



**Good Practice in Traditional Chinese Medicine Research in  
the Post-genomic Era**

**GP-TCM**

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**D.1.11**

**Scientific papers on challenges and solutions to the  
quality control of CHM submitted for publication**



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## 1 Scientific Papers associated with quality control (D1.11)

### 1.1 Introduction

The overall objectives of WP1 are to:

- Design a standard system for the quality control of Chinese herbal medicines (CHM) in the EU
- Design a system that will provide greater transparency about the complexity of TCM nomenclature, thus clarifying plant identities and improving data gathering on CHM species
- Propose guidelines as a basis for the rational development of research methods to authenticate and monitor the quality of TCM plants entering the trade. Guidelines will aim to avoid duplication of research efforts and maximise the use of modern molecular and chemical techniques, especially a functional genomic approach.

### 1.2 Scientific papers

**The key scientific papers from the WP1 are listed below. The report will be updated after the Final Conference to include other publications from members not yet collated.**

- Chan, K, Shaw, D., Simmonds, M.S.J., Leon, C.J., Xu, Q., Lu, A., Sutherland, I, Ignatova, S., Zhu, Y-P., Verpoorte, R., Williamson, E.M., Duez, P. (2012) Good practice in reviewing and publishing studies on herbal medicine, with special emphasis on Traditional Chinese Medicine and Chinese *Materia Medica J Ethnopharm.* 140: 469-475

Web link: <http://www.sciencedirect.com/science/article/pii/S0378874112000517>

#### **Abstract:**

##### Ethnopharmacological relevance

Studies on traditional Chinese medicine (TCM), like those of other systems of traditional medicine (TM), are very variable in their quality, content and focus, resulting in issues around their acceptability to the global scientific community. In an attempt to address these issues, an European Union funded FP7 consortium, composed of both Chinese and European scientists and named “Good practice in traditional Chinese medicine” (GP-TCM), has devised a series of guidelines and technical notes to facilitate good practice in collecting, assessing and publishing TCM literature as well as highlighting the scope of information that should be in future publications on TMs. This paper summarises these guidelines, together with what has been learned through GP-TCM collaborations, focusing on some common problems and proposing solutions. The recommendations also provide a template for the evaluation of other types of traditional medicine such as Ayurveda, Kampo and Unani.

##### Materials and methods

GP-TCM provided a means by which experts in different areas relating to TCM were able to collaborate in forming a *literature review good practice panel* which operated through e-mail exchanges, teleconferences and focused discussions at annual meetings. The panel involved coordinators and representatives of each GP-

TCM work package (WP) with the latter managing the testing and refining of such guidelines within the context of their respective WPs and providing feedback.

### Results

A *Good Practice Handbook for Scientific Publications on TCM* was drafted during the three years of the consortium, showing the value of such networks. A “deliverable – central questions – labour division” model had been established to guide the literature evaluation studies of each WP. The model investigated various scoring systems and their ability to provide consistent and reliable semi-quantitative assessments of the literature, notably in respect of the botanical ingredients involved and the scientific quality of the work described. This resulted in the compilation of (i) a robust scoring system and (ii) a set of minimum standards for publishing in the herbal medicines field, based on an analysis of the main problems identified in published TCM literature.

### Conclusion

Good quality, peer-reviewed literature is crucial in maintaining the integrity and the reputation of the herbal scientific community and promoting good research in TCM. These guidelines provide a clear starting point for this important endeavour. They also provide a platform for adaptation, as appropriate, to other systems of traditional medicine.

### Graphical abstract



- **Zhao Z, Guo P, Brand E. (2012) The formation of daodi medicinal materials J Ethnopharm. 140: 476-481**

**Web link:** <http://www.sciencedirect.com/science/article/pii/S037887411200061X>

### **Abstract:**

*Daodi* medicinal material is produced and assembled in specific geographic regions with designated natural conditions and ecological environment, with particular attention to cultivation technique, harvesting and processing. The quality and clinical effects surpass those of same botanical origin produced from other regions. It is thus widely recognized and has long enjoyed a good reputation. Based on literature, market and field investigation on *daodi* medicinal materials, the historical background and reasons behind the formation and the development of *daodi* medicinal material are analyzed. This review clarifies the concept and rationalizes the formation of *daodi* medicinal material.

### Graphical abstract



**Associated outputs on quality control produced by members of WP1 include:**

- **Chen, S. Yao, H. Han, J. Liu, C. Song, J. Shi, L. Zhu, Y. Ma, X. Gao, T. Pang, X. Luo, K. Li, Y. Li, X. Jia, X. Lin, Y. Leon, C. (2010). Validation of the ITS2 Region as a Novel DNA Barcode for Identifying Medicinal Plant Species. PloS ONE 5(1): e8613. doi:10.1371/journal.pone.0008613**

**Web link:**

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0008613>

**Abstract:**

**Background**

The plant working group of the Consortium for the Barcode of Life recommended the two-locus combination of *rbcL* + *matK* as the plant barcode, yet the combination was shown to successfully discriminate among 907 samples from 550 species at the species level with a probability of 72%. The group admits that the two-locus barcode is far from perfect due to the low identification rate, and the search is not over.

**Methodology/Principal Findings**

Here, we compared seven candidate DNA barcodes (*psbA-trnH*, *matK*, *rbcL*, *rpoC1*, *ycf5*, ITS2, and ITS) from medicinal plant species. Our ranking criteria included PCR amplification efficiency, differential intra- and inter-specific divergences, and the DNA barcoding gap. Our data suggest that the second internal transcribed spacer (ITS2) of nuclear ribosomal DNA represents the most suitable region for DNA barcoding applications. Furthermore, we tested the discrimination ability of ITS2 in more than 6600 plant samples belonging to 4800 species from 753 distinct genera and found that the rate of successful identification with the ITS2 was 92.7% at the species level.

**Conclusions**

The ITS2 region can be potentially used as a standard DNA barcode to identify medicinal plants and their closely related species. We also propose that ITS2 can serve as a novel universal barcode for the identification of a broader range of plant taxa.

- **Chen, S. Lin, Y. Qian, Z. Leon, C.J. (2010). A colored identification atlas of Chinese materia medica and plants as specified in the pharmacopoeia of the People's Republic of China. Chinese Pharmacopoeia Commission and Institute of Medicinal Plant Development, Chinese Academy of Medical Sciences, People's Medical Publishing. 2 vols. 1,200 pp.**



**Web link:** <http://www.chinascientificbooks.com/a-colored-identification-atlas-of-chinese-materia-medica-and-plants-as-specified-in-the-pharmacopoeia-of-the-peoples-republic-of-china2-volumes-p-7427/>

**Introduction:**

The compilation is based on the Pharmacopoeia of the People's Republic of China, 2010 edition. In this book, 491 common Chinese medicines are described and accompanied by over 2300 colour photographs of the source plants and their corresponding medicinal materials. Each photograph has been carefully selected so as to illustrate the habitat of the species, the morphology and key identification of both the plants themselves and their corresponding authentic and typical medicinal materials. The professional combination of sound scientific information and high quality illustrations with clear and helpful captions enables the reader to easily identify the plants and medicines described. As such, the book greatly enhances awareness of the importance of good botanical identification characters. Unlike many other reference books its popular and easy to understand style is likely to attract and become an invaluable reference work for all those engaged in medical research, practice, clinical trialling and teaching as well as industry and all suppliers of Chinese medicinal materials, including crude, processed and patent Chinese medicines, both home and abroad.

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