the 5 determined funguses was very small. And it is presumed that there were little thymine and thymidine in fungus.