

Pharmaceutical Ethnobotany Survey of Anticancer Plant Resources from The Hlawgar Wildlife Park, Yangon Region, Myanmar

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ABSTRACT

Since prehistoric time, men have used natural resources especially from plants for healthcare purpose. The information of therapeutic uses for cancer is very rare. The present work information is the result of pharmaceutical ethnobotany investigation on the Hlawgar Wildlife Park, Yangon Region from June to October 2014. We studied the plant resource therapeutically used materials especially for the treatment of cancer by Thai and Myanmar traditional practitioners. Specimens were collected together with two Thai traditional practitioners. Data were combined with the interview of four traditional practitioners, two from Thailand and two from Myanmar. A total 32 species, 23 families were recognized as record. Those species were recommended for specific treatments of different organ cancer by two Thai traditional practitioners, and some of them are used as medicine by Myanmar traditional practitioners too. In the present research morphological identification was carried out using literatures. Furthermore, herbarium specimens were deposited in the Department of Botany Herbarium, University of Yangon. Those species need to address more systematic and scientific methods. These data were useful for future pharmacological study, and also for estimation of the species which are in threat of exhaustion.

Key Words: anticancer resource, ethnobotany, Myanmar, traditional practitioners

INTRODUCTION

Human have relied on plant resource as food, shelter, clothes and healthcare for daily life since prehistoric time. Mendonça-Filho [2006] stated plants are still used and have considerable importance in international trade. Herbal medicine knowledge and its efficacy was acquired by trial and error and handed over from one generation to another. However, the diffusion of herbal medicine knowledge is sometimes

dangerous because there is improper communication.

Pharmaceutical ethnobotany experience for several years has verified to be a precious channel in modern screening of pharmacology [Natural products isolation 2005:4]. Nowadays, the information of botanical resource from traditional practitioners has acquired considerable awareness in part of the scientific researchers. But methods in informant selection need to be carefully created level. Myanmar and Thailand have a long history of traditional remedies and learning of biological origin for therapeutic used [Ashin Nagathein 1977; Bodeker 1997]. The information about traditional therapeutic uses for cancer is very rare; it needs to address secure and reasonable quality control methods modified to pharmaceutical ethnobotany resource.

This is time to get utmost advantage from the experience of traditional practitioners to give sufficient health care service not only to countryside people but also who believe to use herbal medicine. In the present study, the pharmaceutical information may be original, or rare uses in the treatment of cancer for particular organs and that might be needed to be elucidated urgently. Hence, this paper was reported as an ethnobotanical survey. The aims of this research are:

- To report locally anticancer resource utilized by Thai;
- To assess the utilization of Myanmar habitat species;
- To evaluate the common species used by Myanmar and Thai;
- To predict how much medicinal anticancer resource stand in the protective area;
- To estimate the threaten species.

MATERIALS AND METHODS

Geographic and Forest Type Overview

The location of Yangon region is the eastern boundary of the Ayeyarwaddy Delta area to the north-west of Andaman Sea, south of Bago Region and East of Ayeyarwaddy Region. The Hlawgar Wildlife Park is situated in the Yangon region that is a protected area and was established in 1982 with the total area of 3.63 km². The Hlawgar Wildlife Park has plenty of water resource, such as lakes and streams and also sloping area [Fig. 1]. Forest type is tropical wet evergreen forest and they form high, dense, multilayered evergreen forests characterized by a vast number of tree species. Even classified as wet evergreen forests there were patches of deciduous forests, and wetland vegetation, and swamp forests species are grown well.

Ethnic Composition of Yangon Region

According to the Population and Housing Census of Myanmar [2014], composition of the ethnic in Yangon Region is diverse, and major group is Burma the biggest ethnic group of Myanmar's population; some are Karin, Mon, Yakhine, Shan, Chin and

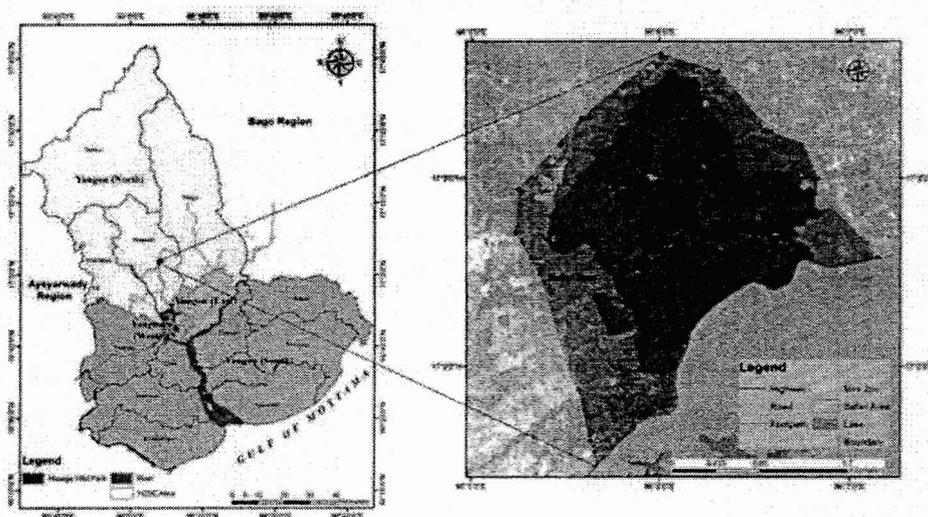


Figure 1: Map of Yangon Region and the location of the Hlawgar Wildlife Park. (Agriculture Atlas, Myanmar, 2002; Google map, 2014)

Kachin. Most of them are office staff, industry workers, and farmers. Myanmar is the dominant and official language. This research area, the lowland region of Ayeyarwaddy river delta is fertile. Products of this area are mainly rice, however currently industrial zone are expanded.

Climate

Yangon region belongs to Köppen's tropical monsoon climatic zone and has long rainy season from the mid of May to the mid of October. During this time we have a substantial amount of rainfall. Dry season is from the mid of October to the mid of May but during the dry season there are some rainy days. Temperature is fluctuated because of rainy days and average maximum temperature range from 29 to 37°C and average minimum temperature range from 17 to 25°C [Meteorology and Hydrology Department, Yangon, 2014].

Data Collection

Informants having ethnobotanical and traditional remedy knowledge, especially professional herbal specialists were selected. Four traditional practitioners, two from Thailand and two from Myanmar were recruited to minimize the instability of knowledge level. Data were collected through unstructured and unlimited interviews. Informants from Thailand were contributed their herbal remedies knowledge in the field which showed the plants to confirm. Identification of the medicinal plant specimens collected from the study area was performed at the Herbarium of the Department of Botany, University of Yangon by comparison with already identi-

fied herbarium specimens and literatures [Hooker 1885; Lawrence 1969; Cronquist 1981; Kress et al. 2003]. The entry of each species included the name of family, Latin binomial, author. Voucher specimens were enclosed at the Herbarium of The Department of Botany, University of Yangon.

Data collection chiefly based on the experiences of Thai traditional practitioners namely Mr. Boon Phyoung and Mrs. Vun Phong Phyoung [Chinmayi, Thailand] with addition of the knowledge of Myanmar traditional practitioners Mr. Than Swe and Mrs. Thin Thin Nwe [Yangon, Myanmar]. For some botanical specimens, interviews were taken and repeated for confirmation. Myanmar names, treatments of illness, plant parts used, general mode of preparation and administration were recorded for each plant during the interviews.

RESULTS

Botanical Resource and Their Uses

The present research was concentrated on ethnobotanical reports by traditional practitioners from Thailand and Myanmar for their medical uses. Also, the medical uses of Thailand and Myanmar are different in most cases but related in some instances.

Thirty two species mentioned by professional traditional practitioners were recorded. The recorded species were referred to by two Thai traditional practitioners for the treatment of cancer of particular organs. Among them only 19 species were recommended for medical uses by Myanmar traditional practitioners. A plant species mentioned by one or two practitioners was considered to be valuable. Reported Botanical resource with their family names, scientific names, Myanmar names, condition and habit of species, part used and uses are shown in Table 1 comprising of 23 families.

Part Used for Botanical Origin and Preparation Mode

In Myanmar traditional remedies, stem, bark, root, rhizome and leaves are the major parts utilized for medicinal uses and others including flower, fruits, and the whole plant are only or miscellaneously used. But in the case of treatment of different kinds of cancer, Thai herbal medicine practitioner used mainly bark, stem, root, and rhizome for the treatment of cancer (Fig. 2). Aerial parts are taken habitually, easy to get and energetic organs of the plant; moreover primary metabolite and secondary metabolite are accumulated in these parts. Underground portions, i.e. roots and rhizomes also store energy and manufacture secondary metabolite.

Dosages for every treatment are subjected to the age, gender, physical appearance or fitness of the patient. Decoction (boiling with water for oral dose and sink in alcohol for external application) and demulcent (mixing with ingredient such as jaggery, butter, milk, glycerin, and honey) are the most familiar mode of preparation.

Table 1: List of Medicinal Plants mentioned by Thai Traditional Practitioners for treatment of Cancer

Sr. No.	Family and Scientific Name	Myanmar Name	English Name	Condition and habit of species	Part Use	Uses
1.	Annonaceae <i>Milusa velutina</i> Hook. f. & Thomson <i>Uraria ptychocalyx</i> Roxb.	Tha but Gyi Tha but Nwe	Dom-sal	W (T) W (Cl)	Stem Root, Leaves	Nose cancer (Thai) Prostrate gland cancer (Thai); toothache (Myanmar)
2.	Apocynaceae <i>Holarhena antidysenterica</i> Wall. <i>Wrightia arborea</i> (Dennst.) Mabb.	Let Htoke Gyi Let Htoke lay	Bitter oleander Queen wrightia	W, G(T) W (T)	Bark Root	Intestine cancer (Thai); Anti-dysenteric, anti-inflammatory, uterine relevant, menstrual diseases, Antimicrobial (Myanmar) Kidney failure and related diseases (Thai, Myanmar)
3.	Araceae <i>Aniophophallus campanulatus</i> (Roxb.) Blume ex Decne.	Wa U	Elephant food yam	W, G (H)	Rhizome	Liver cancer (Thai); Slim aid (Myanmar)
4.	Caesalpiniaceae <i>Cassia siamea</i> Lam. <i>Cassia fistula</i> L.	Mae Zali Ngu	Winged cassia Shower tree	W, G (T) W, G (T)	Bark, Leaves, buds Fruits Leaves, buds	Kidney failure (Thai) . Tonic, insomnia (Myanmar) Intestine cancer (Thai); antiviral, skin diseases, carminative, arthritis, Antimicrobial, diuretic, gastrointestinal disease (Myanmar)
5.	Casuarinaceae <i>Casuarina equisetifolia</i> Forst.	Pin Lac Ka Vwe		W, G (T)	Bark	Liver cancer (Thai)
6.	Celastraceae <i>Lophopetalum fimbriatum</i> Wight.	Yae Main		W (T)	Bark	Skin cancer, internal organ cancer (Thai)
7.	Combretaceae <i>Terminalia chebula</i> Retz. <i>Terminalia bellerica</i> Roxb.	Phan Gar Thit saint	Chebolic myrobalan	W, G(T) W(T)	Root, bark Root Bark Fruits	Liver cancer, intestine cancer(Thai); diarrhea, dysentery, wound healing (Myanmar) uterus cancer (Thai); asthma, cough, antimicrobial (Myanmar) tonic, appetizer (Myanmar)
8.	Ebenaceae <i>Diospyros ebreitoides</i> Wall.	Aut Chin zar	Persimmon	W (T)	Bark	intestine cancer (Thai)
9.	Euphorbiaceae <i>Bridelia retusa</i> (L.) A. Juss. <i>Croton joufra</i> Roxb.	Seik Che Thet Yin Kado	Kowli	W (T) W (T)	Bark Bark	Lung cancer (Thai) Intestine cancer (Thai); Gastrointestinal diseases, anti-inflammatory for liver, lung, joints, ulcer, snake bite (oral dose) (Myanmar)
10.	Fabaceae <i>Butea frondosa</i> Roxb. <i>Dalbergia cultrate</i> Grah. <i>Pterocarpus microcarpus</i> Kurz.	Pauk Yin Taik Thit Pa dauk	Flame of forest Amhri	W (T) W (T) W, G (T)	Bark Flower Bark Root Wood, bark leaves	Intestine cancer (Thai); anthelmintic, ulcer, Diuretic (external use) (Myanmar) Lymphatic cancer (Thai); Hepatic disorder, diuretic, Itching, skin diseases (Myanmar) Internal organ cancer (Thai); kidney failure, Toothache (Myanmar)
11.	Hypericaceae <i>Cratogeomys neriifolium</i> Kurz.	Bebya	Bebya	W (T)	Root, stem	Liver cancer, intestine cancer (Thai)
12.	Hypoxidaceae <i>Curculigo orchoides</i> Gaenth	Myet Ga Mone	Curculigo, Golden eye grass	W (H)	Rhizome	Uterus cancer (Thai)
13.	Loganiaceae <i>Strychnos nux-blanda</i> L.	Kha baung	Strychnine tree	W (T)	Bark Seeds	Liver cancer (Thai) Diarrhea, dysentery, eye infection (Myanmar)
14.	Mimosaceae <i>Mimosa pudica</i> L.	Hti Ka Yone	Mimosine	W (S)	Whole plant	Liver cancer, Heart disease (Thai); Kidney stone, asthma, intestinal bleeding, anti-inflammatory (Myanmar)
15.	Minispermaceae <i>Stephania verosa</i> (Bl.) Spreng.	Taung Kyar		W (Cl)	Rhizome	Uterus cancer (Thai, Myanmar)
16.	Moraceae <i>Ficus callosa</i> L. f. <i>Streblus asper</i> Lour.	Kha Aung Oat Ne	Country fig Toothbrush tree	W (T) W (T)	Bark Root	Liver cancer (Thai) Lung cancer, Liver cancer, intestine cancer (Thai) Carminative, antimicrobial (Myanmar)
17.	Rubiaceae <i>Mitragyna rotundifolia</i> (Roxb.) Kuntze <i>Randia dumetorum</i> Lam.	Bin Ga Say Than bayar	Emetic nut	W (T) W (T)	Bark, stem Stem	Lung cancer, intestine cancer (Thai) All organs (Thai)
18.	Rutaceae <i>Zanthoxylum budrunga</i> Wall.	Ma Yar Nin	jingbawng	W (T)	Fruits	Liver cancer, uterus cancer, skin cancer (Thai)
19.	Sapindaceae <i>Scheichera oleosa</i> (Lour.) Oken	Gyoe	Ceylon oak	W (T)	Bark	Good blood circulation (Thai),
20.	Schophyllaceae <i>Scoparia dulcis</i> L.	Say cho		W, G (H)	Whole plant	Lung cancer (Thai); asthma, toothache, antipyretic (Myanmar)
21.	Sterculiaceae <i>Pterospermum semisagittatum</i> Buch. Ham.	Na gel	Mucukunda	W (T)	Stem	intestine cancer (Thai)
22.	Tiliaceae <i>Berrya annonilla</i> Roxb.	Phet won		W (T)	Root Leaves	Prostrate cancer (Thai); inhaler (Myanmar)
23.	Verbenaceae <i>Tectona grandis</i> L. f.	Kyun	Teak	W, G (T)	Leaves Bark Wood	Diabetes, all organ cancer (Thai), Diarrhea (Myanmar) Anti-inflammatory (Myanmar) Itching (Myanmar)

W: found only in wild; W, G: found both in wild and at home garden; T: Tree; S: Shrub; H: Herbs; Cl: Climber

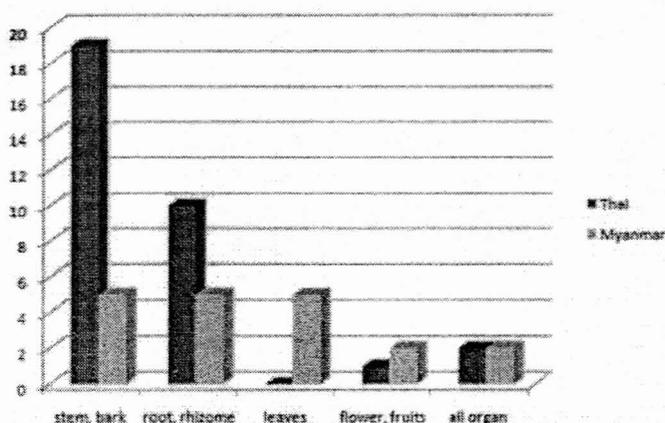


Figure2: The plant parts used of Thai and Myanmar traditional medicine

Preparation mode of drug for each plant is the most difficult section to report because this research just relies on the opinion of traditional practitioners.

DISCUSSION AND CONCLUSION

Botanical Resource Habitat and Current Status

The specimens reported in this study were collected at wild state; in the Hlawgar Wildlife Park, although some of them can be seen in the home garden, namely *Holarrhena antidysenterica* Wall., *Cassia siamea* Lam., *Cassia fistula* L., *Terminalia chebula* Retz., *Casuarina equisetifolia* Ferst., *Pterocarpus microcarpus* Kurz., *Scoparia dulcis* L., *Tectona grandis* L. f. and *Amorphophallus campanulatus* (Roxb.) Blume ex Decne. They have medicinal value and Myanmar people planted them in home garden. The plants species can also find in home garden are 28% and only in wild are 72%. Myanmar practitioners still believe that medicinal plants from nature are more effective in the treatment of diseases. Therefore, traditional practitioners collect material of plants for medicines in the wild. Collecting from natural condition is a huge hazard for the plants.

It is normal through changes in the location and biotic conditions that more plants species were used in the earlier period than now. The present data are useful to help the modern health care system and the production of synthesized drug. Furthermore, crisis on habitat disappearance or extinction of plant species and disappearance of the indigenous knowledge has led the exhaustion of the specific plant resources and their related information. Moreover, information on ethnopharmaceutical plant species is extinct because most of the traditional remedy practitioners have passed away without correctly transferring their knowledge to the new generations especially in Myanmar.

In some plant species like *Zanthoxylum budrunga* Wall., Thai traditional prac-

practitioners used for treatment of cancer and also described its antioxidant activity by Islam et al. [2014]. However, Myanmar people did not use it as medicine. However, 19 species had significant use such as *Uraria ptychocalyx* Roxb., *Holarrhena antidysenterica* Wall., *Wrightia arborea* (Dennst.) Mabb., *Amorphophallus campanulatus* (Roxb.) Blume ex Decne., *Cassia siamea* Lam., *Cassia fistula* L., *Terminalia chebula* Retz., *Terminalia bellerica* Roxb., *Croton joufra* Roxb., *Butea frondosa* Roxb. *Dalbergia cultrate* Grah., *Pterocarpus microcarpus* Kurz., *Strychnos nux-blanda* L., *Mimosa pudica* L., *Stephania verosa* (Bl.) Spreng., *Streblus asper* Lour., *Scoparia dulcis* L., *Berrya amonilla* Roxb. and *Tectona grandis* L. f. because those species were mentioned by both Thai and Myanmar traditional practitioners, but widespread use of plant parts and target diseases were different. It might be cause of divergence of knowledge of ethnopharmacology due to a lack of properly transfer of their awareness to the next generations. On the other hand, Thai practitioners and Myanmar practitioners were agreed in the use of *Wrightia arborea* (Dennst.) Mabb. for the treatment of kidney failure and related diseases, and also *Stephania verosa* (Bl.) Spreng. for the treatment of uterus cancer.

Ethnobotanical Resource Trade and Hazard

Collection of plant genetic resources from the nature tend to lead to the reduction in biodiversity found in all over the world. Extreme harvest of underground organs and/or reproductive organs which are vital to the continued existence of the plants often leads to the depletion of plant resources. In this study, among 32 species 26 are trees and need a long period to grow. It takes for some plant 3-4 years to reach the flowering and fruiting stage, reducing their regeneration possibility. Nowadays, Myanmar traditional practitioners intentionally grow medicinal plants at different levels for their production of herbal medicine. But they were capable of growing only a few species; others are still in the waiting list, and those other species are facing threats of extinction. Moreover, larger threats for bioresources were collection from the nature for illegal trades in the vast amount. Even in the protective area some medicinal plants were collected from the wild according to the market demand especially for border trade. Hence, plant species noted in this study can be suitable targets for future study.

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