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### **Notorious Aristolochic acids in traditional herbal medicines: Successful identification and validation using DNA barcodes, Real-Time PCR with TaqMan technology and UHPLC-HR-MS**

Traditional herbal medicines adulterated and contaminated with plant material from the Aristolochiaceae family, which contain Aristolochic acids (AAs) cause aristolochic acid nephropathy. Approximately 274 traditional Chinese patent medicines containing Aristolochiaceae materials are still sold in mainland China today. In order to protect consumers from health risks, efficient methods to detect and differentiate Aristolochiaceae herbs and their putative adulterants or substitutes needs to be established. In this study, we used DNA barcodes (internal transcribed spacer 2 (ITS2) and psbA-trnH), Real-Time PCR TaqMan arrays and Ultra High Performance Liquid Chromatography-Mass Spectrometer (UHPLC-HR-MS) to differentiate between plant materials from Aristolochiaceae and non-Aristolochiaceae herbs. 158 Aristolochiaceae samples representing 46 species and four genera as well as 131 non-Aristolochiaceae samples representing 33 species, 20 genera and 12 families were analyzed using DNA barcodes based on the ITS2 and psbA-trnH sequences. Aristolochiaceae herbs were successfully discriminated from non-Aristolochiaceae herbs using BLAST1, the nearest distance method and the neighbor-joining (NJ) tree. In addition, based on sequence information of ITS2, we designed eleven groups of primer/TaqMan probe combinations and developed a Real-Time PCR assay which successfully identified herbal material from the Aristolochiaceae family. Using UHPLC-HR-MS and AA I and AA II as standard markers, we demonstrated that most representatives from the Aristolochiaceae family contain AAs. Therefore, an integrated DNA barcodes, Real-Time PCR assays using TaqMan probes and UHPLC-HR-MS method can be successfully used to identify Aristolochiaceae material in traditional herbal medicines and can provide an efficient and reliable authentication system for protecting consumers from health risks.

### **Biography**

Shi-Lin Chen is the director of Institute of Medicinal Plant Development (IMPLAD), Chinese Academy of Medical Sciences & Peking Union Medical College and the director of the WHO Center for Collaboration on Traditional Medicine. Prof. Chen obtained his PhD from Chengdu University of Traditional Chinese Medicine and he has been the Visiting Professor in Hong Kong Polytechnic University. Having been trained in Royal Botanic Gardens, Kew, Prof. Chen is concurrently acting as the editor of Acta Pharmaceutica Sinica, Chinese medicines and Chinese Herbal Medicine. He has so far published more than 200 scientific papers and a few books. His research is mainly in development and utilization of medicinal plant resources.

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