Review on Some Malaysian Traditional Medicinal Plants with Therapeutic Properties

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Abstract: There are many medicinal plants that have been used for thousands of years. These plants can now be found in herbal products and as part of the traditional Malaysian health care system because of their therapeutic efficacy. This paper discusses the use of ten medicinal plants in the traditional medicinal system of Malaysia and related scientific studies on their Pharmaceutical properties, which demonstrate their traditional uses. The plants viewed are Amaranthus spinosus L., Arundina graminifolia (D.Don) Hochr., Callicarpa arborea Roxb., Carica papaya L., Citrus grandis L., Coleus amboinicus Lour., Curcuma domestica Valeton., Psidium guajava L., Garcinia atroviridis Griff. ex T. Anders., and Zingiber officinale Rosc. All the plants mentioned in this paper have therapeutic properties, which explains and validates their uses in traditional medicine.

Keywords: Traditional medicine, Antioxidants, Food, Free radicals, Malaysia.

1. INTRODUCTION

All through human history, people have used different materials from nature to cure their ailments and enhance their health [1]. For thousands of years, nature has been the source of medicine, and a large number of modern drugs have been isolated from the natural sources used in traditional medicine [2]. Worldwide, medicinal plants have become mainstream in the latter part of the 20th century. This is due partly to widespread acceptance of the importance of traditional and indigenous remedies, and the integration of derivatives from natural sources in pharmaceutical products [3-5]. Moreover, the importance of medicinal plants has increased because of the increasing need to make health care affordable as well as the belief that natural remedies are reliable and more effective than conventional drugs [6-8].

Over the years, medicinal folklore has proved to be priceless compared to current drug screening. Several significant modern drugs such as digitoxin, reserpine, tubocurarine, ephedrine, ergometrine, atropine, vinblastine and aspirin had their origins in traditional folk medicines [2, 9]. Approximately 119 compounds that have been used as single structure medical agents are currently derived from plants, about 77% of these medicinal plants were found by screening plants based on their ethnomedical uses and the resulting compounds have been employed in situations that approximate traditional uses [2, 10].

The use of traditional medicinal plants in most developing countries is the normative basis for the conservation of good health [11]. An increased reliance on the use of medicinal plants in industrialized societies can be attributed to the extraction and development of a number of drugs and chemotherapeutics from plants, as well as herbal remedies commonly used in rural areas [12]. In industrial societies, herbal remedies have become more common in the treatment of minor ailments, due to increasing of cost of maintaining personal health [13].

The major established categories of traditional medicine are from Asia, especially those from India (Aryuvedc, Unani, Siddha), China (Wu-Hsing) and Japan (Kampo), even today they still following the concepts of the diagnosis and remedy have been known for thousands of years [14-16]. The treatments are mostly a mix of plants but they may occasionally contain animal parts or minerals and they are formulated to realize an expected therapeutic goal. They are usually regarded as "drugs", in these traditions and it is not rare to find a plant component that work synergistically to enhance the therapeutic value or other characteristics of the remedy [7].

2. MEDICINAL PLANTS USED IN MALAYSIAN TRADITIONAL SYSTEM

Thousands of years ago, Malaysia had an extensive variety of plant species and traditional medical
systems. More than 1300 medicinal plant species have been recorded in Peninsular Malaysia alone [17]. Although Malaysian traditional medicine is derived from the Unani systems of medicine, which is turn had Hellenic roots, the Malaysian system has been affected by Indonesian, Chinese, Indian, and Orang Asli traditional practices [18]. In the Malaysian medicine system, herbal products form an important component. In 1999, medical and aromatic plants were estimated to have a value of RM 4.6 billion in the Malaysian herbal product market with an annual projected growth rate of 15-20% [19, 20]. Approximately 7,411 plant species (excluding Bryophyta, Algae and Fungi) have been identified in Sabah and about 80% of the indigenous plants were used by local communities. In addition, about 1,200 were used statewide for medicinal purposes [21, 22].

Several studies have indicated that free radicals contribute to increase various ailments such as hemorrhagic trauma, arthritis, senility, atherosclerosis, ischemia, Alzheimer, Parkinson’s illness, gastrointestinal disturbances, tumor promotion, and carcinogenesis [23]. Antioxidants are molecules that play a significant role in preventing or delaying degenerative diseases that are the result of the oxidative damage of living cells caused by free radicals [24]. Over the years, artificial antioxidants such as butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA), tert-butylhydroquinone (TBHQ) and propyl gallate (PG) have been tested for probable toxicity and there are extensive studies on antioxidants polyphenolic extracts from natural plant materials to replace artificial antioxidants [25].

Malaysian plants are widely valued for their aromas and tastes and many of these plants are medicinal and used to treat various human illnesses. Studies have shown that several plants in Malaysia are poisonous to animals and humans because of the presence of specific components. Screening botanical extracts for potential toxins is a significant step in assessing their appropriateness for the market [25, 26].

The active oxygen and free radicals contributed in the pathogenesis of specific human ailments, as well as aging, cancer and atherosclerosis [27]. Active oxygen and free radicals, such as superoxide anion (O²⁻), hydrogen peroxide (H₂O₂) and hydroxyl (OH⁻), are formed continuously in human body through natural metabolic actions. Their actions can be dissenting through a balanced organization of antioxidant defenses, including antioxidant synthesis and enzymes. A breach in this equilibrium causes oxidative strain, which may lead to cell damage and death [28]. As a result, a great deal of attention has been focused on the use of antioxidants, particularly natural antioxidants, to prevent lipid peroxidation, or to protect against free radical harm [29]. Foods rich in antioxidants playing a critical role in avoiding heart disease, vascular tumors and neurological diseases [30-32].

Recently, interest has grown in discovering antioxidants derived from plant sources to replace artificial antioxidants. Natural antioxidants are seen as being safer and more desirable than their synthetic counterparts because they occur in plant foods, data from scientific reports and laboratory studies indicate that plants contain a large variety of phytochemicals that have antioxidant activities [33].

Antioxidants are naturally present in in many different parts of a plant (flowers, stems, barks, pods,

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<tr>
<th>No</th>
<th>Scientific Name, Family</th>
<th>Local Name</th>
<th>Traditional Uses</th>
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<tbody>
<tr>
<td>1</td>
<td>Amaranthus spinosus L. (Amaranthaceae)</td>
<td>Bayam berduri</td>
<td>Gastric</td>
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<td>2</td>
<td>Arundina graminifolia (D.Don) Hochr. (Orchidaceae)</td>
<td>Ubi bemban</td>
<td>Gastric</td>
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<td>3</td>
<td>Callicarpa arborea Roxb. (Verbenaceae)</td>
<td>Tambang besi</td>
<td>Flatulence and gastric</td>
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<td>4</td>
<td>Carica papaya L. (Caricaceae)</td>
<td>Betik</td>
<td>Gastric</td>
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<td>5</td>
<td>Citrus grandis L. Osbeck (Rutaceae)</td>
<td>Limau besar</td>
<td>Gastric</td>
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<td>6</td>
<td>Coleus amboinicus Lour. (Lamiaceae)</td>
<td>Hati-hati</td>
<td>Constipation</td>
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<td>7</td>
<td>Curcuma domestica Valeton (Zingiberaceae)</td>
<td>Kunyit (turmeric)</td>
<td>Gastric and bloating</td>
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<td>8</td>
<td>Psidium guajava L. (Myrtaceae)</td>
<td>Jambu batu</td>
<td>Diarrhea and stomach ache</td>
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<td>9</td>
<td>Garcinia atroviridis Griff. ex T. Anders (Clusiaceae)</td>
<td>asam gelugor</td>
<td>Gastric</td>
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<td>10</td>
<td>Zingiber officinale Rosc. (Zingiberaceae)</td>
<td>Halia</td>
<td>Gastric and flatulence</td>
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leaves, fruits, roots, wood, seeds, and pollens), characteristic composites with antioxidant actions contain vitamins, phenolic compounds and carotenoids. Thus, recommendations were made to increase consumption of vegetables and fruits rich in nutrients that work to reduce the danger of chronic disease [34-37].

3. LIST OF SOME MEDICINAL PLANTS USED IN MALAYSIAN TRADITIONAL SYSTEM

A review of the studies related to medicinal plants in Malaysia yield a list of ten most important antioxidant plants. A list of plants used in Malaysian traditional has been summarized in Table 1.

3.1. Amaranthus spinosus L.

The aqueous extract of Amaranthus spinosus revealed a remarkable immunostimulating action [38]. The stem extract had antimalarial actions [39] and the ethanolic extract of the whole plants showed hepatoprotective activity [40]. A vegetable with a high percent of antioxidant compounds [41] and high nutritional values because it is high in protein, fiber and essential amino acids, particularly lysine. Amaranthus spinosus L. a very good remedy to combat the impact of air pollution [42].

The betalains in the stem of Amaranthus spinosus L. include amaranthin, isoamaranthine, hydroxycinnamates, rutin, quercetin and kaempferol glycosides [43]. It has also contains amaranthoside, a lignan glycoside; amaricin, a coumaroyl adenosine, stigmasterol glycoside, and betaines such as glycinebetaine and trigonelline [44]. Betalains are well-known anti-oxidants, anti-cancer, antiviral and anthelmintic agents [39, 43, 45-47] (Figure 1).

3.2. Arundina graminifolia (D.Don) Hochr.

Arundina graminifolia (D. Don.) Hochr. is an evergreen terrestrial orchid known commonly as "bamboo orchid." It typically grows in the plains and mountains of Chittagong, Sylhet and northwestern India. It can be found in the Himalayas of Nepal, Sri Lanka, Thailand, Laos, Cambodia, Vietnam, southern China, Japan, Taiwan, Malaysia, and Java. The flower is attractive and blooms for about one and a half months. It is also used as a cut flower for ornamental purposes. Unfortunately, because it has been ruthlessly harvested and its habitats destroyed, the bamboo orchid is now a rare orchid species in Bangladesh [48]. For protection from extinction, and to meet the increased demand for cultivation of flowers, it is important to develop techniques for the rapid deployment of this type [48]. Arundina graminifolia is anti-bacterial and a decoction of its roots has been used to ease body aches [49] (Figure 2).

3.3. Callicarpa arborea Roxb.

Callicarpa arborea is prevalent in Nepal, Bhutan, India, Sri Lanka, Bangladesh, Burma, China, Indochina, Malaysia, Singapore, Indonesia, the Philippines, New Guinea, and all but the eastern region of Thailand [50]. The bark is crushed and the resulting liquid is consumed to treat stomach pain, dysentery and vomiting. The juice from the bark is an effective hemostatic for the treatment of cuts [51]. The Callicarpa has a rich history of ethnobotanical usage, mainly in Asia, several species of the genus Callicarpa have recognized ethnobotanical uses as traditional and ethnomedicines and as fish poisons. For example, C.
arborea Roxb. has been used in India to treat skin disease [52].

The leaves and bark of Callicarpa arborea are used for the treatment of rheumatism and skin diseases, and the juice from the fruit reduces fever [53]. According to the literature, Callicarpa arborea contains β-sitosterol, β-amyrin, lupeol, epilupeol, ursolic acid, oleanolic acid, L (+)-α-amino-β-(p-methoxyphenyl)- propionic acid, masnilic acid, betulinic acid and baurerol [54] (Figure 3).

Figure 3: Callicarpa arborea Rox. (http://www.efloras.org/florataxon.aspx?flora_id=110&taxon_id=200019235).

3.4. Carica papaya L.

In addition to growing in Malaysia, papaya is also grown in India, Sri Lanka, and Thailand [55]. Usually the ripe flesh of the papaya is used to make sauce, pickled or preserved as marmalade or jam. Papaya juice is high in vitamins A and C (ascorbic acid), and is regarded as a “health food.” The antioxidant levels and activities of the seeds of guava, papaya and mango are high and the seeds could be used commercially as a food or as a source of nutraceuticals in the future [56].

The plants used in tropical diets include fruits and vegetables. Occasionally these foods are also used as therapeutic treatments because of their medicinal properties. For instance, papaya fruit contains immune-stimulating and antioxidant agents [57, 58], the seeds and the latex are used in the treatment of gastrointestinal nematode infections and have an anthelmintic activity [59]. The immature fruit and seeds have a bacteriostatic activity on human intestinal pathogens [60]. The leaves of the papaya have been used to relieve the symptoms of asthma, as a vermifuge, a remedy for gastric diseases, amoebic dysentery, and fever. The methanolic leaf extract causes vasodilatation and has antioxidant effects, both important components for reducing cardiovascular problems [61]. The aqueous extract has been shown to support the healing processes of burns in rats [62, 63] (Figure 4).

Figure 4: Carica papaya L.

3.5. Citrus grandis L. Osbeck.

Citrus grandis (L.) Osbeck or Citrus maxima (J. Burm.) is also known as pomelo or shaddock. C. decumna L is considered to be an ancient species [64]. It is part of the family Rutaceae, sub-family Aurantioideae, clan Citreae and sub-clan Citrinae [65], which suggests that it is indigenous to Thailand and Malaysia, [66] . Southern China has been proposed as its place of origin with Thailand, Malaysia, Indonesia, the Philippines and Japan as secondary centers.

Researchers believed that it originated in South East Asia where it extended to China, the Indian subcontinent, and Iran. It was introduced to the West Indies (Barbados) and the Dutch East Indies (Indonesia) in the 17th century by Captain Shaddock, and thus it was given his name. In Asia it is grown in household gardens for its fruit. Citrus grandis is unknown in the wild [67].

Citrus fruits are rich sources of natural antioxidants. The primary source of energy is not an the antioxidant vitamin C or higher amount of dietary fiber, but other antioxidant compounds [68]. In Asian countries, citrus fruits, such as lime (Citrus microcarpa and Citrus
aurantifolia), lemon (Citrus limon), and pummelo (Citrus grandis) are commonly available and regularly consumed as fruit, whole fruit juices, and as preserved snacks. The pummelo, the biggest of all citrus fruits, has a place at the mid-autumn Moon Festival observed by Chinese families. Traditionally, people eat white pummelo through this festival. Recently, red pummelo has been cultivated on a large scale and promoted in southern Taiwan. The red pummelo may have more antioxidant compounds than the white variety because of the presence of antioxidant lycopene, carotenoid, and anthocyanins in orange and red colored fruits (Moro, Tarocco, and Sanguinello varieties) [69]. However, the properties and antioxidant potential of red pummelo has not been reported [70] (Figure 5).

In Brazil, especially in the north-eastern region, the use of Coleus amboinicus is a widespread practice and this plant is used as a crude extracts or as an infusion to treat many ailments including inflammations [77] and cancer. Investigating the anti-inflammatory and anti-tumor activities of Coleus amboinicus may determine if its traditional medical uses are supported by its pharmacological effects [74] (Figure 6).

![Figure 5: Citrus grandis L.](http://www.uphcm.edu.vn/caythuoc/index.php?q=node/41)

### 3.6. Coleus amboinicus Lour.

Coleus amboinicus Lour, also known as (Plectranthus amboinicus, Coleus aromaticus, and Plectranthus aromaticus (Benth.)) Roxb are members of the Lamiaceae (Labiatae) family and have many common names: country borage, Cuban oregano, Indian borage, French thyme, Spanish thyme, Mexican mint and soup mint. Plectranthus contains more than 300 species, which are commonly used to treat skin ailments, digestive issues and respiratory illnesses [71, 72]. Previous pharmacological studies have indicated that Coleus amboinicus has anti-epileptic, antioxidants and antimicrobial activities [73, 74]. The leaves of these species contain essential oils, flavonoids, terpenes derivatives, and cinnamic. These phytocompounds have anti-inflammatory and chemotherapy effects [74-76].

![Figure 6: Coleus amboinicus Lour.](http://www.uphcm.edu.vn/caythuoc/index.php?q=node/41)

### 3.7. Curcuma domestica Valeton

The traditional organization of Indian medication, Ayurveda, is interested with the avoidance, diagnosis and treat of illness. Ayurveda uses the rhizomes and vegetation of different types belonging to the Zingiberaceae family, particularly those of Curcuma longa Linn. (Syn. Curcuma domestica Valeton). Curcuma longa is commonly identified as Turmeric, in English, or Haldi, in Indian. C. longa is one of the better known medicinal herbal attributed with adaptogenic, anti-pressure, anti-fatigue, and antioxidant properties [78]

Turmeric have vital oils, primarily terpenoids (such as turmerones, atlantones and zingiberene) and flavonoids such as curcuminoids, (as well as curcumin). In the 1970’s, researchers discovered that curcumin have neuro-protective properties that helped with the amyloid pathology of Alzheimer’s illness, opposed to-carcinogenic, and anti-HIV-1 activities. A great deal of data has been gathered that supports Turmeric’s anti-inflammatory, anti-tumor, and reno and cardio-protective activities as well as acknowledging its lipid lowering potential [79, 80] (Figure 7).
3.8. *Psidium guajava* Linn

The *Psidium guajava* Linn. (Myrtaceae) is widespread and grows as shrub or small tree reaching 15m. In Asia and Africa, *Psidium guajava* is used to prevent and treat scurvy [81, 82]. In mice and humans the juice from Guava fruit has a hypoglycemic activity [83]. In Bolivia and Egypt, guava leaves have been employed as a remedy for illnesses including cough and pulmonary ailments [84]. Young guava leaves are used in India to treat cough [85]. In China, the people used guava leaves against inflammatory with hemostatic agent [86]. *P. guajava* is also used to treat vomiting and diarrhea and its leaves were used in the treatment of cholera [81, 82].

Alcohol, chloroform and water extracts of young guava leaves are useful against both *Shigella* spp. and *Vibrio* spp of *Aeromonas hydrophila* [87]. The water extract of desiccated guava leaves possesses bactericidal action that is effective versus *Staphylococcus aureus, Sarcina lutea* and *Mycobacterium phlei* [88]. However, the ethanol extract of dried guava leaves was ineffective against 8 microbial strains secluded from faeces of people with contagious diarrhea [82, 87, 89].

Recently, an infusion of dried guava fruit and leaves has become popular as a drink in Taiwan [30]. Moreover, a guava infusion is more effective against low blood sugar levels if the guava tree was the host to a parasite known as African Mistletoe (*Loranthus bengwensis* L.) [90]. The guava leaf extract has anti-diarrheal [91] antipyretic [92], antimicrobial [82] and bio-antimutagenic [93] properties this extract may play an essential role in preventing oxidative stress that contributes to the development of diabetes and cancer (Figure 8).


*Garcinia atroviridis* Griff. ex T. Anders (Guttiferae) is also known as 'asam gelugor' in Malaysia. This plant grows abundantly in the Malay Peninsula and it is valued for its medium sized fruit. It is a common crop, especially in the Northern regions and it is important both economically and medically to the area. Dried slices of the fruits are known as 'asam keping' and are used commercially as a popular spice in curries, fish dressings and also as a sour relish [94, 95]. The young leaves have culinary uses and are used as a traditional vegetable [96]. On the east coast of Peninsular Malaysia, fresh fish is steamed with the leaves of *Garcinia atroviridis* to keep it fresh. In traditional medicine, *G. atroviridis* has been used as a post-partum medication and to remedy earache, dandruff, cough, and stomach pains associated with pregnancy [94, 97].

Plants from the genus *Garcinia*, especially *Garcinia kola* and *Garcinia mangostana* are widely mentioned as containing a variety of biological actions such as, anti-HIV, antimicrobial, antithepatotoxic, antioxidant, anti-inflammatory, and antivulcrogenic actions. However, only a few of these studies included *G. atroviridis* [98].

The antimicrobial effectively of *G. atroviridis* has been found to be an important source of antibacterial, anti-nematodes, antitumor, and antiviral components.
Plants from the genus *Garcinia* contain xanthones, benzophenones and bioflavonoids and it has been reported that atroviridin, garcinia acid (identical to synthetic (-)-hydroxycitric acid) and its g-lactone components can be isolated. These plants also contain hydroxycut acid, a successful preventer of lipogenesis with profitable and medical usage [94, 97, 98] (Figure 9).

Figure 9: *Garcinia atroviridis* Griff. ex T. (https://www.flickr.com/photos/adaduitokla/7653337948/).

3.10. *Zingiber officinale* Rosc

The family Zingiberaceae are well known for their medicinal value and are widely distributed throughout equatorial regions, especially in Southeast Asia. The family is a significant natural resource that supplies several useful products including food, spices, medicines, dyes, perfumes and cosmetics [99]. *Zingiber officinale* is a traditional medicinal herbs that have been used for more than 2000 years by Polynesians to enhance overall health and as a remedy for diabetes, high blood pressure, cancer, and several other ailments [100]. *Zingiber officinale* has a number of antioxidant constituents including beta-carotene, ascorbic acid, terpenoids, alkaloids, and polyphenols such as flavonoids, flavones glycosides, and rutin [101]. Simple to cultivate, *Zingiber officinale*, with its wide range of antioxidants, can be a primary source for natural, phytochemical antioxidants [102]. Although different extracts are derived from ginger, it is the CO2 extracts that contain the most polyphenol materials that have a structure that resembles the structure its rhizomes [103, 104].

Ground ginger is frequently used because it exhibits antioxidant abilities [101]. Earlier studies on the antioxidant properties of different species of ginger species looked only at the rhizomes [100, 105-107], which have tyrosinase inhibiting properties [108]. More recently, skin-lightening cosmetics have been developed from the rhizomes of ginger [109].

While the leaves have been employed as a flavouring and in traditional medicine, research regarding their antioxidant and tyrosinase inhibiting properties is lacking. *Zingiber officinale* with its extensive range of antioxidants has the potential as an easy to cultivate supply of natural, phytochemical antioxidants [100] (Figure 10).

Figure 10: *Zingiber officinale* Rosc.

4. CONCLUSION

Several Malaysian plants display therapeutic properties because they contain compounds with antioxidant principles that play in a synergistic manner with other compounds. In Malaysia, research has been directed to identify antioxidant compounds with limited toxicity. In this study, antioxidants represent an important means to discover probable and therapeutically beneficial molecules. The phytochemical analysis of different extracts revealed many compounds including phenolic acid, flavonoids, tyrosinase, curcumin, ascorbate, carotenoids, and polyphenols, which have been shown to have strong antioxidant properties.

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