

การศึกษาพฤกษศาสตร์พื้นฐานของการใช้สมุนไพร เพื่อปรับภูมิคุ้มกันของร่างกายในจังหวัดอุบลราชธานี

Studies on the Utilization of Medicinal Plants as Immunomodulators in Ubon Ratchathani Province, Thailand

ชุตินันท์ ประสิทธิ์ภูริปรีชา (Chutinun Prasitpuriprecha)¹

บังอร ศรีพานิชกุลชัย (Bung-orn Sripanidkulchai)²

วีระพงษ์ ลุลิตานนท์ (Viraphong Lulitanond)³

จรัสพรรณ สงวนเสริมศรี (Jarasbhan Saguansermisri)⁴

บทคัดย่อ

การศึกษาพฤกษศาสตร์พื้นฐานเพื่อสำรวจการใช้สมุนไพรในการปรับภูมิคุ้มกันของร่างกาย ด้วยวิธีการสัมภาษณ์เชิงลึก หมอพื้นบ้าน จำนวน 21 คน ในจังหวัดอุบลราชธานี ในปีพ.ศ.2544-2545 ผลการวิจัยพบว่ามีการใช้สมุนไพรจำนวน 45 ชนิด จาก 24 วงศ์ เพื่อใช้ในการรักษาโรคที่เกี่ยวข้องกับระบบภูมิคุ้มกัน วงศ์ที่พบมากที่สุด คือ วงศ์ Fabaceae ส่วนของพืชที่นำมาใช้มากที่สุด คือ ลำต้น การเตรียมสมุนไพรนิยมใช้วิธีต้ม น้ำดื่ม โรคที่มักพบมีการใช้สมุนไพรรักษามากที่สุด คือ โรคตับ, โรคมะเร็ง และใช้เป็นยาอายุวัฒนะ ตามลำดับ อย่างไรก็ตาม ควรมีการศึกษาวิจัยอย่างเป็นระบบในอนาคต เพื่อศึกษาองค์ประกอบทางเคมีฤทธิ์ทางภูมิคุ้มกัน วิทยาเภสัชวิทยา และพิษวิทยา เพื่อพิสูจน์คุณค่าของสมุนไพรในการปรับภูมิคุ้มกันของร่างกาย

Abstract

An ethnobotanical survey on the utilization of medicinal plants as immunomodulators in Ubon Ratchathani Province, Thailand was carried out during 2001-2002. The information was obtained from 21 reliable professional traditional medicine practitioners by in-depth interviews. Forty-five medicinal plants belonging to 24 families were documented for their therapeutic properties on the immune system. The most commonly represented family was Fabaceae. The stem was the most frequently used part of the plant. Decoction with water was the greatest herbal preparation. Oral administration was the main method of prescription. The most common use was to treat liver disease, followed by cancer and for anti-aging. Further systematic investigations into the chemical constituents, immunopharmacological activity and toxicity of these medicinal plants will be needed to determine their true medicinal worth.

คำสำคัญ: พฤกษศาสตร์พื้นฐาน สมุนไพร สารปรับภูมิคุ้มกัน

Keywords: Ethnobotany, medicinal plants, immunomodulators

¹ผู้ช่วยศาสตราจารย์ ภาควิชาชีวเภสัชศาสตร์ คณะเภสัชศาสตร์ มหาวิทยาลัยอุบลราชธานี

²รองศาสตราจารย์ ภาควิชาเภสัชเคมี คณะเภสัชศาสตร์ มหาวิทยาลัยขอนแก่น

³รองศาสตราจารย์ ภาควิชาจุลชีววิทยา คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น

⁴รองศาสตราจารย์ ภาควิชาบริหารเภสัชกรรม คณะเภสัชศาสตร์ มหาวิทยาลัยเชียงใหม่

Introduction

Indigenous medicine is now recognized worldwide as a healthcare resource. According to the World Health Organization (WHO), as much as 80% of the world's population depends on traditional medicine for its primary health care needs (Azaizeh et. al., 2003). Medicinal plants have been used to treat human illness since time immemorial. Some medicinal plants are believed to promote positive health and maintain resistance to infection by re-establishing body equilibrium and conditioning the body tissue. The restorative and rejuvenating power of these herbal remedies may be due to their action on the immune system (Atal et. al., 1986).

Today, the concept of immunomodulation has begun to find acceptance in medicine. The potential uses of immunomodulators in clinical medicine include the reconstitution of immune deficiency and the suppression of normal or excessive immune function. Immunomodulators are being used as immunotherapy in diseases such as cancer, infectious diseases, immunodeficiency disorders, autoimmune disease and inflammation. Some medicinal plants have been shown to be strong immunomodulators (Labadie et. al., 1989). Nowadays, many researchers are interested in screening for new immunomodulators from plants. There are two ways to select natural products for investigation. The classical method is laboratory-based, relying on previous taxonomic findings, phytochemical factors, immunopharmacological studies, and random screening methods. The other, which is gaining popularity among investigators, is searching traditional texts and herbal medicine usage, including oral interviews with traditional indigenous healers – the ethnobotanical route (Lipp, 1989; Williams, 2001).

Ethnobotany has been widely used for the documentation of indigenous knowledge on the use of medicinal plants. This information is not only useful for the conservation of cultural traditions and biodiversity, but also for community health care and drug development (Martin, 1995). The objective of this study was to investigate the utilization of medicinal plants as immunomodulators in Ubon Ratchathani Province, Thailand, in order to conserve the native knowledge of folk medicines and to provide potential candidates for new drugs therapies.

Methodology

Study area: Ubon Ratchathani is located in the north-eastern part of Thailand (15°13' 59"N, 104°51' 47"E). The province covers a total area of 15, 744 km², with Laos PDR to the north and east and Cambodia to the south (Fig 1.) Most of the area is about 68 m above the sea level. The vegetation comprises dry evergreen forest and deciduous forest. Ubon Ratchathani is divided into twenty districts and five minor districts. Many people still use traditional medicine as an alternative treatment, especially in rural areas.

Methods

The investigation was carried out in Ubon Ratchathani between 2001–2002. Ethnobotanical information was obtained from 21 reliable traditional medicine practitioners from different areas of Ubon Ratchathani. They were all male in the age range of 60–83 years (average about 70 years). The data on these professional traditional practitioners were obtained from Ubon Ratchathani Province Public Health Office. The selected practitioners were often highly respected individuals within their communities.

At the time of the survey, they still provided their services to local patients and those in remote areas.

The information on medicinal plants utilization was gathered through direct in-depth interviews with the authors, according to the classical indications in ethnopharmacobotanical research proposed by Waller (1993). The first selection criterion was a single plant remedy used in diseases which can reasonably be associated with dysfunction of immune systems as described in Table 1 (Labadie et. al., 1989). We did not investigate the combination remedies, although a mixture of several crude extracts could have greater beneficial effects or greater toxicity compared with a single plant extract. Crude drugs given in combination could act synergistically, but they could have unknown interactions (Borchers et. al., 1997). The second criterion was a single plant used as a tonic, aphrodisiac, restorative and health promoting agent – a concept of strengthening host defense against different diseases. The last selection criterion was a plant mentioned by at least three separate practitioners as giving the best result or being the top plant for each practitioner.

For each medicinal plant collected, its vernacular name, the part used, method of preparation, route of administration, dosage, duration, ingredients added, dietary restriction, ritual procedure, and other details of ailment were obtained (Croom, 1983). Each locality was visited at least 4–5 times, in different seasons. After compilation of all data, the plant materials were collected under the guidance of the local practitioners. We identified these specimens at the Faculty of Pharmaceutical Sciences, Ubon Ratchathani University and also by comparing with the authentic specimens at the Herbarium of the Department of Agriculture and Department of

Forestry, Ministry of Agriculture, Bangkok, Thailand. Voucher specimens were deposited in the herbarium of the Faculty of Pharmaceutical Sciences, Ubon Ratchathani University.

Results

Altogether 45 medicinal plants belonging to 24 families have been documented for their therapeutic properties on immune system. The data as shown in Table 2 included, for each plant, the family name in alphabetical order, botanical name, vernacular name, plant part used, method of preparation, administration and ailment treated, along with its voucher specimen number.

The most commonly represented family was Fabaceae, followed by Asclepiadaceae and Rubiaceae, respectively. The stem was the most frequently used plant part, while whole plant and root were second. However, more than one part of some plants can be used. The most popular form of herbal preparation was decoction. The processes of decoction were all similar. One handful of medicinal plants was placed into three cups of boiling water. The supernatant alone was drunk 2–3 times a day. Other preparations were alcoholic maceration, aqueous infusion, steeping in honey or blended with honey into balls and eaten. Some plants were used in more than one method of preparation. The most common remedy was to cure liver disease, followed by treating cancer and for anti-aging activity.

Discussion and conclusion

Among the 45 plants listed in Table 2, some of them have already been experimentally studied, but for different indications or pharmacological activities. *Murdannia loriformis* demonstrated

antimutagenicity in rats (Intiyot et. al., 2002). *Salacia chinensis* had some alpha-glucosidase inhibitory activity (Yoshikawa et. al., 2003). *Cyperus rotundus* possessed anti-inflammatory, anti-pyretic, analgesic (Gupta et. al., 1971) and insecticidal activities (Dadang et. al., 1996). *Crateva adansonii* had cytotoxic effects (Ayoub and Babiker, 1984). Other plants, such as *Molineria latifolia*, *Aristolochia potheri* and *Hymenocardia wallichii* were not documented in literature. It is worth noting that for all of these plants, there is no record of experiments on their immunomodulating activity. Thus, these plants need further investigation to determine their effectiveness in the immune system. New immunomodulators of plant origin will minimize the expenditure incurred by the purchase of foreign drugs. Further systematic investigations into the chemical constituents, pharmacological actions, and toxicity of the plant material will be needed to improve medicinal value.

Traditional management of medicinal plants and practices of herbal medicine is built on the basis of indigenous knowledge. There is a long tradition, in rural societies, of using medicinal plants for both preventive and curative health care; local people have developed reliable knowledge and effective methods to identify, harvest, utilize, maintain, and preserve medicinal plants and their habitats for sustainable use (Pei, 2001). Nowadays the traditional use of medicinal plants in therapy has decreased because of some socio-economic welfare, well-developed transportation and medicinal facilities (Rao, 1996). Knowledge of using plants as remedies is apparently the result of transmission from the older to the younger generation. Skills and experiences of traditional medicine practitioners are passed to the next generation

by word of mouth. Each healer has his methods of preparation, following his parents' or teacher's tradition. Medicinal herb practitioners are already very old. The younger generation, however, has no interest and chooses to learn from the traditional healers. To prevent traditional medicinal knowledge from being lost, it is imperative that this knowledge is documented scientifically (Brito, 1996). Plant drug discovery and development need collaboration between field practitioners and scientific researchers. The current survey has shown that most of the interviewed practitioners are ready to cooperate with researchers.

In conclusion, this study has been useful in order to preserve indigenous knowledge of the utilization of medicinal plants, especially as immunomodulators, from traditional medicine practitioners and to provide valuable information for the investigation into new candidates for immunotherapy.

Acknowledgements

This work was financially supported by grants of the Graduate School, Chiangmai University. The authors are grateful to Associated Professor Dr. Wongsatit Chuakul, Faculty of Pharmacy, Mahidol University and Mr. Bhanubong Bongcheewin, Faculty of Pharmaceutical Sciences, Ubon Ratchathani University for their help in plant identification. We would like to acknowledge Professor Dr. J. Edward Moreton, Department of Pharmaceutical Sciences, University of Maryland, Baltimore, USA for kindly editing this article. We also wish to thank all the traditional practitioners who helped make this research possible.

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Table 1 Symptoms describing the immunomodulating meaning (Labadie; et. al., 1989)

1. Infectious conditions : wounds, burns, abscess, fever, bacterial infection, viral infection
2. Tumour & cancers
3. Allergy : asthma, rash, acute dermatitis, insect bites
4. Inflammatory conditions: rheumatism, pain, inflammation
5. Human immunodeficiency syndrome : AIDs
6. Autoimmune disease
7. Liver disease : jaundice, hepatoma, hepatitis, hepatomegaly, hepatopathy, cirrhosis



Fig 1. Map of Ubol Ratchathani (www.thaihotelslinks.com/Ubol-Ratchathani/map.php)

Table 2 Medicinal Plants with potential Immunomodulating Activity

Botanical name	Vernacular name	Parts used	Preparation & Administration	Aliment	Voucher number
Apocynaceae					
<i>Alyxia reinwardtii</i> Blume	Tungtoon, Tungtoon-kaw	stem	decoction, taken orally	hepatopathy	ch02/0001
<i>Holarrhena pubescens</i> Walp. ex G. Don	Moke-luang, Moke-yai, Yangpud	bark	decoction, taken orally	wound, abscess	ch02/0002
Aristolochiaceae					
<i>Aristolochia pothierii</i> Pierre ex Leconte	E-loompompao, Krachau-Toongtong	rhizome	decoction, taken orally	anti-aging	ch02/0003
Asclepiadaceae					
<i>Dischidia nummularia</i> R. Br.	Pappae, Tingsaeu, Kledmungkorn	bulb	decoction, taken orally	hepatomegaly, cirrhosis	ch02/0004
<i>Gymnema griffithii</i> Craib	Tysong-kaw, Tankpae	root	decoction, taken orally	tonic	ch02/0005
<i>Hoya pachyclada</i> Kerr	Tang-yai, Tang-luang	stem and leaf	decoction, taken orally	hepatomegaly	ch02/0006
<i>Hoya parasitica</i> (Roxb.) Walp. ex Trail	Tang-lek, Nompjitt	stem and leaf	decoction, taken orally	hepatomegaly	ch02/0007
Capparidaceae					
<i>Capparis micracantha</i> DC.	Caichoo-ton, Chingchee, Paysajomplak	stem	decoction, taken orally	breast cancer	ch02/0008
<i>Crateva adansonii</i> DC.	Kam, Kumbok	bark	decoction, taken orally	cancer, anti-aging	ch02/0009
Celastraceae					
<i>Salacia chinensis</i> L.	Takai	stem	decoction, taken orally	hepatomegaly	ch02/0010
<i>Salacia verrucosa</i> Wight	Takoung , Takwang	stem	decoction, taken orally	hepatomegaly	ch02/0011
<i>Siphonodon celastrineus</i> Griff.	maddock, margdook, bukcoke	root, bark	decoction, taken orally	hepatitis, skin rash	ch02/0012

Table 2 (continued)

Botanical name	Vernacular name	Parts used	Preparation & Administration	Aliment	Voucher number
Commelinaceae					
<i>Murdannia loriformis</i> (Hasak.) R. S. Rao & Kamnathy	Ya-pakking, Ya-taewarda	whole plant	decoction, taken orally	hepatomegaly	ch02/0013
Cyperaceae					
<i>Cyperus rotundus</i> L.	Ya-haewmoo	rhizome	decoction, taken orally	health promoting, hepatotonic	ch20/0014
Euphorbiaceae					
<i>Croton cascarilloides</i> Raeusch.	Plaunam-gnern	root	decoction, taken orally	fever, viral infection	ch02/0015
<i>Hymenocardia wallichii</i> Tul.	Hu-ling, Hua-ling, Fabnarm	stem	decoction, taken orally	fever, chickenpox	ch02/0016
<i>Suregada multiflorum</i> (A. Juss.) Brail.	Kunthongpayabath, Dooksai	stem	decoction, taken orally	cancer	ch02/0017
Fabaceae					
<i>Bauhinia penicilliloba</i> Pierre ex Gagnep.	Sewdang, Putaulomlook, Sewkrau	root	decoction, taken orally	tonic, appetizer	ch02/0018
<i>Butea superba</i> Roxb.	Jankrau, Thongkrau	stem	decoction and then steeping in honey, taken orally	anti-aging, tonic	ch02/0019
<i>Desmodium styracifolium</i> (Osbeck) Merr.	Koungkouhee, Peesaunam	root, stem	decoction, taken orally	fever, allergic dermatitis	ch02/0020
<i>Desmodium triflorum</i> (L.) DC.	Ya-kledhoi	whole plant	decoction, taken orally	tonic	ch02/0021
<i>Dunbaria bella</i> Prain	Tau-kangkok, Kanglauy, Kangkrung	root	decoction, taken orally	mumps, asthma	ch02/0022
<i>Phyllodium longipes</i> (Craib) Schindl.	Kasampeek, Kiedpla	root	decoction, taken orally	hepatopathy	ch02/0023
<i>Sindora siamensis</i> Teijsm. & Miq.	Ton-tae, Maka-tae	whole plant	decoction, taken orally	tuberculosis	ch02/0024
<i>Zornia diphylla</i> (L.) Pers.	Kraeu-kiengpeun, Thunyarn	whole plant	decoction, taken orally	tonic	ch02/0025

Table 2 (continued)

Botanical name	Vernacular name	Parts used	Preparation & Administration	Aliment	Voucher number
Gnetaceae					
<i>Gnetum macrostachyum</i> Hook.f.	muay-dang	stem	alcoholic maceration, taken orally	pain, inflammation	ch02/0026
<i>Gnetum montanum</i> Markgr.	muay-leung	stem	decoction, taken orally	fever, inflammation	ch02/0027
Gramineae					
<i>Echinochloa crus-galli</i> (L.) Pal	Ya-plongpai, Ya-pai	whole plant	decoction, taken orally	fever, dengue	ch02/0028
Hypoxidaceae					
<i>Molineria latifolia</i> Herb. ex Kurz	Van-sarklek	rhizome	alcoholic maceration, taken orally	anti-aging, tonic	ch02/0029
Liliaceae					
<i>Ophiopogon intermedius</i> D.Don	Somphoo, Ya-prakthin	whole plant	decoction, taken orally	tonic	ch02/0030
Loranthaceae					
<i>Dendrophthoe pentandra</i> (L.) Miq.	Kafak-noina	whole plant	decoction, taken orally	vaginal cancer	ch02/0031
Menispermaceae					
<i>Tinospora crispa</i> (L.) Miers ex Hook.f. & Thomson	Boraped, Krau-kaohor-tuapoo	stem	blended ball with honey, taken orally	jaundice, anti-aging	ch02/0032
Myrsinaceae					
<i>Ardisia helfferiana</i> Kurz	Somkungkhon, Mae-hang	bark, leaf	decoction, taken orally	hepatopathy, tonic	ch02/0033

Table 2 (continued)

Botanical name	Vernacular name	Parts used	Preparation & Administration	Aliment	Voucher number
Oleaceae					
<i>Chionanthus ramiflorus</i> Roxb.	Plumalee, Oubdam	stem	decoction, taken orally	cancer	ch02/0034
<i>Myxopyrum smilacifolium</i> Blume	Prakhunchaisri, phonsandha	stem, leaf	decoction, taken orally	liver cancer	ch02/0035
Orchidaceae					
<i>Vanilla aphylla</i> Blume	Thau-gnu-khew, Krau-khaokwang-on Han-gnu-khew	stem	decoction, taken orally	hepatopathy	ch02/0036
Polygalaceae					
<i>Polygala chinensis</i> L.	Ma-e-kum	whole plant	decoction, taken orally	aphrodisiac, restorative	ch02/0037
Restionaceae					
<i>Leptocarpus disjunctus</i> Mast	Saemahor	whole plant	decoction, taken orally	aphrodisiac, restorative	ch02/0038
Rubiaceae					
<i>Canthium berberidifolium</i> Gecces	Gnengdook	root, stem	decoction, taken orally	cirrhosis, hepatopathy	ch02/0039
<i>Prismatomeris griffithii</i> Ridl.	E-lum, Dookkai	root	infusion with water, taken orally and crush to apply locally	wound from snake bite	ch02/0040
<i>Vangueria spinosa</i> Roxb.	Raviengnoi, Nam-gnengdook	stem	decoction, taken orally	cirrhosis	ch02/0041
<i>Xanthonea parviflora</i> (O.Ktze.) Craib	Kiengpeun, Krobjakawan	stem	decoction, taken orally	AIDs	ch02/0042

Table 2 (continued)

Botanical name	Vernacular name	Parts used	Preparation & Administration	Aliment	Voucher number
Santalaceae					
<i>Scleropyrum wallichianum</i> (Wight & Arn.)	Nomwau, Meaudkon	stem	decoction, taken orally	tonic	ch02/0043
Taccaceae					
<i>Tacca leontopetaloides</i> (L.) Kunze	Bombaoyai, E-rok, Tauyaimom	rhizome	decoction, taken orally	cancer, hepatopathy	ch02/0044
Vitaceae					
<i>Ampelocissus martinii</i> Planch.	Krau-Kouy	rhizome	decoction, taken orally	breast cancer	ch02/0045