UNIVERSITI TEKNOLOGI MARA

PROBLEMS AND PROSPECTS OF TRADITIONAL COLLECTION AND PROCESSING OF MEDICINAL PLANT MATERIALS; STANDARDISATION OF MATERIAL DESIGNATED AS AJISAMAT

TENGKU AZLAN SHAH BIN
TENGKU MOHAMAD

Thesis submitted in fulfillment of the requirements for the degree of

Master of Science

Faculty of Pharmacy

January 2011
CANDIDATE’S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA (UiTM). It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

In the event that my thesis is found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree and subjected to the disciplinary rules and regulations of Universiti Teknologi MARA (UiTM).

Name: TENGKU AZLAN SHAH BIN TENGKU MOHAMAD
Candidate’s ID No: 2004361047
Programme: Master of Science in Pharmacy
Faculty: Pharmacy
Thesis Title: Problems and Prospects of Traditional Collection and Processing of Medicinal Plant Materials; Standardisation of Material Designated As Ajisamat

Signature: ......................................
Date: ....................................

Date: 8/1/2011
ABSTRACT

The current practices of collection and processing of herbal materials by traditional practitioners (mostly Malays) in Perak, Malaysia, were reviewed in order to evaluate how these practices could possibly have an impact on the quality of the final products. The documentation was done through a structured interview survey conducted on 56 practitioners selected from each district of Perak. A majority of the selected practitioners were of the older generation. The method of gathering the plant materials combines collection from the wild, small scale cultivation as well as purchasing from grocery shops or other practitioners. The most commonly used plant parts are roots and leaves. The initial processing practices generally involve slicing of the raw materials into smaller pieces, drying under direct sunlight and grinding. The materials are commonly stored loosely packed, unprotected from light or pest. In total these practitioners use 184 types of plant according to their vernacular names. An analysis of the data showed that the plant known as Ajisamat corresponds to two different species from different families - *Salacia macrophylla* Blume (Celastraceae) and *Prismatomeris glabra* (Rubiaceae). Therefore pharmacognostical studies were undertaken to determine identity and quality criteria for these plants. Macromorphological inspection of the vegetative parts of the two plants reveals only a slight difference in the arrangement of the petioles. However, a microscopic investigation of the plants roots revealed distinctive anatomical features. Prismatic calcium oxalate crystals and banded paratracheal parenchyma seen in the root section were characteristics of *S. macrophylla* while *P. glabra* is characterised by an abundance of raphide crystals in the root. Other features like the differences of vessels diameters and arrangements were also of diagnostic importance for identification of the plants. Some of these characters were also identified in the powder of these plants and proposed for diagnostic purpose. The percentages of ethanol extractive values for *Salacia macrophylla* are 1.41±0.14 and 5.56±0.62 for cold and hot method, while percentages of water extractive values are 1.44±0.26 and 5.25±0.66 for cold and hot method respectively. The percentages of ethanol and water extractive values for *Prismatomeris glabra* are 1.07±0.19 and 6.20±0.53 respectively for cold and hot method. Percentages of total ash, acid-insoluble ash, water-soluble ash and sulphated ash for *Salacia macrophylla* are 1.92±0.01, 0.14±0.18, 0.77±0.22 and 14.43±8.21 while for *Prismatomeris glabra* are 3.15±1.17, 1.25±0.28, 2.57±0.85 and 47.21±17.46 respectively. Thin layer chromatography analysis for *Salacia macrophylla* developed by using a mixture of hexane and acetone as mobile phase shows three orange spots visible under ordinary light and under UV-254 nm at Rf 0.14, Rf 0.18 and Rf 0.38 as well as three compounds visible under UV-366 nm, at Rf 0.05, Rf 0.24, Rf 0.66. In addition, a HPLC profiling method was developed for *Salacia macrophylla*. It uses a hexane extract of the plant and normal phase analysis with a mixture of hexane and ethyl acetate as mobile phase through isocratic elution (85% hexane: 15% ethyl acetate) from 0-25 min and gradient elution (85%-55% hexane: 15%-45% ethyl acetate) from 26-50 min, with injection volume of 20 microlitres and flow rate of 1 millilitre per minute. A good resolution chromatogram with single peaks at the retention time of 12, 13 and 18 min was detected by using wavelengths 273 nm and 285 nm, while longer wavelength reveal a large and poorly resolved peak at a retention time of 22 minutes. The fingerprint chromatogram together with other pharmacognostical information can be utilised as identification tools for *Salacia macrophylla* Blume and a monograph for the plant is proposed.
ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious, the Most Merciful. Praise is to Allah the Almighty. The peace and blessing is unto Prophet Muhammad s.a.w.

I wish to express my sincere gratitude and appreciation to my supervisor, Professor Dr. Jean-Frédéric Faizal WEBER Abdullah, Director of Institute for Research of Natural Medicines (iKUS), UiTM, for his continuous support, generous guidance, help, patience and encouragement during the research processes and thesis preparation until its completion. He has pointed out the correct direction and led me through obstacles, to the success of this research.

My word of thanks also goes to Dr. Ibtisam Abd. Wahab, my co-supervisor and to Professor Dr. Aishah Adam, the Dean of Faculty of Pharmacy UiTM.

I am profoundly grateful to Professor Dr. Abu Bakar Abd. Majeed, the former Dean of Faculty of Pharmacy (now the Assistant Chancellor, Research Management Institute (RMI), UiTM), for his personal encouragement and concern.

My word of thanks also goes to Associate Professor Dr. Khatijah Husin, Dr. Noraini Talip and Mr. Mohd Ruzi Abd. Rahman from Department of Natural Resources and Environmental Sciences, Faculty of Science and Technology, UKM for their excellent scientific advice, guide and assistance.

My appreciation goes to Mr. Richard Chung and Mr. Kamarudin Salleh of Forest Research Institute Malaysia (FRIM) for their assistance in the identification of the plants. I would also like to thank Miss Zainon Abu Samah and Dr. Ani Sulaiman, also from FRIM, for their advice and opinions.

I would also like to thank En. Ahmad (Pak Mat Siam) from Changkat Jering, Taiping, Perak, for his help in obtaining the plant samples for this research. Appreciation also goes to all practitioners who had participated and shared their precious knowledge in the survey.

I would also like to acknowledge the support given to me by the management of Universiti Kuala Lumpur - Royal College of Medicine Perak (UniKL-RCMP), Ipoh, during the course of this study.

My word of gratitude also goes to all my fellow colleagues at Pharmacy Programme, UniKL-RCMP for their help and concern. Heartfelt thanks goes to Tuan Haji Abd. Rahim and Tuan Haji Sofian Yahya for their ‘fatherly’ advice and moral support, especially during the hard times, which has supplied me with profuse momentum to ride out the tides and move forward.

I would also like to thank all members of iKUS and staff of Analytical Centre (HPLC lab), my friends and few others, for the cheerful working environment as well as for their friendship, opinions and assistance.

Finally, I recorded my love and thank to my wife Aida Mohamud, my daughters Tengku Atiqah Farhana and Tengku Iffah Najihah, my sons Tengku Ahmad Luqman, Tengku Ahmad Hakimi and Tengku Ahmad Lutfi, for their abundant love, support and understanding throughout my studies. Also to my beloved father, whom had always encouraged me to pursue higher knowledge (even though it is sad to say that he is not witnessing this achievement), my mother and the whole family, for their love, sacrifices and support. I shall forever recognize their sacrifices, encouragements and love during my many years of pursuing of knowledge.

Thank you.
## CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE PAGE</td>
<td>li</td>
</tr>
<tr>
<td>CANDIDATE’S DECLARATION</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>iv</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>v</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>xi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xiii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xiv</td>
</tr>
<tr>
<td>LIST OF PLATES</td>
<td>xix</td>
</tr>
<tr>
<td>ABBREVIATIONS</td>
<td>xxi</td>
</tr>
</tbody>
</table>

### CHAPTER 1  INTRODUCTION

1

### CHAPTER 2  LITERATURE REVIEW

2.1 Global overview of current situation and issues related to traditional medicines. 5

2.2 Efforts taken by the World Health Organisation (WHO) pertaining to quality controls and regulatory frameworks for traditional medicines. 10

2.3 Current situations of traditional medicines in Malaysia 12

2.3.1 Effort on the research, development and promotion of traditional medicines in Malaysia. 15

2.3.2 Regulations applicable to traditional medicines in Malaysia. 17

2.4 The Herbal Monographs 19

2.4.1 The WHO monographs 19