



A REVIEW ON MALAYSIAN CULINARY HERBS AND ITS PHARMACOLOGICAL PROPERTIES

Medicinal Plants

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ABSTRACT

Traditional herbs of Malaysia (locally called "ulam") comprise of more than 120 species representing various families, from shrubs to large trees. This review was conducted to study the taxonomy, phytochemistry, traditional uses and pharmacological properties of the Malaysian culinary herbs including *Ocimum sanctum*, *Mentha spicata*, *Centella asiatica*, *Cymbopogon citratus*, *Allim cepa*. Culinary herbs like Lemongrass, galangal (lengkuas), turmeric (kunyit), kaffir lime leaves, laksa leaves (daun kesom), wild ginger flower buds or torch ginger (bunga kantan) and screwpine leaves (pandan leaves) add flavor and zest to poultry, meat and seafood. Apart of the culinary use basil has been traditionally employed as a medicinal herb in the treatment of headaches, coughs, diarrhea, constipation, warts and/ or kidney malfunction. Fresh and dried plants and their essential oil is used in food, cosmetic, confectionary, chewing gum, toothpaste and pharmaceutical industries. *Centella asiatica* is used to treat skin disease, rheumatism, inflammation, syphilis, mental illness, epilepsy, diarrhea and wounds, leprosy, phlebitis. *C. citratus* leaves have demonstrated anti-inflammatory, hypotensive and diuretic activities and also cancer chemo-preventive properties. Phyto chemical compounds like reduced organosulfur compounds alkenyl cysteine, flavonoids, tannins and phenolic acids, have been identified as the active compounds responsible for the reported pharmacological properties of the culinary herbs.

KEYWORDS

Culinary herbs, *Ocimum sanctum*, *Mentha spicata*, *Centella asiatica*, *Cymbopogon citratus*, *Allim cepa*.

Malaysian culinary herbs

Malay food is strong, and spicy with aroma, combining the rich tastes of the many herbs and spices commonly found in Southeast Asia. Many of the fresh herbs and roots that are commonly grown in the Southeast Asian region have found their way into Malay cooking. Lemongrass, shallots, ginger, chilies and garlic are the main ingredients that are blended together to make a sambal sauce or chilly paste, a condiment that often accompanies every meal of Malay food. Other herbs like galangal (lengkuas), turmeric (kunyit), kaffir lime leaves, laksa leaves (daun kesom), wild ginger flower buds or torch ginger (bunga kantan) and screwpine leaves (pandan leaves) add flavor and zest to poultry, meat and seafood.

Traditional herbs of Malaysia comprise of more than 120 species representing various families, from shrubs to large trees. The leaves, shoots or rhizomes of the vegetable are eaten fresh as salad or cooked. They are consumed because of their taste, which adds variety and flavor to the diet, as well as for health benefit. Nutritional studies have indicated that many of these vegetables are rich in carbohydrate, proteins, minerals and vitamins (1). Some of the vegetables are also claimed to have medicinal properties, such as blood cleansing, induction of uterine contractions and prevention or cure of ailments such as diabetes, high blood pressure, cardiovascular disease, arthritis, fever and coughs. In addition, it is also believed that vegetables play a vital role in lowering the incidence of cancer, as well as the control of aging and age-related diseases.

The plants, including *Pithecellobium confertum*, *Averrhoa bilimbi*, *Portulaca oleracea*, *Solanum torvum*, *Solanum nigrum*, *Persicaria tenella*, *Cosmos caudatus*, *Pandanus amaryllifolius*, *Curcuma mangga*, *Ocimum basilicum*, *Anacardium occidentale* and *Melicope ptelefolia* were proven to have antioxidant potential. A popular local vegetable, *P. oleracea* has been used as folk medicine in different countries to treat different ailments of humans (2). A recent report indicated that an extract of *P. oleracea* accelerates wound healing and treatment of indomethacine and phenylbutazone-induced ulcers (3). A well-known medicinal plant, *P. tenella* has been reported to possess antifeedant, antimicrobial, cytotoxic, and anticomplement activities (4). More recently, it has been reported that the ethyl acetate fraction of this plant possessed antinociceptive (5) and antioxidant activities (6). The sweet basil (*O. basilicum*) has been used for medicinal purposes, as a culinary herb and as an insect-controlling agent (7). The ethanol extracts of *O. basilicum* were tested for antioxidant activity using trolox equivalent antioxidant capacity (TEAC), and showed a linear positive relationship with the total phenolic contents (8).

The leaves of *P. amaryllifolius* are used for coloring and to impart fragrance to foods while the whole plant is pounded for poulticing joints. The presence of volatile compounds in the leaves of *P. amaryllifolius* particularly 2-acetyl-1-pyrroline (9, 10), plays an important role as an aroma. The rhizomes of *C. mangga* are traditionally used as a stomachic for the treatment of chest pains, fever and general debility, as well as to aid womb healing. It has been reported that the ethanolic extract of *C. mangga* showed antifungal activity against three plant pathogens (11). Ginseng herb has a long history of use as an alternative medicine. The root is adaptogen, cardiogenic, demulcent, panacea, sedative, sialagogue, stimulant, tonic and stomachic. The major constituents in ginseng are triterpenoid saponins, ginsenosides, acetylenic compounds, panaxans and sesquiterpenes.

Allium tuberosum (Kuchai) is a staple food in Asian cooking where fresh leaves are used. In Chinese herbal medicine, it is used to treat fatigue condition, control excessive bleeding, and as an antidote for ingested poisons and problems. The juice of *Coriander sativum* (Daun ketumbar) is used as a treatment for acne, applied to the face like toner and also used as a carminative and as digestive aid. *Carica papaya* is used as an aid for stomach ailments, liver and bile ducts ailments, pancreatic disease, the leaves are used as a heart tonic and as an analgesic agent. The fresh leaves are used for dressing foul wounds, the juice is useful in dyspepsia, catarrh of the stomach, to deter warts and epithelioma. *Kaempferia galangal* (Galangal), the rhizome of this plant is widely used as a spice, food flavorings and as an ingredient in the preparation "Jamu" a local tonic prepared by the Malays. The leaves are used to treat eye disease, tooth aches, cholera, contusions, chest pain, headaches and constipation and antinociceptive agent (12). In Chinese medicine, a decoction or powder is used to treat cold, pectoral and abdominal pains, headache, toothache, and as a stimulant.

Piper sarmentosum a traditional plant found in tropic regions of Southeast Asia, India and South China. The whole plant is used as an expectorant and leaves are used as a carminative agent also used to treat fever, digestive disorder and toothache, rheumatism and proven antioxidant properties. Decoction prepared from the roots is said to be diuretic and effective in treating coughs, flu, rheumatism, pleurisy and lumbago (13).

Ocimum basilicum (Thai basil)

Ocimum basilicum (Lamiaceae) locally called as "Selasih" is an annual herb which grows in several regions around the world as a major essential oil crop which is cultivated commercially in many countries

(14). It is an aromatic, annual herb, 0.3-0.5 metres tall. The plant is almost hairless. The leaves and stems deep purple in color, leaves are ovate, flowers white or pink, and fruits have four small nutlets. It features a square stem, leaves always grow in pairs, opposite each other and at 90 degree angles from the previous pair of leaves.

Apart of the culinary use basil has been traditionally employed as a medicinal herb in the treatment of headaches, coughs, diarrhea, constipation, warts and/ or kidney malfunction (15,16). Basil has been extensively utilized in food as a flavoring agent, and in perfumery and medical industries (17) (Telci *et al.*, 2006). Recently the potential uses of *Basilicum* essential oil, particularly as antimicrobial and antioxidant agents have also been investigated (18, 19, 20, 21,22). The *O. Basilicum* essential oils exhibited a wide and varying array of chemical compounds including terpene and non-terpene, depending on variations in chemotypes, leaf and flower colors, aroma and origin of the plants (23).



Plate 2.1 *Ocimum basilicum*

Taxonomy

Kingdom: Plantae

Order: Lamiales

Family: Lamiaceae

Genus: *Ocimum*

Species: *O. basilicum*

***Mentha spicata* (Spearmint)**

Mentha spicata (Lamiaceae), locally known as "Pudina" is a creeping rhizomatous, glabrous and perennial herb with a strong aromatic odor. It has square stems rise to about 2 feet, bearing short-stalked, acute pointed, lance shaped, wrinkled, bright green leaves with finely toothed edges and smooth surfaces with prominent ribs. The small flowers are densely arranged in whorls or rings in the axil of the upper leaves forming cylindrical, slender, tapering spikes, pinkish or lilac in color. The oil of *Mentha spicata* is rich in carvone and presents a characteristic spearmint odor. The fresh and dried plants and their essential oil is used in food, cosmetic, confectionary, chewing gum, toothpaste and pharmaceutical industries (24). Leaves, flowers and the stem of *Mentha spp* are frequently used in herbal teas or as additives in commercial spice mixtures for many foods to offer aroma and flavor (25). It is well documented the essential oil from *mentha* species possess antimicrobial and antioxidant properties (26, 27). This herb is considered as a stimulant, carminative, antispasmodic, stomachic and diuretic and is used in the treatment of gas pain, rheumatism, toothache, muscle pain. Mint possesses antioxidant properties due to the presence of active constituents like menthone, menthol, rosmarinic acid and carvone (28). Pudina extracts (*Mentha spicata*) are used as flavoring in culinary preparation through out the plains of India and possessed DNA damage protecting activity and antioxidant potential (29).



Kingdom: Plantae

Order: Lamiales

Family: Lamiaceae

Genus: *Mentha*

Species: *M. spicata*

***Centella asiatica* (Pennywort)**

Centella asiatica (L.), locally called as "Pegaga" is a stoloniferous perennial herb, commonly growing in humid areas in several tropical countries and cultivated as a vegetable or spice in Asia, Africa and Oceania. It has slender stems, creeping stolons, green to reddish green in color with rounded apices, smooth texture and palmately netted veins.

The rootstock consists of rhizomes growing vertically down, flowers are pinkish in color in small, rounded bunches. It is used to treat skin disease, rheumatism, inflammation, syphilis, mental illness, epilepsy, diarrhea and wounds, leprosy, phlebitis (30) and as a remedy for fever, to reduce uric acid levels, to treat high blood pressure and as a memory enhancer and as a cure for many diseases in the folk medicine in several countries (31). It has been used as ointments, dentifrices and cosmetics, commercial dentifrice containing *C. asiatica* based on the study which showed an improvement of oral conditions (32).

Studies have indicated that the plant possess anti-herpes simplex activity, anti-hepatoma activity anti-inflammatory activity antioxidant activity (33) and as a chemopreventive agent for cancer. The main active principles of *C. Asiatica* are triterpene glycoside and asiaticoside (34).

Asiatic acid is a pentacyclic triterpene found in *Centella asiatica* induced apoptosis in human breast cancer cells (35). The main bioactive compounds include triterpenoids such as madecassoside, asiaticoside, madecassic acid and asiatic acid (36). Previous phytochemical and biological investigations of *C. asiatica* have yielded several triterpenes (37).

Polyacetylenes (38) and flavonoids (39). Different parts of *Centella asiatica* were found to contain high phenolic content which exhibit strong association with its anti-oxidative activities.



Centella asiatica

Taxonomy

Kingdom: Plantae

Order: Apiales

Family: Mackinlayaceae

Genus: *Centella*

Species: *C. asiatica*

***Cymbopogon citratus* (Lemon grass)**

Cymbopogon citratus (DC) Stapf. (Poaceae) locally known as "Serai" is a aromatic tropical grass with clumped bulbous stems that ultimately become leaf blade. It has dense clumps up to 6 feet (1.8 meter) tall and 4 feet (wide).

The strap like leaves 1.3-2.5 cm wide with scabrous margins and gracefully drooping tips. It is a native herb from India and is also cultivated in other tropical and subtropical countries. Infusions or decoctions of dry leaves have been utilized as stomachic, antispasmodic, carminative and antihypertensive agents (40, 41).

Studies on extracts from *C. citratus* leaves have demonstrated anti-inflammatory, hypotensive, vasorelaxating and diuretic activities and also cancer chemo-preventive properties, antimycotic (42).



Cymbopogon citratus
Taxonomy

Kingdom: Plantae
Order: Poales
Family: Poaceae
Genus: *Cymbopogon*
Species: *C. citratus*

Allium cepa (Spring onion)

Allium cepa is an evergreen bulb growing to 0.6 m (2 feet). It is the edible plants of various *Allium* species, all of which are "onion-like", having hollow green leaves and lacking a fully developed root bulb. The leaf blades are tubular, slightly flattened on the adaxial side, and although hollow are closed at the tip. Leaves are up to 40 cm in height and 20 mm in diameter. The umbel is an aggregate of flowers at various stages of development; usually it consists of 200-600 small individual flowers, small and white. Bulb onion contain high levels of the reduced organosulfur compounds alkenyl cysteine sulfoxides (ACSOs), which confer characteristic flavors and human health benefits (43). The importance of biological and pharmacological activities, such as antifungal, antibacterial, antitumor, anti-inflammatory, antithrombotic and hypocholesterolemic properties of certain steroid saponins and sapogenins, such as b-chlorogenin, has been recently demonstrated (44).



Allium cepa
Taxonomy

Kingdom: Plantae
Order: Asparagales
Family: Amaryllidaceae
Genus: *Allium*
Species: *A. cepa*

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