

Ethnobotanical survey of the ginger family in selected Malay villages in Peninsular Malaysia

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ABSTRACT The study was carried out to document the traditional uses of plants belonging to the ginger family (Zingiberaceae) in 14 selected villages in the states of Kelantan, Selangor and Wilayah Persekutuan, Peninsular Malaysia. Sixteen species in 7 genera are used as food, medicine, spices, condiments, dyes and in rituals. Except *Alpinia conchigera* which can be found also in secondary forest, the species are cultivated in home-gardens. Only 3 of these species, i.e. *Alpinia conchigera*, *Curcuma mangga* and *Etligeria elatior* are native to Peninsular Malaysia.

ABSTRAK Kajian ini telah dijalankan untuk mendokumentasikan kegunaan tradisional tumbuh-tumbuhan daripada famili halia (Zingiberaceae) di 14 buah kampung yang terpilih di negeri Kelantan, Selangor dan Wilayah Persekutuan, Semenanjung Malaysia. Sejumlah 16 spesies daripada 7 genus telah dilaporkan berguna sebagai makanan, perubatan, rempah, pewarna dan adat resam. Semua spesies yang dikaji kebiasaannya ditanam di perkarangan rumah kecuali *Alpinia conchigera* yang juga hidup liar di hutan-hutan sekunder. Daripada 16 spesies yang dilaporkan hanya 3 spesies iaitu *Alpinia conchigera*, *Curcuma mangga* dan *Etligeria elatior* didapati asli di Semenanjung Malaysia.

(Zingiberaceae, traditional medicine, food, spice)

INTRODUCTION

Reports on traditional uses of plants by the Malay villagers of Peninsular Malaysia date back to the 19th century. Of these, the uses of plants in traditional medicine is perhaps the most significant. Among the early reports on the Malay traditional medicinal materials were those of Holmes [1], Ridley [2] and Ahmad [3]. Other studies include rituals and beliefs among the Malays [4]. Later Burkill [5] summarized all the earlier records of medicinal uses as well as other uses of economic importance of the various plant families. This was followed by an extensive review by Perry [6] of "Medicinal Plants of East and South-East Asia", utilised during or before 1961.

Zingiberaceae is one of the largest monocotyledonous families of the order Zingiberales which have been reported to be useful as food, traditional medicine, spice, condiment, dye and flavour. These are perennial, aromatic herbs which form part of the undergrowth flora of tropical and sub-tropical forests with orchid-like flowers. The plants thrive well in damp, shaded habitats. More than 150 wild and cultivated zingiberaceous species

have been reported for Peninsular Malaysia [7] of which at least 40-50 species have been widely utilised for various purposes [5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17]. The significance of zingiberaceous species in traditional cosmetics was also reported [18]. Lately there have been pronounced interest in the study of the ginger family in medicine and many species were screened for various compounds [19, 20, 21, 22, 23].

The present study documents the ethnobotanical uses of members of the ginger family among Malay villagers in Kelantan, Selangor and Wilayah Persekutuan, Peninsular Malaysia.

MATERIALS AND METHOD

One hundred households from 14 villages were randomly selected in Kelantan, Selangor and Wilayah Persekutuan representing the East and West parts of Peninsular Malaysia, respectively (Table 1). These villages were selected based on their remoteness covering as many representative areas as possible over the two states. A set of systematic questionnaire was prepared and members of each household were individually interviewed. The questions asked among others require information on: (1) useful herbaceous plants (local

names, wild or domesticated, parts used, detailed procedures for specific uses, knowledge of past uses, their present and past importance to the community); (2) if domesticated - methods of propagation, maintenance, purpose of domestication; (3) if wild - methods of gathering, types of forests; and (4) socio-economic status of each household.

These information were recorded in detail and field characters were also noted. Whenever possible plants were acquired for herbarium specimens. The data were analysed with comparison to past and current references.

Table 1. List of villages selected for survey.

Village
Kelantan Kuala Kubur Datu, Ulu Kelantan (102° 00 'E 5° 24'N) Kg. Jerimbong, Kuala Krai, Ulu Kelantan (101° 54 'E 5° 29'N) Kg. Paloh Rawa, Machang (102° 10 'E 5°45'N) Kg. Selising, Pasir Putih (102° 20 'E 5°54'N) Kg. Bukit Bidang, Melor (102° 18 'E 5°56'N) Kg. Kual, Ketereh (102° 15'E 6°00 'N) Kg. Wakaf Bharu, Tumpat (102° 12'E 6° 12 'N)
Selangor Kg. Melayu, Batu 13 1/2, Sungai Buluh (101°18 'E 3° 18' N) Kg. Melayu, Pasir Baru, Ulu Semenyih (101°50' E 2° 58' N) Kg. Ijok, Batu 8, Kuala Selangor (101° 06' E 3° 37' N) Kg. Sungai Pusu, Batu 8 1/2, Gombak (101° 43' E 3° 16' N) Kg. Padang, Batu 20, Ulu Langat (101° 52' E 3° 12' N) Kg. Sekinchan, Batu 7, Sungai Leman, Sabak Bernam. Kuala Selangor (101° 08' E 3° 12 ' N)
Wilayah Persekutuan Kg. Segambut Tengah, Segambut, Kuala Lumpur (101° 38 'E 3° 15' N)

RESULTS

At least 16 zingiberaceous species are frequently utilised by village folks for various purposes (Tables 2, 3, 4). All the species recorded are cultivated plants grown mostly in home-gardens for home consumption. A few species such as *Alpinia galanga*, *Zingiber officinale* and its red variety *Zingiber officinale* var. *rubrum* ('halia bara'), *Curcuma domestica*, *Etilingera elatior* and *Kaempferia galanga* are grown to be sold in the wet market. Of the 16 species studied, only *Alpinia conchigera* is found both cultivated and wild. It normally grows in the 'belukar' in wet but exposed habitats along the periphery of the villages or sometimes in palm oil and rubber estates. Only three of these species, i.e. *Alpinia conchigera*,

Curcuma mangga and *Etilingera elatior*, are native to Peninsular Malaysia.

The usage of the 16 zingiberaceous species can be categorised into three main groups (Tables 2, 3, 4):

(a) species used in traditional medicine (Table 2)

All the 16 species are medicinally important for a wide variety of illnesses. At least 9 species are frequently used as post partum medicine in the form of poultices, health drinks, salad or bath mixtures. Rhizomes of *C. aurantiaca*, *C. domestica*, *Z. officinale* and young shoots of *A. galanga* are used in the treatment of colic. Two species are used for strains and sprains. Poultice of *A. conchigera* is used to cure skin fungal infection.

Table 2. List of Zingiberaceous species used in traditional medicine. (K=Kelantan; S=Selangor/ Wilayah Persekutuan)

Species	Part used	Treatment	Method of utilisation (state)
<i>Alpinia conchigera</i>	Rhizome	Skin fungal infection or rashes Health drink	Poultice rubbed on infected parts (K) Rhizome juice + fresh milk (K)
<i>Alpinia galanga</i>	Young shoots	Expel water leech ('Lintah'); Colic.	Juice taken orally (K); Juice + other plant parts taken orally (K)
<i>Amomum kepulaga</i> (<i>A. cardamomum</i>)	Leaves	Post partum medicine	Mixture with other leaves in water for bathing, to remove body odour (K&S)
<i>Boesenbergia rotunda</i>	Rhizomes	Post partum medicine	Eaten raw or pickled (K&S)
<i>Curcuma aeruginosa</i>	Whole plant	Muscle pains and strains	Decoction taken orally (K&S)
<i>Curcuma aurantiaca</i>	Rhizome	Post partum medicine	Poultice with lime and pepper rubbed on abdomen. (K&S)
<i>Curcuma domestica</i>	Rhizome	Post partum medicine	Juice taken orally (S) Poultice with other plant parts pasted on abdomen (K&S)
	Mature rhizome	To stop bleeding Stomachache & gastric	Young rhizome eaten with salt and black pepper (K) Applied onto circumcision wound (S) Juice mixed with egg yolk, taken orally (S)
<i>Curcuma mangga</i>	Rhizome	Colic	Eaten raw with rice or pickled (K&S)
<i>Curcuma zedoaria</i>	Rhizome	Colic	Juice taken orally (K)
<i>Etilingera elatior</i>	Leaves	Post partum medicine	Mixture with other herbs in water for bathing to remove body odour (K&S)
<i>Kaempferia galanga</i>	Rhizome	Post partum medicine Family planning	Eaten raw with areca nut and betle leaves (S) Eaten raw (S)
	Leaves	Fever	Poultice applied onto the head (S)
	Rhizome	Mouth ulcers Sprains	Eaten raw (K) Poultice with rice, applied topically (S)
<i>Zingiber montanum</i>	Leaves	Post partum medicine	Mixture with other herbs in water for bathing, to remove body odour (K&S)
		Itch caused by caterpillars	Poultice applied topically (K)
<i>Zingiber officinale</i>	Rhizome	Colic	Juice taken orally (K&S)
		Diuretic	Juice taken orally (K&S)
		Jaundice	Decoction with other herbs taken orally (K)
<i>Zingiber officinale</i> var. <i>rubrum</i>	Rhizome	Aching joints	Juice mixed with vinegar, applied topically (S)
<i>Zingiber ottensii</i>	Rhizome	Stimulate appetite Post partum Medicine	Juice mixed with papaya leaf juice taken orally (S) Rhizome juice taken orally (S)
<i>Zingiber zerumbet</i>	Rhizome	Same as above	Same as above

(b) species used as food (Table 3)

Eight species can be consumed as spice and eaten raw or pickled as salads. Rhizomes of *A.*

galanga, *Z. officinale*, inflorescence of *Etlingera elatior* and leaves of *C. domestica* are popular as food flavours.

Table 3. List of Zingiberaceae species used as food. (K= Kelantan; S = Selangor/Wilayah Persekutuan)

Species	Part used	Food type	Method of Utilisation (state)
<i>Alpinia galanga</i>	Rhizome	Spice	One of various spices used for cooking (K&S)
	Young rhizome	Eaten raw or pickled	Thin slices eaten with rice (K&S)
	Young leaves	Vegetable	Cooked with coconut milk and chilies (S)
	Inflorescence	Eaten raw or scalded	Eaten with rice (K&S)
	Rhizome	Adding aroma to meat	Pounded with ginger and boiled with meat (K)
<i>Amomum kepulaga</i> (<i>A. cardamomum</i>)	Fruit	Spice	One of various spices used for cooking (K&S)
		Eaten raw	Eaten with rice (K)
<i>Boesenbergia rotunda</i>	Young rhizome	Eaten raw or pickled	Thin slices eaten with rice (K&S)
<i>Curcuma domestica</i>	Mature rhizome	Spice	One of various spices used for cooking (K&S)
	Young rhizome	Eaten raw or pickled	Thin slices eaten with rice (K&S)
	Inflorescence	Eaten raw	Eaten with rice (K&S)
	Leaves	Spice, Flavouring	One of various spices used for cooking (S)
<i>Curcuma mangga</i>	Young rhizome	Eaten raw or pickled	Eaten with rice (K&S)
<i>Etlingera elatior</i>	Inflorescence	Spice, Flavouring	Mixed with rice (K) Noodle dish ('laksa') (S) Fish curry (S)
		Flavouring, Vegetable	Flavouring various dishes (S) Eaten with rice (S)
<i>Kaempferia galanga</i>	Rhizome	Eaten raw	Eaten with rice (K&S)
		Spice	One of various spices used for cooking (K&S)
<i>Zingiber officinale</i>	Mature rhizome	Spice	One of various spices used for cooking (K&S)
		Flavouring drinks	As ginger juice or mixed with various drinks (K&S)
	Young rhizome	Eaten raw or pickled	Eaten with rice (K&S)
	Inflorescence	Eaten raw or scalded	Eaten with rice (K&S)

(c) species with miscellaneous uses (Table 4)

Except *K. galanga*, the species are utilised in rituals associated with beliefs, customs and

traditions. Only *C. domestica* is known to be used as a colouring agent.

Table 4. Miscellaneous uses of Zingiberaceae species. (K= Kelantan; S= Selangor/Wilayah Persekutuan)

Species	Part used	Uses	Method of utilisation (state)
<i>Alpinia galanga</i>	Young leaves	Charm cure	Used for exorcising spirits from possessed persons (K)
<i>Curcuma aurantiaca</i>	Mature rhizome	Talisman	Worn as talisman to improve business (S)
<i>Curcuma domestica</i>	Mature rhizome	Talisman Charm cure Fever, ritual healing Stomachache, ritual healing Colouring	Worn as talisman for protection (K) For healing children with sores and expelling worms (K) Chewed together with betle leaves, areca nut and 'gambir' and this mixture is spat on patient from head to toes. (S) Mixed with lime and applied onto stomach. (S) Making glutinous rice yellow (K&S). Colouring finger tips and nails (K) and dyeing cloth (K)
<i>Curcuma zedoaria</i>	Mature rhizome	Talisman Cosmetic powder	Worn as talisman to improve business (K) Rhizome, glutinous rice, 100 types of flowers, pounded finely and soaked in water. (K) or rhizome mixed with several aromatic plant parts, rice pounded together and soaked in water. (K) Residue used as cosmetic powder.
<i>Kaempferia galanga</i>	Mature rhizome and leaves	Cosmetic powder	Rice pounded with rhizome and leaves. (S) Leaves mixed with several aromatic plant parts, rice pounded together and soaked in water. (K) Residue used as cosmetic powder.

DISCUSSION

The present ethnobotanical survey shows that the Zingiberaceae species have been widely utilised in the Malay villages for various purposes. Perry [6] recorded 39 medicinal species belonging to 10 genera from the family Zingiberaceae, of which 4 species from 4 genera are of minor medicinal value. Our study shows that all the 16 species from 7 genera investigated are medicinally important and these are comparable to Perry's data. Of these, 15 species are recorded for Selangor and Wilayah Persekutuan while 12 species are recorded for Kelantan. Four medicinal species, namely *A. kepulaga*, *Z. officinale* var. *rubrum* (red variety or 'halia bara'), *Z. ottensii* and *Z. zerumbet* were recorded to be used only in Selangor. Similarly the medicinal uses of *A. conchigera*, *A. galanga* and *C. zedoaria* are specific to Kelantan. The usage of these species in traditional medicine and rituals are more pronounced in Kelantan than in Selangor and Wilayah Persekutuan.

Zingiberaceous species are among the most frequently used species as post-partum medicine but generally there is no significant difference between the two states investigated. There are however obvious disparities between the two

states in the treatment of other illnesses. *Amomum kepulaga*, *E. elatior* and *Z. montanum* are often mixed with other herbs for bathing, to remove body odour during confinement. Generally these plants are aromatic and many species are known to be rich in essential oils.

The anti-fungal effect of *A. conchigera* could be attributable to the presence of cineol, an antiseptic compound which is frequently observed in several *Alpinia* spp. [24, 25]. In Kelantan, the juice extracted from the young shoots of *A. galanga* is taken orally to expel water leech or mixed with other plants and taken for colic. Pearce *et al* [26] reported that in the Iban community, Sarawak, the rhizomes mixed with salt are rubbed on the skin to cure ringworm. In another study potent anti-ulcer principles namely, 1'- acetoxychavicol acetate and 1'- acetoxyeugenol acetate were isolated from the seeds of *A. galanga* and methanolic extract of the seeds showed significant anti-ulcer activity in rats [27].

This study reveals that the rhizome of *Boesenbergia rotunda* is eaten raw or pickled as a post-partum treatment and also as food in Kelantan and Selangor. Records by Burkill and Haniff [8] and Burkill [5] show that it has been used as external applications for rheumatic and muscular

pains after childbirth. Sasmito [23] found that the essential oil from the rhizomes of *B. rotunda* which contains methylcinna-mate and zingiberone has the ability to solubilize calcium kidney stones.

The rhizomes of *C. domestica* and *K. galanga* have been reported for their antiseptic property in healing wounds, cuts and ulcers in Kelantan and Selangor respectively. *C. domestica*, *Z. officinale* and *Z. zerumbet* have also been used as antiseptic medicine in other countries [28, 29, 30, 31, 32]. The antiseptic property of *C. domestica* is attributable to its curcumin content which has been reported to show antibacterial activities [33]. The utilisation of *K. galanga* in post partum medicine and *Z. officinale* (red variety) in treating joints and strains in Selangor are also reported by Fasihudin and Hasmah [16] for Sabah.

The utilisation of species as food in particular *A. galanga*, *C. domestica* and *Z. officinale* is a common practice in the Asian region. The consumption of the edible species (Table 3) for spice, vegetable, salad and food flavours is more or less similar for Kelantan, Selangor and Wilayah Persekutuan except *A. galanga*, *Amomum kepulaga* and *E. elatior*. For instance, the inflorescence and pith of *E. elatior* are used in Selangor to flavour various dishes whereas the inflorescence is one of the important ingredient of a special 'vegetable rice' in Kelantan.

The species that are used in rituals associated with belief or custom sometimes involve the element of magic in both states. This study also reveals that in Kelantan and Selangor, *K. galanga* is mixed with other aromatic plant parts to produce cosmetic powder, whereas a similar decoction involving *C. zedoaria* is specific for Kelantan. Their utilisation in cosmetic powder has not been reported before. Of the species recorded, *C. domestica* is the most widely used in all the three categories discussed for both states.

Acknowledgments The authors are grateful to the University of Malaya and the Malaysian Government for financial assistance under R & D Programme (07/04/049). The authors also thank the Malay villagers of Kelantan and Selangor for their cooperation in this study.

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