MANUAL FOR CULTIVATION PRODUCTION AND UTILIZATION OF HERBAL MEDICINES IN PRIMARY HEALTH CARE

Department of Medical Sciences
Ministry of Public Health
Nonthaburi Thailand
1990

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MANUAL FOR CULTIVATION PRODUCTION AND UTILIZATION OF HERBAL MEDICINES IN PRIMARY HEALTH CARE

Prepared for the Training Course
Under the Activity of Standardization,
Quality Control and Utilization of Herbal Medicines

In the Technical Cooperation in Pharmaceuticals
among ASEAN Countries Project

Organized by
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PREFACE

WHO as well as ASEAN countries have long realized the potential value of traditional remedies including medicinal plants (crude drugs) which constitute the great part of traditional medicine. In dealing with traditional medicines, it is the aim of WHO to provide safe and effective remedies for the use in primary health care. Consequently, ASEAN countries supported by WHO, place great emphasis on the utilization of herbal medicines by making a five-year plan (1987-1991) for the activity entitled "Standardization, Quality Control and Utilization of Herbal Medicines in ASEAN Countries" coordinated by Indonesia and Thailand. This activity is one of several activities in the Technical Cooperation among ASEAN Countries on Pharmaceuticals.

The objective of this activity is to assure the quality of herbal medicines, particularly the ones widely and commonly used by the people in the ASEAN countries, and to promote their utilizations in primary health care programme by :

(a) setting up of standard and quality control procedures for medicinal plants used in the production of these medicines.

(b) preparing and exchanging herbal materials used for reference purposes.

(c) promoting cultivation of medicinal plants and production of herbal medicines commonly used in primary health care, particularly in the project areas.

(d) preparing a manual on cultivation, production and utilization of herbal medicines commonly used in primary health care in ASEAN countries and training community health workers/village health volunteers in the use of manual in a pilot project area.

To fulfill the last strategy, this manual was prepared. It covers 35 plants commonly used in Indonesia, Philippines and Thailand under the following topics :

1 Description of plant
2 Characteristic of crude drug
3 Cultivation
4 Production, and
5 Utilization (according to ethnomedicine and/or the belief of traditional doctors)

During September 1990, two trainees from each participating country will be trained to use the manual at the Division of Medicinal Plant Research and Development, Department of Medical Sciences, Thailand. Upon returning to their home countries, it is expected that they will organize and conduct the same training course for at least 30 health workers/village health volunteers in 1991. It is hoped that after receiving the training, each person will then be able to train more and more health workers and volunteers so that the safe and effective use of medicinal plants in the primary health care will become more widespread in the ASEAN countries.

CONTENTS

General Notice

The following general provisions are applied to the statement occurred in this manual.

Storing of crude drug

The dried crude drug should be kept in a well-closed container or baled with plastic or a gunny sack. Label the name of crude drug and harvesting date. Crude drug should be stored in a dried room, air-dried every 2~3 months and used within one year.

Compounding

Decoction

The method of simmering the herb to yield soluble ingredients is called decoction. A decoction is usually prepared before used. Fresh herb should either be crushed, sliced or cut into small pieces. Dry herb should either be ground or well-bruised. Decoction could be obtained by decantation or straining while hot. Unless specified in monograph, the amount of water should be enough to cover the herbal materials. Simmering period can be divided into three types, depending on the nature of crude drug.

1. Slight simmering : suitable for flatulent preparations which usually contain volatile substances. Put the crude drug in boiling water, allow to boil and simmer for 1-2 min in a covered container.

2. Normal simmering : suitable for general crude drug. Put the crude drug in water then heat to boil and simmer for 10 min.

3. Long simmering : used with some special crude drug such as hard wood, bark, etc. In general, add water to the crude drug and boil until 1/3 of total volume is left.

Maceration

The herb should be cut into small pieces or powdered, immersed in the solvent in a closed container and allowed to stand for a period of time, usually 1-7 days, with frequent agitation. The mixture is then strained and the marc is pressed. The total liquid is clarified by filtration or by decantation after standing.

Infusion

Infusion is the method to extract the ingredient by steeping the herbal materials in cold or boiling water. A cold infusion is prepared, when the active principles of

the plant are highly volatile or could be decomposed by heat, by steeping the herb in water for several hours. A hot infusion could be made by pouring boiling water over the herb and steeping in a covered container for 10-30 min.

Limewater

Dissolve an excess amount of lime in cold water. Allow to settle and use the clear supernatant liquid.

Pill

This preparation is useful when the taste or smell of crude drug is too strong to drink in tea form. It may be prepared easily by mixing the pulverized plant material with water, honey, syrup or starch solution. The sweet binder will improve the taste of the pills. For storing, the pills should be completely dried.

Utensil

Glass, ceramic, earthenware, or unbroken enameled cast iron should be used in the preperation of herbal drug. Plain cast iron or aluminum ware is not recommended since it may deteriorate some herbal ingredients.

Storage

Powder and pills should be kept in tightly closed containers usually glass and protected from light.

Precaution

1. Prolonged use of medicinal plants is not recommended. If symptoms still persist after 3-5 days of therapy, stop the medication and consult a physician.
2. The methods of preparation and administration of herbal drug in this manual should be strictly followed. Modification of these traditional methods may cause untoward effects.
3. Dosage recommended in traditional prescription is usually an adult dose; hence, dosage should be adjusted in children.
4. Medicinal plants with signs of degradation, decomposition, or contamination with mold, fungi, insects and other animal including their excreta must be discarded. It should contain the least amount of foreign matter.
5. If any abnormal signs and symptoms such as nausea, vomiting, urticaria, irregular heart beat, blurred vision, etc. occur, stop the medication promptly and consult a physician.

Dose Equivalent

1 glass	250	ml
1 cup	75	ml
1 tablespoon (tbsp)	15	ml
1 teaspoon (tsp)	5	ml

Allium sativum Linn.

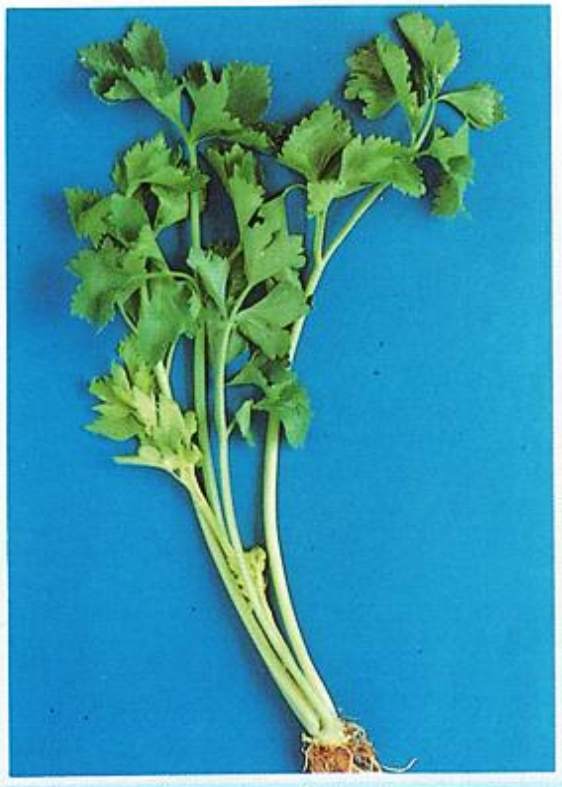
Alpinia galanga (L.) Sw.

Alstonia scholaris (L.) R.Br.

Andrographis paniculata (Burm.f.) Nees

Annona squamosa Linn.

Apium graveolens Linn.



Blumea balsamifera (L.) DC.

Boesenbergia rotunda (L.) Mansf.

Cassia alata Linn.

Cassia siamea Lamk.

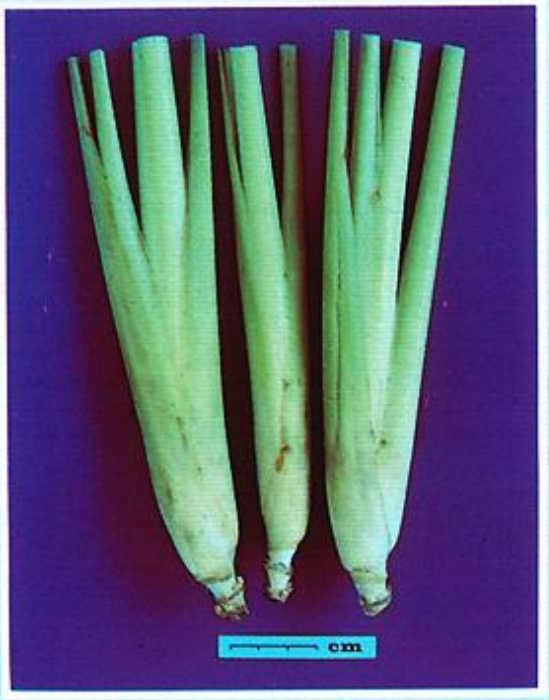
Centella asiatica (L.) Urban

Coleus amboinicus Lour.

Coleus scutellarioides (L.) Benth.

Curcuma longa Linn.

Cymbopogon citratus (DC.) Stapf



Cyperus rotundus Linn.

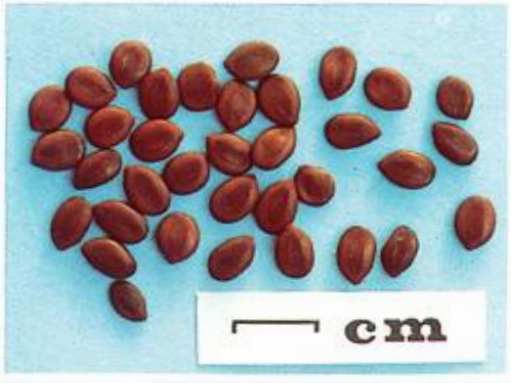
Ehretia microphylla Lamk.

Eurycoma longifolia Jack

Garcinia mangostana Linn.

Imperata cylindrica (L.) Raeuschel

Leucaena leucocephala (Lamk.) de Wit



Mentha cordifolia Opiz

Morinda citrifolia Linn.

Ocimum sanctum Linn.

Orthosiphon aristatus (Bl.) Miq.

Piper betle Linn.

Pluchea indica (L.) Less.

Psidium guajava Linn.

Punica granatum Linn.

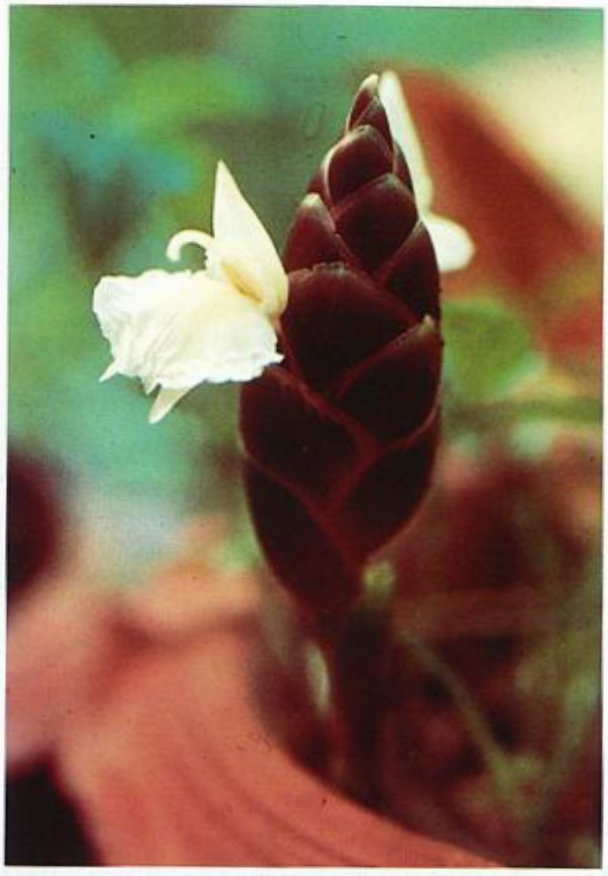
Quisqualis indica Linn.

Tamarindus indica Linn.

Tinospora crispa (L.) Miers ex Hook.f. & Thoms.

Vitex negundo Linn.

Zingiber cassumunar Roxb.



Zingiber officinale Rosc.

Allium sativum Linn.

ALLIACEAE

English name : Garlic

Local name :

Brunei	:	
Indonesia	:	Bawang putih
Malaysia	:	
Philippines	:	Bawang
Singapore	:	
Thailand	:	Krathiam

Description of plant

Herb 30-60 cm high; subterraneous bulb broadly ovoid, 1-4 cm in diameter, often consisting of several crowded bulbils, enclosed by whitish or purplish sheath. Leaf linear, 0.4-2.5 cm wide, up to 60 cm long, longitudinally folded with keel on lower surface, sheathing at base. Peduncle up to 60 cm high. Umbel globose, with large spathe, usually with bulb-like nodules. Flower small; tepal 6, oblong, acuminate, white to greenish-white, or purple; stamen 6. Capsule small, 3-valved.[1-3]

Part used : Bulb

Characteristic of crude drug

Crude drug occurs as dried bulbs or bulbils, some of which the scales are removed. Dried bulbil is whitish or brown to dark brown, wrinkled with longitudinal furrows. Odour characteristic; taste persistently pungent.

Cultivation

Soil and climate

It can be grown on a variety of soil with enough supply of water. Planting should be carried out before winter. Exposure to low temperature subsequent to bulb formation assists the process. For this reason, garlic may fail to produce bulb in hot climate.

Propagation and planting

Garlic is always propagated vegetatively through the single clove, which may be planted with a spacing of about 15 × 30 cm in a good tilth and the weed must be controlled. Garlic responds well to manure. The bulb begins to mature 4-6 months after planting.

Harvesting

The bulbs should be harvested by collecting the whole plants when the leaves begin to dry and bend over. They are dried in the sun for about a week.

Production

Post-harvest handling

Gather the whole plants together into bundles, then dry by hanging on the support until outer sheaths are dry. Collect the dried bundles, remove leaf sheaths and rootlets before storing.

Utilization

Recommended use in primary health care

INA : Bulb (fresh or dried)
Anthelmintic, Antihypertensive, Hemorrhoid
— taken as such[4]
Ringworm, Tinea
—rub topically[4]

PHIL : Bulb (fresh or dried)
Antihypertensive
— taken as such[4]
Root canal antiseptic therapy
— apply expressed juice topically.[4]

THAI : Bulb (fresh or dried)
Ringworm
— rub a fresh bulb to the affected area[5]
Carminative
— take 5 fresh bulbils (2g) of which the scales are removed.[5]

Related scientific study

— Allicin, the hydrolytic product of alliin that is formed when the bulbous tissue is disrupted, accounts for the major antibacterial and anticandidal activities of aqueous extract of garlic bulb. It is heat labile, stable in acid,

unstable in base and is destroyed by thiols such as L-cysteine or glutathione.[6-7]

- Garlic extract could inhibit the growth of *Cryptococcal neoformans* even at the dilution of 1:1280. Higher concentrations of the extract were required to inhibit the growth of *Candida albicans, Tinea mentagrophytes* and *Epidermophyton floccosum*.[8]
- Topical application of crude extract at a 1:10 concentration in water or 5% garlic in feed were effective in treating Microsporum canis-induced dermatophytosis in the rabbit or experimental candidiasis in the chick, respectively.[9-10]
- After oral ingestion of 25 ml of fresh garlic extract which was the maximum tolerable dose, anticandidal and anticryptococcal activities were detected in undiluted serum 0.5 and 1 hr later.[11]
- In children, lyophilized garlic preparation administered orally was effective in treating gastroenterocolitis, dyspepsia, while topical administration was effective in treating skin abscesses or suppurative ear inflammation.[12]
- There were no toxic symptoms in the rat chronically treated with garlic extract even at 2 g/kg 5 times a week during six-month period. There were no significant differences in urinary, hematological and serological parameters from control. No abnormal histopathological findings were observed in any tissues or organs.[13]
- Diallyldisulfide and allicin may be responsible for allergic contact dermatitis in garlic-sensitive patients.[14]

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Alpinia galanga (L.) Sw.

ZINGIBERACEAE

English name :

Local name

Brunei	:	
Indonesia	:	Lengkuas
Malaysia	:	
Philippines	:	
Singapore	:	
Thailand	:	Kha

Description of plant

Herb, leafy shoot up to 2 m high. Leaf simple, alternate, oblong to lanceolate, up to 60 cm long and up to 15 cm wide, acute at apex, attenuate at base; petiole short; ligule entire; sheath often glabrous. Inflorescence terminal, up to 30 cm long; bract ovate, up to 2 cm long; bracteole similar to bract but smaller. Calyx up to 1 cm long, shallowly 3-dentate. Corolla greenish-white; tube slightly exceeding the calyx; lobe up to 1.5 cm long. Labellum white with lilac veins, about 2 cm long, with a claw. Lateral staminode small, subulate. Filament up to 2 cm long. Fruit globose or ellipsoid, up to 1 cm in diameter.[1-2]

Part used : Rhizome

Characteristic of crude drug

Crude drug occurs as sliced pieces of dried rhizome, light brown, subcoriaceous; fracture fibrous. Periderm reddish-brown. Odour slightly aromatic; taste pungent.

Cultivation

Soil and climate

This plant can grow on most kinds of soil, preferably on loamy or loose fertile soil. Waterlogging should be avoided.

Propagation and planting

It is propagated through the rhizome by cutting it into small pieces with one or two buds attached and usually planting on ridges 30×50 cm apart with 10×20 cm

spacing. The leaves will appear above the ground in about four weeks.

Harvesting

The rhizomes should be harvested 9-10 months after planting.

Production

Post-harvest handling

Collect the rhizomes, cut off the rootlets and wash thoroughly. The rhizome is sliced into pieces, 0.3-0.5 cm thick, then dry in the sun.

Utilization

Recommended use in primary health care

INA : Rhizome (fresh or dried)
Carminative
Antifungal
— apply topically.[3]

THAI : Rhizome (fresh or dried)
Antifungal
— apply the preparation of crushed fresh rhizome macerated in ethanol overnight to the affected area.[4]
Carminative
— drink the decoction of 5 g of fresh or 2 g of dried rhizome prepared by slight simmering.[4]

Related scientific study

— The essential oils from fresh and dried rhizomes showed an antimicrobial activity against *Candida albicans*, gram-positive bacteria and some dermatophytes, using the agar overlay technique. The main components of the oil were also tested and terpinen-4-ol was found to be the most active.[5]

— The n-pentane or diethylether extract of dried rhizome was active against *Trichophyton mentagrophytes*. 1'-Acetoxychavicol acetate, 1'-acetoxyeugenol acetate and 1'-hydroxylchavicol acetate were found in the antifungally active fractions. Acetoxychavicol acetate was active against the seven fungi tested and its MIC value for dermatophytes ranged from 50-250 g/ml.[5] 5

— Essential oil obtained from the rhizome showed antibacterial activity against a variety of gram-negative and gram-positive organisms.[6]

— Seven compounds isolated from chloroform extract were active against

Microsporum gypseum, Trichophyton rubrum, Epidermophyton floccosum, Candida albicans, and *Cryptococcus neoformans.*[7]

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Alstonia scholaris (L.) R.Br.

APOCYNACEAE

English name : Devil tree

Local name

Brunei	:	
Indonesia	:	Pulai
Malaysia	:	
Philippines	:	Dita
Singapore	:	
Thailand	:	Phayasattaban, sattaban, Tinpet

Description of plant

Tree. Leaf simple, 4 to 10-verticillate, often obovately oblong, 5-28 cm long and 2-11 cm wide, cuneate at base, usually rounded at apex, with close and numerous lateral veins. Petiole short. Panicle 7-13 cm long. Pedicel short. Flower pubescent, fragrant. Calyx lobe 5, small, ovate. Corolla tube 0.6-0.9 cm long; corolla lobe 5, shorter than tube, broadly obovate, light green to yellowish-white. Stamen 5. Fruit cylindrical, 20-50 cm long, many-seeded. Seed small, flat, with a tuft of hair at both ends.[1-2]

Part used : Stem bark

Characteristic of crude drug

Dried crude drug occurs as pieces of stem bark. Outer surface coarse, cracked, brown to dark brown, with whitish spots of lenticels. Inner surface brown with faint longitudinal striations. Fracture fibrous. Odourless; taste slightly bitter.

Cultivation

Soil and climate

Deveil tree is a tropical plant commonly found in evergreen rain forest. It thrives best on loamy soil and often in periodically flooded area.

Propagation and planting

This plant is propagated usually through the seed. Germination takes 1-2 weeks. Two months after planting, when the seedling is 10-15 cm high, it should be potted.

Young plant of one year old can be planted with a spacing of 6-7 m. Air-layering method could also be used; however, it is not economical for commercial purpose.

Harvesting

Bark should be collected when the plant is at least three years of age.

Production

Post-harvest handling

Collect the bark and dry in the sun.

Utilization

Recommended use in primary health care

INA : Bark (dried)
Antipyretic, Tonic
— decoction[3]

Related scientific study

— *A.scholaris* is of value as a febrifuge.[4]

— The bark has been used as an antipyretic as well as a tonic. It is known to contain various indole alkaloids including echitamine (ditain) and akuammicine.[5]

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Andrographis paniculata (Burm. f.) Nees

ACANTHACEAE

English name :

Local name

Brunei	:	
Indonesia	:	Sambiloto
Malaysia	:	
Philippines	:	Sinta
Singapore	:	
Thailand	:	Fathalaichon

Description of plant

Annual herb. Stem acutely quadrangular. Leaf simple, opposite, lanceolate, acute, entire to slightly undulate, 2-12 cm long and 1-3 cm wide; upper one often bracteiform. Petiole short. Inflorescence 10-30 cm long, terminal and axillary. Pedicel short. Calyx 5-partite, small linear. Corolla tube narrow, about 0.6 cm long; limb not shorter than the tube, 2-lipped; upper lip oblong, white with yellow top; lower lip broadly cuneate, 3-fid, white with violet markings. Stamen 2; anther basally bearded. Superior ovary, 2-celled. Capsule oblong linear, 1-2 cm long and 0.2-0.5 cm wide, compressed, with a longitudinal furrow on the broad face. Seed small, subquadrate.[1-3]

Part used : Aerial part of plant

Characteristic of crude drug

Dried herb occurs as a mixture of broken, crisp, mainly dark green leaves and quadrangular stems; capsule fruits and small flowers occasionally found. Odour slight and specific; taste intensely bitter.[4]

Cultivation

Soil and climate

The plant can grow well on open sandy and loamy soil with adequate water.

Propagation and planting

Seeds, collected from well-formed and ripened fruits of selected plants, are sown carefully on soil for seedling. One month after germination, seedlings of about 10 cm high are transplanted in pits 20 cm apart.

Harvesting

The best harvesting time should be before flowering period which usually takes place 110-120 days after planting. The yield of fresh leaves varies from 8,500-10,000 kg per acre.

Production

Post-harvest handling

Collect the whole plant and cut off the roots, remove other foreign substances, then wash thoroughly, cut into segments, 15-20 cm long, and dry in the sun.

Utilization

Recommended use in primary health care

THAI : Aerial part of plant

Antipyretic

— prepare the decoction of 25 g of fresh or 3 g of dried plant by long simmering. Take 1 glass of the decoction at a time, twice a day to relieve fever.[5]

Antidiarrheal

— drink 1 glass of the decoction of 25-75 g of fresh or 3-9 g of dried plant prepared by long simmering.[5]

— take 2 of 500 mg pills 4 times a day after meal and at bedtime.[6]

For sore throat

— take 2 of 500 mg pills 4 times a day after meal and at bedtime.[6]

Related scientific study

— A clinical trial in patient with acute diarrhea and bacillary dysentery indicated that this plant could decrease fluid input and diarrheal stool and was more efficacious in treating shigellosis than cholera.[7]

— Extract of the whole plant showed antimicrobial activity *in vitro*.[8]

— 85% Ethanol extract of the plant exhibited antipyretic activity in the rabbit.[9]

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Annona squamosa Linne.

ANNONACEAE

English name : Sweetsop, Sugar apple

Local name

Brunei	:	
Indonesia	:	Srikaya
Malaysia	:	
Philippines	:	
Singapore	:	
Thailand	:	Noina

Description of plant

Shrub or small tree. Leaf simple, alternate, narrowly elliptic, oblong or lanceolate, 5-17 cm long, 2-6 cm wide, cuneate or rounded at base, acute or obtuse at apex. Petiole short. Flower solitary or in few-flowered cyme; peduncle 1-2 cm long. Sepal 3, small triangular. Outer petal 3, greenish-white, oblong to linear, 1-3 cm long, about 0.5 cm wide. Stamen numerous. Carpel numerous and distinct in anthesis. Fruit 5-12 cm in diameter, spherical or ovoid, slightly pruinose; areole rounded, convex, separated by deep grooves; pulp whitish. Seed numerous, brownish-black.[1-2]

Part used : Seed

Characteristic of crude drug

Seed 1-1.5 cm long, 0.5-0.9 cm wide, brownish-black, obovoid, hard, shiny, with hilum at narrow end. Odourless; taste oily.[3]

Cultivation

Soil and climate

Sweetsop is a tropical plant. It can grow on most kinds of soil, such as clayey, sandy or lateral soil, but thrives best on sandy loam with pH 5.5-7.4[4] and good drainage. This plant prefers dry climate.

Propagation and planting

Sweetsop is propagated through the seed or by side grafting. Seedlings should be transplanted in plastic bags from November to December. Cultivation should be

carried out in early rainy season. Seedlings, over 1 year old, are cultivated in pits 3-4 m apart. Sweetsop will shed leaves around December to January. Suckers, water sprouts and branches smaller than 0.5 cm in diameter should be cut off. Fertilizer (15-15-15) should be applied at an amount of 3-5 kg/plant twice a year, after cutting off small branches and at the beginning of the fruiting period.

Harvesting

Sweetsop should be harvested 110-120 days after flowering while the fruit is whitish-green.

Production

Post-harvest handling

Select undamaged seeds, wash thoroughly, and dry in the sun.

Utilization

Recommended use in primary health care

INA : Seed
Pediculicide (for the treatment of hair lice)
— grind and rub topically[5]

PHIL : Seed
Pediculicide
— crush, mix with coconut oil, apply topically[5]

THAI : Seed, leaf (fresh)
Pediculicide
— crush 10-20 seeds (or 7-8 fresh leaves, if seeds are not available), remove seed coat, mix with animal or vegetable oil (1:2), strain and press to obtain most of the oil. Apply the oil to the hair, cover with a thin cloth and wash thoroughly after 1-2 hrs.[6]

Precaution

It may irritate the eyes.[7]

Related scientific study

— A clinical trial showed that the seed and the leaf can treat hair lice with minor side effects or irritation.[8]
— The seed contains a caustic resin which is a toxic irritant principle and are used to get rid of head-lice.[9]

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Apium graveolens Linn.

UMBELLIFERAE

English name : Celery

Local name :

Brunei	:	
Indonesia	:	Sledri
Malaysia	:	
Philippines	:	Kintsai
Singapore	:	
Thailand	:	Khunchai

Description of plant

Herb up to 90 cm high. Leaf pinnate; petiole rather long, usually with a sheath. Leaflet obliquely rhomboid, 2-5 cm long and 1.5-4 cm wide; upper leaf often smaller; base cuneate, acute; apex acute; margin acutely dentate or incised. Compound umbel with peduncle 0-2 cm long. Flower small; pedicel filiform; petal 5, very small, white to greenish-white or yellowish-white; stamen 5. Fruit glabrous, small, 0.1-0.2 cm long, splits into two mericarps when mature.[1-3]

Part used : Leaf

Cultivation

Soil and climate

This plant requires temperate climate and well-drained red, black or alluvial soil. It grows well in a place with low humidity and plenty of sunshine.

Propagation and planting

The plant is propagated through the seed. The most suitable period for cultivation is two months before winter. Germination takes 1-2 weeks. Seedling of about 2 months old can then be planted.

Harvesting

The crop should be harvested 4 months after planting by collecting the whole plant.

Utilization

Recommended use in primary health care

INA : Leaf (fresh or dried)
Diuretic, Hypotensive[4]

Related scientific study

— Aqueous extract of celery stem showed anti-inflammatory activity.[5]
— Celery has been used as a domestic remedy for rheumatism.[6]
— Aqueous extract of celery showed diuretic effect in the rat and the rabbit.[7]
— Aqueous extract of celery showed hypotensive effect in the rabbit and the dog when administered intravenously.[7-10]

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Blumea balsamifera (L.) DC.

COMPOSITAE

English name :

Local name :

Brunei	:	
Indonesia	:	Sembung
Malaysia	:	
Philippines	:	Sembung
Singapore	:	
Thailand	:	Nat

Description of plant

Undershrub or shrub 0.5-4 m high, pilose. Leaf simple, alternate, usually elliptic to lanceolately oblong, 6-40 cm long and 1.5-20 cm wide, acuminate at both ends, dentate to serrate, pilose. Petiole up to 3 cm long, with 2-3 appendages. Head yellowish, combined into panicle. Involucre 0.4-0.7 cm long; bract lanceolate to linear, multiseriate. Marginal flower numerous; corolla filiform, up to 0.6 cm long, 2 to 4-lobed, glabrous; style bifid. Disk flower funnel-shaped, up to 0.7 cm long, 5-lobed, pubescent; stamen 5; style bifid and exserted. Achene small; pappus hair whitish or often reddish-yellow.[1-2]

Part used Leaf

Characteristic of crude drug

Dried crude drug occurs as crumpled and broken leaves; margin serrate. Upper surface brown to dark brown, coarse. Lower surface light brown to brown, soft hairy. Odour camphoraceous; taste slightly bitter and aromatic.

Cultivation

Soil and climate

This tropical plant can grow from sea level to high altitude. It thrives best on rich, friable loam with high humus content and good drainage.

Propagation and planting

It is propagated through seeds by planting in seedbeds at a depth of 1 cm with a spacing of 3x10 cm. After 2-3 weeks of germination, seedlings should then be potted. Six months later, young plants can be planted.

Harvesting

The leaves can be harvested when the plants are about one year old.

Production

Post-harvest handling

Wash the leaves thoroughly and dry in the sun.

Utilization

Recommended use in primary health care

INA : Leaf

Antitussive

— decoction[3]

PHIL : Leaf (fresh or dried)

Diuretic

— prepare the decoction by boiling chopped leaves (6 tbsp if fresh or 4 tbsp if dried) in 2 glasses of water for 15 min. Cool and strain. Drink 1/2 glass of the decoction initially, followed by 1/3 glass 3 times daily thereafter.[4]

Related scientific study

— Ethanol extract of the leaf yielded the antispasmodic principle, cryptomeridiol.[5]

— Ngai-camphor, extracted from this plants, is regarded as febrifuge and carminative.[6]

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Boesenbergia rotunda (L.) Mansf.

(*B.pandurata* (Roxb.) Schlechter

ZINGIBERACEAE

English name :

Local name

Brunei	:	
Indonesia	:	Temukunci
Malaysia	:	
Philippines	:	
Singapore	:	
Thailand	:	Krachai

Description of plant

Herb; short rhizome. Leafy shoot up to 80 cm high. Leaf often elliptic, up to about 40 cm long and 20 cm wide. Petiole 5-16 cm long; sheath often as long as petiole. Inflorescence terminal; bract up to 5 cm long, often lanceolate; bracteole same length as bract but narrower. Calyx about 2 cm long, bifid. Corolla pale pink; tube exceeding the bracts; lobe often oblong to lanceolate about 1.5 cm long and 0.4 cm wide. Lateral staminode shorter and broader than corolla lobe. Labellum about 2.5 cm long and 2 cm wide; apex slightly bilobed. Fruit ellipsoid.[1-2]

Part used : Rhizome

Characteristic of crude drug

Crude drug occurs as small pieces of dried rhizome. Periderm brown with scars and annulations. Inner part pale yellow, showing cortex and stele seperated by indistinct endodermis. Odour characteristic; taste slightly pungent.

Cultivation

Soil and climate

The plant can be grown on most kinds of soil but thrives best on loamy or alluvial friable soil.

Propagation and planting

The plant is propagated through the rhizome by placing on a seedbed with sand or sandy loam. Water should be given until sprout appears. The sprouting rhizomes are usually planted on ridges 60 cm apart with 50 cm spacing.

Harvesting

The rhizomes can be collected at least 8 months after planting when the lower leaves turn yellow.

Production

Post-harvest handling

Wash the rhizomes thoroughly, then cut into small pieces and dry in a shaded and ventilated place.

Utilization

Recommended use in primary health care

INA : Rhizome (fresh or dried)
Antidiarrheal[3]
Carminative
— take expressed juice from fresh rhizome or the decoction from dried rhizome once or twice a day.[3,4]

THAI : Rhizome (fresh or dried)
Antiflatulent
— take the decoction of 5-10 g of fresh or 3-5 g of dried rhizome prepared by slight simmering.[5]

Related scientific study

— Rhizome contains volatile oil.[4]
— Water extract or pressed juice of fresh root did not show mutagenic effect in *Bacillus subtilis* H-17 (rec+) and M-45 (rec-) strains.

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Cassia alata Linn.

LEGUMINOSAE

English name :

Local name

Brunei	:	
Indonesia	:	Ketepeng cina
Malaysia	:	
Philippines	:	Akabulko
Singapore	:	
Thailand	:	Chumhetthet

Description of plant

Shrub. Leaf alternate or spirally arranged, pinnate, 30-60 cm long, with 8-20 pairs of leaflets. Stipule deltoid, persistent. Leaflet elliptically oblong, often rounded at both ends, 5-15 cm long and 3-7 cm wide; petiolule short. Raceme dense, 20-50 cm long and 3-4 cm wide; bract yellow, caducous. Pedicel very short. Sepal 5, unequal, oblong, 1-2 cm long and 0.6-0.7 cm wide. Petal 5, bright yellow, orbicularly ovate to spathulate, about 2 cm long. Stamen 10. Pod thick, flattened and winged, 10-15 cm long and 1.5-2 cm wide; wing about 0.5 cm wide. Seed slightly quadrangular.[1-3]

Part used : Leaf

Characteristic of crude drug

Crude drug occurs as brown broken or unbroken dried leaves. Leaf oblong or obovate, emarginate, oblique at base, with entire margin, harsh at lower surface; petiole short. Odour indistinct; taste bitter.[4]

Cultivation

Soil and climate

The plant requires warm humid climate and grows well on all kinds of soil.

Propagation and planting

This shrub is usually propagated through the seed. Seeds obtained from ripe fruits, after proper dormancy, are sown in a well-prepared seedbed. Germination takes place in 1-2 weeks. Seedlings should be potted 1 month after germination. The young plants of 3 months old can be planted in pits with 3 m spacing.

Harvesting

The best harvesting period is 6-7 months after planting. The yield of fresh leaves is 1,000-1,500 kg per acre.

Production

Post-harvest handling

Select undamaged leaves, wash thoroughly and dry in the sun.

Utilization

Recommended use in primary health care

INA : Leaf (fresh or dried)

Antifungal (ringworm)

— apply poultice to the affected area.[5]

PHIL : Leaf (fresh or dried)

Antifungal (ringworm), Scabicide

— apply 50% decoction of the leaf topically twice a day for 21 days.[5]

THAI : Leaf (fresh or dried)

Antifungal (ringworm)

— rub the crushed fresh leaf frequently over the affected area.[6]

Laxative, Cathartic

— drink the decoction of 12 dried leaves (3 g) prepared by normal simmering to relieve constipation.[6,7]

— pour 1 glass of boiling water over 3-6 g of minced dried leaves and brew for 10 min. Take the infusion at bedtime.[8]

— take 3-6 of 500 mg pills at bedtime.[8]

Precaution

It should not be used in patients with known history of intestinal or biliary tract obstruction, cramp, spastic constipation, symptom of appendicitis or any undiagnosed abdominal pain. It should be used with caution in young children or in patients with inflammatory bowel disease. Prolonged use should be avoided.[9]

Related scientific study

— In a clinical trial, infusion of the leaf showed laxative effect in patient with constipation.[10]

— Anthraquinones and extracts from the leaf exhibited antimicrobial properties.[11,12]

— A clinical trial indicated that an alcoholic extract of the leaf in cream base was effective in treating ringworm and scabies.[13]

— The leaf of *C.alata* contained anthraquinones which were shown to have laxative effect.[14]

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Cassia siamea Lamk.

LEGUMINOSAE

English name :

Local name

Brunei	:	
Indonesia	:	Johar
Malaysia	:	
Philippines	:	Later
Singapore	:	
Thailand	:	Khilek

Description of plant

Tree. Leaf pinnate, 4-12 pairs of leaflets. Stipule minute. Petiole 2-3 cm long. Leaflet ovately oblong, 3-7.5 cm long, 1.2-2.6 cm wide, finely pubescent on lower surface; base rounded; apex often rounded or emarginate; petiolule short. Flower in terminal panicle. Sepal 5, small orbicular, unequal. Petal 5, yellow, broadly obovate, 1.5-2 cm long. Stamen 10, unequal. Pod flat, longitudinally waved, 15-30 cm long, 1-1.6 cm wide. Seed 20-30, small, oval, flat.[1-3]

Part used : Leaf

Characteristic of crude drug

Crude drug occurs as greenish-brown broken and unbroken dried leaves, oblong; margin entire. Odourless; taste slightly bitter.

Cultivation

Soil and Climate

This plant grows best in the tropics on loam or sandy loam with good drainage, especially at the altitude of 300-500 m.

Propagation and planting

This plant is propagated through the seed. To hasten germination, the seed should be soaked in water for about 12 hrs prior to sowing. Seeds may be sown on

1 x 5 m seedbeds. Germination takes place in about 2 weeks and seedlings should be transplanted in plastic bags or pots. Young plants of 3-4 months old should be planted in pits of 30x30 cm and 40 cm deep. A spacing of 1x2 m or 2x2 m is recommended for leaf or flower harvesting, respectively.

Harvesting

The mature leaves can be harvested for medicinal purposes.

Production

Post-harvest handling

Wash the leaves thoroughly and dry in the sun.

Utilization

Recommended use in primary health care

INA : Leaf (fresh or dried)

Antipyretic

— 10% decoction of young leaves.[4]

THAI : Leaf (fresh or dried)

Cathartic

— drink one cup of the decoction of 80-100 g of fresh leaves, prepared by normal simmering, early in the morning.[5]

Anti-insomnia

— drink the decoction of 50 g of fresh or 30 g of dried leaves, prepared by normal simmering, at bedtime.[6]

Related scientific study

— The leaf contains anthraquinones which are known as cathartic.[7]

— An alkaloid from the leaf of *C.siamea* possessed definite depressant action upon the central nervous system particularly the cerebrum and the spinal cord. The respiration was apparently unaffected even by very large doses.[8]

— In the rat treated with an alkaloid from *C.siamea* for 17 days, the voluntary activity was diminished and the gastro-intestinal tract smooth muscle tonicity was slightly increased.[8]

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Centella asiatica (L.) Urban
UMBELLIFERAE

English name :

Local name

Brunei	:	
Indonesia	:	Pegagan, Duan kaki kuda
Malaysia	:	
Philippines	:	Takip kuhol
Singapore	:	
Thailand	:	Buabok

Description of plant

Herb, creeping with long stolon. Leaf rosette at each node, orbicular to reniform, 1-7 cm in diameter; margin entire, crenate, or usually dentately repand; base cordate. Petiole long. Umbel solitary or 2-5 together in leaf axil. Peduncle shorter than petiole. Flower small, usually 3. Petal 5, minute, white or rose-tinged. Ovary laterally flattened. Fruit small, laterally flattened, orbicular to ellipsoid.[1-3]

Part used : Herb

Characteristic of crude drug

Dried herb greenish-brown; stolon thin, long, twisted; leaf rennate or cordate, flattened, brittle; petiole long, narrow; root short, hairy, occasionally found. Odour aromatic; taste bitter.[4]

Cultivation

Soil and climate

This plant is commonly found in the tropics. It grows well on the ground in humid area with enough sunshine.

Propagation and planting

The plant is propagated through the seed and the stolon. The stolon with nodes and roots is placed in the sand or wet soil for 1-2 weeks, young plant will appear and will be ready for planting in one week.

Harvesting

The plants can be harvested 6 months after planting by digging a clump of plant.

Production

Post-harvest handling

Collect the whole plants, wash thoroughly and dry in the sun.

Utilization

Recommended use in primary health care

INA : Whole plant (fresh or dried)
Diuretic, Tonic[5]

PHIL : Leaf (fresh)
Counterirritant[5]

THAI : Whole plant (fresh)
Treatment of burns and wounds
— apply 2-3 crushed fresh whole plants to the affected area.[6]

Related scientific study

— Asiaticoside, medecassol, medecassic acid and asiatic acid when apply to the skin can increase tensile strength and promote the proliferation of granulation of the wound.[7,8]

— A clinical trial in chronically infected ulcer of the skin showed that the herb extract can heal the ulcer.[9]

— Asiaticoside from this plant has been used in the treatment of leprous ulcer and slow-healing wound.[10]

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Coleus amboinicus Lour.

LABIATAE

English name :

Local name

Brunei	:	
Indonesia	:	Daun jinten
Malaysia	:	
Philippines	:	Miayana
Singapore	:	
Thailand	:	Niamhusua

Description of plant

Herb up to 1 m high, pubescent. Leaf simple, opposite, often broadly ovate, 2-10 cm long and 2-8 cm wide, pubescent, fleshy, fragile, often crenate, obtuse or rounded at apex, rounded to subcordate at base. Petiole 1-5 cm long. Inflorescence terminal, 10-50 cm long; bract ovate. Flower small, pale violet. Calyx campanulate, 0.1-0.4 cm long, 2-lipped; upper lip often ovate; lower lip 4-toothed. Corolla 8-12 cm long, 2-lipped; lower lip much longer than upper lip. Stamen 4. Fruit small.[1-3]

Part used : Leaf

Cultivation

Soil and climate

It thrives best on loamy or loose fertile soil, and cannot stand waterlogging.

Propagation and planting

The plant is commonly propagated by herbaceous cutting. The cutting is placed in the soil at 2-3 cm deep. After 2-3 weeks, it can be transplanted for cultivation with a spacing of 50 cm.

Harvesting

The leaves can be collected at the beginning of flowering period.

Utilization

Recommended use in primary health care

INA : Leaf (fresh or dried)

Carminative, Antitussive, Expectorant.[4]

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Coleus scutellarioides (L.) Benth.

LABIATAE

English name :

Local name

Brunei	:	
Indonesia	:	Miana
Malaysia	:	
Philippines	:	Miayana
Singapore	:	
Thailand	:	Rusiphasomlaeo

Description of plant

Herb up to 1.5 m high, hairy. Leaf simple, opposite, variable in colour, often ovate, 1-15 cm long and 1-10 cm wide, acute at apex, rounded or cuneate at base, subentire to deeply crenate, pubescent on nerves. Petiole 1-5 cm long. Inflorescence 5-60 cm long. Bract ovate. Flower purplish, pubescent; calyx campanulate, 1-2 cm long, unequally 5-toothed; corolla 0.8-1.3 cm long, 2-lipped; lower lip much longer than upper lip; stamen 4. Fruit small.[1-3]

Part used : Leaf

Cultivation

Soil and climate

This plant is commonly found in the tropics. It grows well on most kinds of soil in a humid area.

Propagation and planting

The plant is propagated through the seed or by herbaceous cutting. The herb should be cut into pieces of 10-15 cm long and placed in the sand or wet soil. After 1-2 weeks, the shoot will appear and be ready for planting.

Harvesting

The mature leaves can be collected for medicinal purposes.

Utilization

Recommended use in primary health care

INA : Leaf (fresh or dried)
Haemorrhoid, Stomachic
— decoction[4]

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Curcuma longa Linn.

(*C.domestica* Val.

ZINGIBERACEAE

English name : Turmeric

Local name

Brunei	:	
Indonesia	:	Kunyit
Malaysia	:	
Philippines	:	Luyang Dilow
Singapore	:	
Thailand	:	Khaminchan

Description of plant

Herb. Rhizome orange within. Leafy shoot up to 1 m high. Leaf lanceolate, up to 40 cm long and 7-8 cm wide. Petiole thin; ligule lobe small; sheath with ciliate edge. Inflorescence apical on the leafy shoot, spicate, cylindrical, 10-15 cm long and 5-7 cm wide. Bract white or greenish-white, 5-6 cm long; each subtends flower. Bracteole up to 3.5 cm long. Flower about 5 cm long; calyx tubular, unequally toothed; corolla white; tube funnel-shaped, 3-lobed; staminode and lip creamy-white with yellow median band; filament united to anther about the middle of the pollen sac, spurred at base; ovary trilocular.[1-3]

Part used : Rhizome

Characteristic of crude drug

Dried turmeric occurs in 2 forms: Main rhizome (round turmeric) ovate or oblong, 2.5-4 cm long, 1.5-2.5 cm wide. Finger (long turmeric) cylindrical with short branches, 2-5 cm long, 1-1.8 cm wide; fracture horny. Both forms externally yellowish-brown with root scars and annulations, internally orange, waxy, showing a cortex seperated from a central cylinder (about twice as broad as cortex) by a distinct endodermis; scattered bundles are seen in both cortex and central cylinder. Odour characteristic; taste bitter.[4]

Cultivation

Soil and climate

Turmeric can grow in most places, ranging from sea level to 1,200 m. The soil best suited for its cultivation is sandy and clayey loam containing a large amount of alluvium or deposit of silt with facility for good drainage and adequate water.

Propagation and planting

This plant is propagated vegetatively through the rhizome. Both bulb and finger are used as planting material. In most areas, planting is done either on raised beds or on ridges from May to July. The raised-bed planting is preferable under rainfed condition especially where the soil is light. The broad-ridge method is adopted with advantage in heavy soil especially in a place where irrigation is possible. In a rainfed crop, turmeric rhizome begins to sprout in about a month after planting while sprouting takes place in 15 days in an irrigated crop.

Harvesting

The vegetative growth is rapid during the first four months. The crop becomes ready for harvest in 7-9 months after planting and the main harvest season begins from December and extends up to February. The yield of fresh turmeric varies from 8,500-10,000 kg per acre.

Production

Post-harvest handling

Collect the rhizomes, wash thoroughly. The main rhizomes and fingers are sliced into pieces, 0.3-0.5 cm thick,or separately placed in baskets and steamed until soft. Dry in the sun.

Utilization

Recommended use in primary health care

INA : Rhizome (fresh or dried)

Antidysentery

— decoction[5]

Choleretic

— decoction[5]

Insect bites

— apply topically[5]

PHIL : Rhizome (fresh or dried)

Antiseptic for wound

— apply crushed rhizome to the affected area.[5]

Antiflatulent

— drink the decoction as tea.[5]

THAI : Rhizome (fresh or dried)

Antipruritic, Anti-inflammatory, Insect bites, Allergy

— rub or apply the pressed juice or powder mixed with water to the affected area.[6]

Dyspepsia

— take 2-3 of 500 mg pills 4 times a day after meal and at bedtime.[7]

Precaution

It should not be used orally during pregnancy.[8-10]

Related scientific study

— Petroleum ether, ethanol and aqueous extracts of turmeric showed anti-fertility activities in the rat and the rabbit.[8-10]

— Turmeric could heal wound and ulcer.[11]

— Turmeric was shown to be useful and effective for the treatment of gastric and duodenal ulcer[12], dyspepsia[13] and stomachache.[14]

— Turmeric and its extractives exhibited antimicrobial activity.[15]

— Curcumin from turmeric was shown to have cholagogue action.[16]

— Decoction and water extract of turmeric showed spasmolytic activity in isolated guinea pig ileum preparation and could antagonize contraction caused by various chemical agonists.[17,18]

— Turmeric exhibited anti-inflammatory activity.[19-21]

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Cymbopogon citratus (DC.) Stapf

GRAMINEAE

English name : Lemongrass

Local name

Brunei	:	
Indonesia	:	Sereh
Malaysia	:	
Philippines	:	Tanglad, Salai
Singapore	:	
Thailand	:	Takhrai

Description of plant

Herb up to 2 m high, rarely flowering. Leaf in dense tuft from short rhizome, linear, up to 100 cm long and up to 2 cm wide, acuminate at apex, rough on both sides; ligule membranous; leaf sheath terete, glabrous. Inflorescence terminal, often large, with leafy spathe. Spikelet oblong to lanceolate, about 0.6 cm long, very narrow. Flower small; style bifid; stamen 2. Fruit small.[1-2]

Part used : Rhizome

Characteristic of crude drug

Crude drug occurs as cylindrical segments of dried rhizome, light brown, 0.5-0.8 cm in diameter, wrinkled with many scars and distinct annulations; fracture fibrous. Odour and taste pungent.

Cultivation

Soil and climate

Lemongrass can grow in most kinds of soil. It thrives best on well-drained sandy loam with good supply of humus. It is very sensitive to waterlogging.

Propagation and planting

This plant is propagated by separating a clump of plants. One third from the top of each separated plant should be cut off, and the remaining part of 3-5 plants is planted slantingly in a pit of 30x30 cm, with a spacing of 40x50 cm.

Harvesting

The rhizomes should be harvested by digging out the clump of plants at 4-5 months after planting.

Production

Post-harvest handling

Collect the rhizomes, cut off the rootlets and wash thoroughly, then cut into short segments. Dry in a shaded and ventilated place.

Utilization

Recommended use in primary health care

INA : Rhizome, leaf stalk (fresh or dried)

Antiflatulent

— decoction[3]

PHIL : Rhizome, leaf stalk (fresh or dried)

Antiflatulent

— decoction[3]

Mosquito repellant

— apply the juice from pounded leaves topically.[3]

Diuretic

— make a 20% decoction of leaves. Drink 1/4 glass of the decoction 3 times daily.[4]

Aromatic bath

— boil 4 handfuls of leaves in 1 liter of water for 5 min. Add enough water to make it lukewarm.[4]

THAI : Rhizome, leaf stalk (fresh or dried)

Carminative

— drink the decoction of 40-60 g of crushed fresh leaf stalks prepared by slight simmering.[5]

Diuretic

— drink the decoction of 40-60 g of fresh or 20-30 g of dried leaf stalks prepared by slight simmering, 1 cupful 3 times a day before meal.[5]

— make an infusion of sliced roasted rhizomes and take 1 cupful of infusion 3 times a day.[5]

Related scientific study

- Decoction of lemongrass leaves (10% or 20%) showed some weak diuretic effect when given orally in rats.[6]
- The oil from lemongrass was formerly used as a carminative.[7]
- Infusion of fresh rhizome is given to increase the flow of urine. The decoction of fresh plants is used as a carminative and stomachic.[8]
- An infusion of the leaves administered orally for two months prior to mating or during pregnancy had no toxic effects to adult rats or their offsprings.[9]
- The herbal tea, prepared from dried leaves of lemongrass and given orally to healthy volunteers, produced no sign of toxicity.[10]

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Cyperus rotundus Linn.

CYPERACEAE

English name : Nut grass

Local name

Brunei	:	
Indonesia	:	Teki
Malaysia	:	
Philippines	:	
Singapore	:	
Thailand	:	Haeo mu

Description of plant

Perennial herb. Rhizome ellipsoid or globose to ovoid. Stem slender, triquetrous, smooth. Basal leaf, linear, flattish, acuminate, scabrid on the margin in the upper part; lower sheath reddish-brown. Inflorescence simple to compound; bract 2-4, as long as or overtopping the inflorescence. Primary ray 3-9, unequal. Spikelet linear, compressed, 10 to 40-flowered. Flower small; glume membranous ovate, with 5-7 nerves; stamen 3; stigma 3. Fruit small, trigonous, obovoidly oblong, brownish to black.[1-3]

Part used : Rhizome

Characteristic of crude drug

Dried rhizome, ovate or pear-shaped, 1-4 cm long, 0.5-1 cm wide, externally brownish-black with wrinkled marks and parallel rings of scales, internally light brown to brown. Odour slightly aromatic; taste pungent.[4]

Cultivation

Soil and climate

Nut grass is a perennial weed of the tropical region. It can grow on most kinds of soil, especially silty clay loam.

Nut grass may be propagated through the rhizome by cutting it into small pieces with 2-3 buds attached and placing them in the soil. Germination takes place after one week of watering. Nut grass grows rapidly during rainy season.

Harvesting

After digging out the rhizomes, remove leaves, roots and leaf sheaths.

Production

Post-harvest handling

Collect the rhizomes, cut off the rootlets, wash thoroughly and dry in the sun.

Utilization

Recommended use in primary health care

INA : Rhizome (fresh or dried)
Diuretic[5]

THAI : Rhizome (fresh or dried)
Carminative
— drink the decoction of 15 g of crushed dried rhizomes prepared by slight simmering.[6]
— take 5 crushed fresh rhizomes mixed with honey.[6]

Related scientific study

— Rhizome of *C.rotundus* contains volatile oil.[7,8]
— There are 2 reports on the studies of diuretic activity of this plant.[9,10]

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Ehretia microphylla Lamk.

BORAGINACEAE

English name :

Local name

Brunei	:	
Indonesia	:	Serut cina
Malaysia	:	
Philippines	:	Tsaang gubat
Singapore	:	
Thailand	:	Khoichin

Description of plant

Shrub 1-4 m high. Leaf simple, alternate and fascicle. Leaf often obovate, 1-6 cm long and 0.5-2.5 cm wide, often obtuse at apex, cuneate at base, entire or with 3 to 5-toothed above the middle. Petiole 0.1-0.5 cm long. Inflorescence axillary, 2 to 6-flowered cymes or flower solitary. Peduncle 0.2-2.5 cm long; pedicel 0.1-1.5 cm long. Flower small; calyx 0.3-0.6 cm long, 5-lobed, hairy; corolla white, 0.4-0.7 cm long, 5-lobed; stamen 5; ovary glabrous; style bipartite. Fruit globose, 0.5-0.6 cm in diameter, light red when ripe. Seed small.[1-3]

Part used : Leaf

Cultivation

Soil and climate

The plant can grow well in sandy loam with adequate water.

Propagation and planting

It is usually propagated through the seed or by stem cutting. Germination takes place in about one week. Two weeks after germination, seedlings should be potted. Young plants of 3-4 months old should be planted with a spacing of 1x2 m.

Harvesting

The mature leaves should be collected when needed.

Utilization

Recommended use in primary health care

PHIL : Leaf (fresh or dried)

Anticolic

— boil chopped leaves (4 tbsp if fresh, 6 tbsp if dried) in 2 glasses of water for 15 min. Strain when lukewarm. Drink 1/2 glass of the decoction every 6 hrs.[4]

Antidiarrheal

— boil chopped leaves (12 tbsp if fresh or 10 tbsp if dried) in 2 glasses of water for 15 min. Strain and cool. Drink 1/4 glass of the decoction every 2 to 3 hrs.[4]

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Eurycoma longifolia Jack

SIMAROUBACEAE

English name : —

Local name

Brunei	:	
Indonesia	:	Pasak bumi
Malaysia	:	
Philippines	:	
Singapore	:	
Thailand	:	Plalaiphuak

Description of plant

Small tree. Leaf imparipinnate, usually multijugate, crowded at the top of the tree. Leaflet opposite or subopposite, slightly oblique, lanceolate to lanceolately obovate, 5-20 cm long and 1.5-6 cm wide. Panicle axillary, mostly large and lax, puberulous and with capitate glandular hair. Male and female flowers seperated, reddish. Calyx small; lobe 5. Petal 5, 0.4-0.6 cm long and 0.2-0.3 cm wide. Stamen 5. Carpel 5, free. Fruit ellipsoid or ovoid, 1-2 cm long and 0.5-1.2 cm wide. Seed often oblong, 0.5-0.8 cm long and 0.3-0.6 cm in diameter.[1-2]

Part used : Root

Characteristic of crude drug

Crude drug occurs as segments of dried root; transverse surface yellowish-white with radiating striations; root bark light brown. Odourless; taste intensely bitter.[3]

Cultivation

Soil and climate

It grows well on friable clay to red and laterite soil in the tropical climate from sea level up to 900 m altitude.

Propagation and planting

The plant is propagated usually by seed which takes about one week to germinate.

Seddlings at two weeks of age should be transplanted to plastic bags. Young plants of 5-6 months old should be planted with a spacing of 4-5 m when the plants are raised on a plantation scale.

Harvesting

Cut down the tree of at least three years old and dig out the roots.

Production

Post-harvest handling

Collect the roots, cut off the rootlets, wash thoroughly, cut into segments and dry in the sun.

Utilization

Recommended use in primary health care

INA : Root (dried)
Tonic
— decoction[4]

THAI : Root (dried)
Antipyretic
— take the decoction of 8-15 g of dried root prepared by normal simmering twice a day before meal.[5]

Related scientific study

— 50% Ethanolic extract of the root showed neither hypertensive effect in the dog nor antipyretic effect in the rabbit; however, it possessed smooth muscle relaxant activity and could antagonize histamine-induced contraction of guinea pig ileum.[6]
— Saponin from the root had hemolytic activity.[7]
— Water and 50% ethanolic extract of the root bark had higher *in vitro* parasiticidal activity against the erythrocytic phase of *Plasmodium falciparum* than *Cinchona succirubra* and eurycomalactone was found to be one of the active principles.[8]
— Eurycomanone, eurycomalactone and eurycomanol isolated from the root showed antiplasmodial activity against a multi-drug resistant, Thailand strain (K-1), of *P.falciparum,in vitro*.[9]
— LD50 of the extract made from chopped, dried fresh root administered orally in mice was about 2.66 g/kg while the extract made from long stored

root were virtually nontoxic at the dose of 4.9 g/kg. Nevertheless, this plant was considered to be of low toxicity when the amount recommended for use in man was taken into consideration.[10]

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Garcinia mangostana Linn.

GUTTIFERAE

English name : Mangosteen

Local name

Brunei	:	
Indonesia	:	Manggis
Malaysia	:	
Philippines	:	Mangostan, Mangosteen
Singapore	:	
Thailand	:	Mangkhut

Description of plant

Tree up to 20 m high, with yellow latex. Leaf simple, opposite, ovate, elliptic to oblong, 12-23 cm long and 4-10 cm wide, acuminate at apex, cuneate at base, coriaceous, shining above. Petiole 1-2 cm. Flower unisexual, 2-6 cm across; male flower not found; female flower solitary or paired at the end of branches. Pedicel 1-2 cm long. Sepal 4, about 2 cm long, rounded, yellowish. Petal 4, ovate to obovate, yellowish-green with red edge or almost entirely red, about 2.5 cm long. Staminode 15-20. Ovary ellipsoid to globose; stigma sessile, 4 to 8-rayed. Fruit globose, 3-7 cm across, dark purple. Seed enclosed in aril.[1-2]

Part used : Fruit rind

Characteristic of crude drug

Crude drug occurs as dried fruit rind, reddish-brown. Outer surface smooth. Inner surface concave-lobed; fracture fibrous. Odourless; taste astringent.

Cultivation

Soil and climate

Mangosteen is a tropical fruit plant. It can grow on most kinds of soil. It thrives best on well-drained fertile soil, where the water table stands about 2 m below the surface. A very humid atmosphere where the rainfall is over 800 mm a year is preferred.

Propagation and planting

This plant is always propagated through the seed. The biggest seed of the fruit should be selected, aril is removed and the seed is placed on a seedbed of coconut husk, and kept well-watered. One month after germination, seedlings should be transplanted to plastic bags or pots. The young plants of 2-3 years old should be planted in pits of 90x90x90 cm with a spacing of 10x10 m and shaded at early stage.

Harvesting

The plant begins flowering about 6 years after planting. Three months after flowering period, the purple to dark purple fruits should be harvested.

Production

Post-harvest handling

Collect the fruit rind and dry in the sun.

Utilization

Recommended use in primary health care

INA : Fruit rind (dried)
Antidiarrheal
— decoction[3]

PHIL : Fruit rind (dried)
Anticolic
— prepare the decoction by boiling the mesocarp powder or diced parts (6 tbsp if fresh, 4 tbsp if dried) in 2 glasses of water for 15 min. Strain when lukewarm. Drink 1/2 glass of the decoction every 6 hrs.[3,4]
Antidiarrheal
— prepare the decoction by boiling the powdered or diced mesocarp (3 tbsp if fresh, 2 tbsp if dried) in 2 glasses of water. Strain when lukewarm. Drink 1/4 glass of the decoction every 2-3 hrs.[3,4]

THAI : Fruit rind (dried)
Antidiarrheal
— take the decoction of fruit rind or take the preparation made by rubbing the rind with water.[5]
Antidysentery

— suspend 4 g of toasted, ground fruit rind in 1/2 glass of water and take the suspension every 2 hrs.[5]

Related scientific study

— The fruit rind of mangosteen contains 13.61% tannin.[6]

— The tincture made from the dried husk, used in conjunction with emetine treatment, appears to act as a useful adjuvant, and to cut short acute attacks of amoebic dysentery.[7]

— Mangostin and its derivatives had CNS depressant action in mice and rats and significant effects on cardiovascular system of frogs and dogs.[8]

— Mangostin-3,6-di-o-glucoside had CNS depressant activity. The diglucoside also produced a significant rise in blood pressure in rats.[9]

— The water and alcoholic extracts of fruit rind of *G.mangostana* had the antibacterial effect against *Salmonella typhosa, Shigella sonnei* and *Escherichia coli.*[10]

— After i.p. injection of high dose (200 mg/kg) of mangostin into rats, the SGPT and SGOT activities were increased. At the dose of 1.5 mg/kg (LD50 > 5 mg/kg) it produced no effect to liver protein compared to the same dose of paracetamol.[11]

— Fruit rind of mangosteen was a powerful astringent employed in the treatment of chronic diarrhea and dysentery.[12]

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Imperata cylindrica (L.) Raeuschel

GRAMINEAE

English name :

Local name

Brunei	:	
Indonesia	:	Alang-alang
Philippines	:	Kugon
Singapore	:	
Thailand	:	Yakha

Description of plant

Herb up to 150 cm high; rhizome whitish; node hairy. Leaf linear to lanceolate, 12-100 cm long and 0.5-3 cm wide, scabrid, acuminate at apex, hairy at base; ligule membranous; leaf sheath up to 7 cm long. Inflorescence terminal, often cylindrical, up to 30 cm long. Spikelet lanceolate to oblong, 0.2-0.5 cm long, enveloped in long silky hair. Flower small, superior ovary; style bifid; stigma purple; stamen 2. Fruit small.[1-3]

Part used : Rhizome

Characteristic of crude drug

Crude drug occurs as cylindrical segments of dried rhizome, light brown, 0.2-0.4 cm in diameter, shiny, wrinkled with longitudinal furrows between annulations; fracture horny, tough. Odourless; tasteless.

Cultivation

Soil and climate

This grass is a perennial weed of the tropical region. It can grow on all kinds of soil.

Propagation and planting

It grows naturally throughout the country. Propagation may be carried out through the rhizome and the seed. The rhizome is cut into small pieces with two or three buds attached and placed in the soil. Sprouting takes place in about one week.

This plant grows rapidly during rainy season.

Harvesting

Dig out the rhizomes, remove leaves, roots and leaf sheaths.

Production

Post-harvest handling

Collect the rhizomes, cut off the rootlets and wash thoroughly then cut into short segments and dry in the sun.

Utilization

Recommended use in primary health care

INA : Rhizome or root (fresh or dried)
Diuretic
— boil 6 tbsp of chopped rhizome in 2 glasses of water for 15 min. Drink the decoction 1 part 3 times a day.[4]

PHIL : Root (fresh or dried)
Diuretic
— decoction[5]

THAI : Rhizome (fresh or dried)
Diuretic
— prepare the decoction of 40-50 g of chopped fresh rhizome or 10-15 g of dried rhizome in 2 glasses of water by normal simmering. Drink the decoction 3 times a day before meal.[6]

Related scientific study

— The diuretic activity of aqueous extracts of the rhizome was tested but the results did not show any promising activity. On the contrary, the extracts even showed antidiuretic activity by decreasing the total amount of urine in the rat and increasing the chloride concentration.[7]

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Leucaena leucocephala (Lamk.) de Wit.

LEGUMINOSAE

English name :

Local name

Brunei	:	
Indonesia	:	Lanetoro, Lamtorogong
Malaysia	:	
Philippines	:	Ipil-ipil, Santa elena
Singaport	:	
Thailand	:	Krathin

Description of plant

Shrub or tree, up to 10 m high. Leaf bipinnate, alternate. Leaflet lanceolate to oblong, 0.6-2 cm long, 0.2-0.5 cm wide, obliquely cuneate at base, acute at apex, subsessile. Petiole up to 7.5 cm long, with a gland below the lowermost pair of pinnae, swollen at base. Head 1-3 in leaf axil. Peduncle 2-6 cm long. Flower white, numerous. Calyx campanulate, 0.2-0.3 cm long, 5-toothed. Petal 5, 0.3-0.4 cm long. Stamen 10; filament 0.8-1 cm long, yellowish-white. Pod with short stalk, strap-shaped, 1-2 cm wide, up to 20 cm long, flat. Seed ovate to obovate, 0.6-0.9 cm long, 0.2-0.4 cm wide.[1-3]

Part used : Seed

Cultivation

Soil and climate

This plant can be grown on most kinds of soil both under rainfed and irrigated conditions. It can withstand hot climate and moderate cold but excessive rain during growing period is harmful.

Propagation and planting

It is propagated through the seed. The seed should be collected from well-formed and ripened pod and sown broadcast. Flowering begins in about 1 year after sowing.

Harvesting

The mature seeds should be collected when the pods turn brown.

Utilization

Recommended use in primary health care

INA : Seed
Anthelmintic
— powdered[4]

PHIL : Seed (dried)
Anthelmintic
— take 1 tsp of powdered seed with condensed milk or jelly.[4,5]

Related scientific study

— Of the total free amino acids extracted from the seeds, 60% was the toxic mimosine. In mice fed with rations containing 0.5, 1, or 2% mimosine, body weight, food intake and hair growth were decreased in a dose-dependent manner.[6]

— A feeding trial in goats conducted in Northern Thailand indicated that an excess amount of *L.leucocephala* caused a depression of performance and signs of toxicity due to the presence of mimosine. It was found that an acceptable daily intake of mimosine in goats was 0.18 g/kg body weight.[7]

— The seed contains 20-25% galactomannan gum which has the potential to be used as a laxative.[8]

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Mentha cordifolia Opiz

LABIATAE

English name :

Local name

Brunei	:	
Indonesia	:	Poko
Malaysia	:	
Philippines	:	Yerba buena
Singapore	:	
Thailand	:	Saranae

Description of plant

Herb. Stem quadrangular, glabrous or subglabrous. Leaf simple, opposite, ovate to oblong or suborbicular, 0.5-5 cm long and 0.5-3 cm wide, rounded or obtuse at apex, broadly cuneate, rounded to shallowly cordate at base, serrate or dentate, wrinkled, sunken nerves on the upper surface, densely gland-dotted on lower surface. Petiole 0.1-0.7 cm long. Rarely flowering under normal condition in Southeast Asia.[1-2]

Part used : Leaf

Characteristic of crude drug

Dried crude drug occurs as crumpled broken leaves, greenish-brown, brittle, with some hair on both surfaces; petiole hairy. Odour slightly aromatic; taste slightly bitter and aromatic.

Cultivation

Soil and climate

It thrives well in humid climate. The suitable conditions are well-watered sandy loam, alluvial and laterite soil having plenty of organic matters such as rice husk. It requires partial shade.

Propagation and planting

This herb is propagated by herbaceous cutting. The cuttings are planted at

a depth of 2-3 cm. Young shoots will appear in about 2 weeks after planting.

Harvesting

The mature leaves are collected for medicinal purposes.

Production

Post-harvest handling

Wash the leaves thoroughly and dry in a shaded and ventilated place.

Utilization

Recommended use in primary health care

INA : Herb
Carminative
— infusion[3]

PHIL : Leaf (fresh or dried)
Analgesic
— decoction[3]
Antiflatulent
— decoction[3]

Related scientific study

— Menthol in essential oil from mentha species possessed carminative activity.[4]

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Morinda citrifolia Linn.

RUBIACEAE

English name :

Local name

Brunei	:	
Indonesia	:	Pace
Malaysia	:	
Philippines	:	
Singapore	:	
Thailand	:	Yo

Description of plant

Shurb or small tree; branchlet obtusely quadrangular. Stipule interpetiolar, large. Petiole 0.5-2 cm long. Leaf opposite, elliptically lanceolate, acute at both ends, entire or undulate, 13-30 cm long, 6-17 cm wide. Peduncle long. Head subobovoid to globose, 0.5-2.5 cm long. Flower white. Calyx tube short, truncate. Corolla tube 0.8-1.1 cm long; throat pubescent; lobe 5, acute 0.4-0.5 cm long. Stamen 5, often inserted in throat. Style bifid. Multiple fruit fleshy-bullate, glabrous, irregular-shaped, 3-10 cm long, yellowish-white when ripe. Seed obovoid, small.[1-2]

Part used : Fruit

Characteristic of crude drug

Dried crude drug occurs as sliced pieces of fruit, brown to dark brown, circular, 2.4-3.3 cm in diameter, with many seeds radially arranged. Seed ovoid, brown, 0.4x0.9 cm in size. Odour vinegar-like; taste slightly sour and sweet.

Cultivation

Soil and climate

This plant grows in the tropics. It can be grown on most kinds of soil but thrives best on well-drained and loamy soil with good supply of humus.

Propagation and planting

This plant is propagated through the seeds. The seeds should be soaked in

water for 1 month prior to sowing and sown on seedbeds. Germination takes place in about 4-5 weeks and seedlings of 5-7 cm high should be transplanted to plastic bags or pots. The young plants of 30-50 cm high should be planted in pits of 30x30x30 cm with a spacing of 4x4 m.

Harvesting

The fruits should be collected for medicinal purposes.

Production

Post-harvest handling

Wash the fruits thoroughly, then slice into pieces and dry in the sun.

Utilization

Recommended use in primary health care

INA : Fruit (ripe or unripe)
Antihypertensive
— decoction[3]

THAI : Fruit (ripe or unripe)
Antinauseant, Antiemetic
— frequently sip or drink the infusion or the decoction of 10-15 g of roasted slices of ripe or unripe fresh fruit prepared by normal simmering.[4,5]

Related scientific study

— The clinical study in malarial patients with the symptoms of nausea and vomiting showed that hot infusion of roasted ripe fruit slices could significantly reduce the frequency of vomiting compared to the hot infusion of tea but the effect was less than 5 mg metoclopamide.[6]

— Water extract of the root injected i.v. in an anesthetized dog at a dose of 4 g/kg, produced a marked lowering of blood pressure which lasted approximately 26 min.[7]

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Ocimum sanctum Linn.

LABIATAE

English name : Holy basil

Local name

Brunei	:	
Indonesia	:	Lampes
Malaysia	:	
Philippines	:	Solasi
Singapore	:	
Thailand	:	Kaphrao

Description of plant

Herb or shrub. Leaf simple, oppsite, elliptically oblong or ovate, 1.5-6 cm long, 1-2.5 cm wide, obtuse or acute at apex, cuneate to rounded at base, undulate or serrate, pubescent, dotted on both surfaces. Petiole long. Inflorescence up to 14 cm long. Bract ovate or suborbicular, small. Pedicel short. Calyx 0.2-0.35 cm long, 2-lipped; upper lip suborbicular; lower lip longer than the upper; teeth 4. Corolla lavender or white, 0.3-0.5 cm long, 2-lipped; upper lip shortly 4-lobed; lower lip ovately oblong. Stamen 4, far exserted. Fruit broadly ellipsoid, small, swelling in water.[1-3]

Part used : Leaf

Characteristic of crude drug

Crude drug occurs as dried crumpled broken leaves, greenish-brown to brown, pubescent, brittle; petiole pubescent. Odour characteristic, slightly aromatic and pungent; taste slightly pungent.

Cultivation

Soil and climate

This plant is grown in the tropics. It thrives best on well-drained loamy soil with good supply of humus. It is sensitive to waterlogging.

Propagation and planting

This plant is propagated through the seed or by herbaceous cutting. The seeds

should be sown directly on the ground in shallow drills of plot. If the soil is too acidic, it should be treated well with lime. The soil should be well broken up two weeks before sowing. When the plants are 5-8 cm high, thin out to 20-30 cm spacing.

Harvesting

The leaves should be harvested 4-6 months after planting

Production

Post-harvest handling

Wash the leaves thoroughly and dry in a shaded and ventilated place.

Utilization

Recommended use in primary health care

INA : Leaf and flowering top (fresh or dried)

Carminative

— decoction[4]

Antiemetic

— decoction[4]

PHIL : Leaf (fresh or dried)

Wound wash

— apply the decoction topically.[4]

Tinea (antifungal)

— apply the juice from fresh leaves topically.[4]

Antiflatulent

— decoction[4]

— prepare the infusion by soaking the chopped leaves (3 tbsp if fresh, 2 tbsp if dried) in 1 glass of warm water, let steep for 30 min and strain. Drink 1/3 glass of the infusion every 6 hrs.[5]

THAI : Leaf (fresh or dried)

Carminative

— drink the decoction of 25 g of fresh or 4 g of dried leaves prepared by slight simmering.[6]

Related scientific study

— Holy basil contained alkaloids, glycosides, tannins, saponins, fats and essential oils. The therapeutic value was ascribed to the essential oils.[7]

— The leaf contained the highest percentage of oil. It was composed of eugenol and methyleugenol which possessed antimicrobial effect.[8]

— The water extracts were studied on various body systems of the dog and cat, it had a direct depressant action on the heart, potentiated the hexobarbitone sleeping time and inhibited smooth muscle contraction.[9]

— Crude extract was employed as carminative. The extract did not alter the tonicity of guinea pig ileum but reversibly inhibited acetylcholine or histamine-induced contraction. In the rat uterus, the extract produced contraction and minimized the contraction caused by acetylcholine. There may be multiple mechanisms associated with the carminative and emmenagogic activities.[10]

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Orthosiphon aristatus (Bl.) Miq.

LABIATAE

English name :

Local name

Brunei	:	
Indonesia	:	Kumis kucing
Malaysia	:	
Philippines	:	Balbas pusa
Singapore	:	
Thailand	:	Yanuatmaeo

Description of plant

Herb. Stem quadrangular. Leaf simple, opposite, ovate or rhombic, 3-10 cm long and 1-5 cm wide, acuminate at apex, cuneate at base, serrate, pubescent on nerve. Petiole 1-3 cm long. Inflorescence terminal, 7-30 cm long; bract ovate 0.1-0.2 cm long. Pedicel 0.1-0.6 cm long. Calyx 0.2-0.5 cm long, 2-lipped; upper lip broadly ovate; lower lip 4-lobed, narrowly triangular. Corolla white or pale lilac; tube slender 1-1.8 cm long, 2-lipped; upper lip orbicular, shallowly 4-lobed; lower lip as long as upper one. Stamen 4; filament about 2 cm beyond corolla throat. Fruit oblong, 0.1-0.2 cm long.[1-3]

Part used : Leaf

Characteristic of crude drug

Crude drug occurs as dried crumpled broken leaves, greenish-brown to brown; margin serrate. Odour indistinct; taste slightly bitter.

Cultivation

Soil and climate

The herb requires a warm humid climate and grows well on all kinds of soil.

Propagation and planting

This plant is propagated by herbaceous cutting. The cuttings of about 15 cm long are planted with a spacing of 30 cm. At the early stage, shade should be provided

and water should be given twice a day.

Harvesting

The plant should be harvested before the flowering period and the leaves are selected for medicinal purposes.

Production

Post-harvest handling

Wash the leaves thoroughly and dry in the sun.

Utilization

Recommended use in primary health care

INA : Leaf and flowering top (dried)
Diuretic
— decoction[4]

PHIL : Leaf (dried), flower (fresh or dried)
Diuretic
— decoction[4]
Toothache
— chew flowers or apply into cavity.[4]

THAI : Leaf (dried)
Diuretic
— prepare the decoction of 40-50 g of dried leaves by normal simmering, take 1 cup, followed by plenty of water, 3 times a day before meal.[5]

Related scientific study

— The active diuretic principle, myo-inositol, was obtained from aqueous extract of *O.aristatus*.[6]
— *O.stamineus* had a diuretic effect[7-8] and increased the elimination of Na^+ and Cl^-.[8]
— In dogs, the infusion of *O.stamineus* at a dose of 0.3 mg/kg increased urea and urine output 15-30% and 11-42%, respectively.[9]
— *O.stamineus* had been used as a diuretic and for the treatment of urinary tract infection in Asia and Europe as well as in Thailand.[10]
— 10% Infusion of *O.stamineus* increased urine output within 24 hrs in rats due to the glycoside, orthosiphonin, which was the most active diuretic

principle.[11] An infusion did not exert any side effects even when used for a long time.[12]

— In a clinical study, an infusion of dried leaves could remove renal canaliculi and hence, relieve pain in 40% and 20% of patients, respectively.[13]

— The diuretic effect of 1:10, 1:2, 1:1, 2:1 water extracts was studied and compared with furosemide, it was found that the urine output did not increase but it significantly increased Na^+ and K^+ excretion in urine.[14]

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Piper betle Linn.

PIPERACEAE

English name : Betel

Local name

Brunei	:	
Indonesia	:	Sirih
Malaysia	:	
Philippines	:	Ikmo
Singapore	:	
Thailand	:	Phlu

Description of plant

Climber, thickened at node; stipule lanceolate, amplecting the shoot apex. Leaf simple, alternate, often ovate to elliptic, 4-28 cm long and 3-11 cm wide, acuminate at apex, obliquely rounded or shallowly cordate at base, 2-3 pairs of nerves from the base and one pair from midrib. Petiole 1-4 cm long. Spike solitary, leaf-opposed, cylindrical, 2.5-9 cm long and 0.3-1 cm across, unisexual. Peduncle 1.5-6 cm long. Bract very small, orbicular to ellipsoid, glabrous. Flower crowded, sessile, without perianth. Female flower often with 3-7 stigmas; ovary immersed in rachis of spike. Male flower usually with 2 stamens. Fruit globose, small.[1-3]

Part used : Leaf

Characteristic of crude drug

Crude drug occurs as dried crumpled broken leaves, brittle; margin entire; upper surface dark brown; lower surface brown. Odour characteristic; taste slightly astringent.

Cultivation

Soil and climate

This plant can be grown from sea level up to an elevation of 1,000 m. It thrives best on loamy fertile soil, highly humid and partially shaded area.

Propagation and planting

The plant is propagated by herbaceous cutting. The cuttings of about 60 cm

long are planted a few centimetres apart and allows to twine up stakes about 2 m high. Lime and manure should be given as often as possible.

Harvesting

The leaves are picked at about 18 months after planting, 4 times a year in rotation. The upper leaves are better in quality.

Production

Post-harvest handling

Wash the leaves thoroughly and dry in a shaded and ventilated place.

Utilization

Recommended use in primary health care

INA : Leaf (fresh or dried)

Antitussive

— decoction[4]

Antiseptic (mouthwash, eyewash)

— decoction, gargle, apply as eyewash topically.[4]

PHIL : Leaf (fresh or dried)

Antiflatulent

— apply poultice of heated leaves with oil topically on abdomen.[4]

Anti-inflammatory

— apply poultice topically.[4]

Superficial wounds or cuts

— apply juice of fresh leaves topically.[4]

THAI : Leaf (fresh or dried)

Anti-inflammatory for insect bites and allergy.

— prepare the preparation of 1-7 crushed fresh leaves with liquor or alcohol then apply on the affected area.[4,5]

Related scientific study

— The ethereal and petroleum ether extracts of *P.betle* and its volatile oil exhibited antimicrobial activity. The most sensitive microorganism was *Staphylococcus aureus* (MIC = 1:400).[6,7]

— The ethereal extract of Phlu in the forms of 2% ointment, cream and paste in various bases effectively inhibited microorganisms and produced no

toxicity to rabbit skin.[8]

— A topical dose of 0.5 g of Phlu extract applied once a day for 3 days on rabbit skin produced no skin reaction.[8]

— Before and after UV radiation on guinea pig skin, 0.25 g of Phlu extract in hydrophilic petrolatum base applied topically once a day for 6 days caused erythema skin response.[9]

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Pluchea indica (L.) Less.

COMPOSITAE

English name :

Local name

Brunei	:	
Indonesia	:	Beluntas
Malaysia	:	
Philippines	:	
Singapore	:	
Thailand	:	Khlu

Description of plant

Shrub. Leaf simple, alternate, often obovate to oblanceolate, 2-9 cm long, 1-5 cm wide, acute at apex, attenuate at base, serrate to dentate. Petiole short. Inflorescence terminal; involucre about 0.4 cm long; bract small, many-seriate. Marginal flower numerous; corolla tubular, about 0.3 cm long, 3 to 4-dentate; style bifid. Disk flower 2-6; corolla funnel-shaped, violet, about 0.4 cm long; lobe 5; stamen 5, exserted out of corolla; anther violet and usually connate; style bifid and exserted from antheral tube. Achene small; pappus hair white.[1-2]

Part used : Leaf

Characteristic of crude drug

Crude drug occurs as dried crumpled broken or unbroken leaves, greenish-brown; margin serrate. Odour indistinct; taste slightly salty.

Cultivation

Soil and climate

This plant is a perennial shrub. It requires a warm humid climate and grows well on most kinds of soil.

Propagation and planting

This shrub has never been propagated at all, it grows wildly all over the country. If propagation is needed, it can be carried out through the seed.

Harvesting

The plant should be harvested before the flowering period and the leaves are selected for medicinal purposes.

Production

Post-harvest handling

Wash the leaves thoroughly and dry in the sun.

Utilization

Recommended use in primary health care

INA : Leaf in flowery top

Antipyretic

— decoction or infusion[3,4]

Diaphoretic

— decoction or infusion[3,4]

THAI : Leaf (fresh or dried)

Diuretic

— prepare the decoction of 40-50 g of fresh or 15-20 g of dried leaves by normal simmering. Take 1 cup of the decoction, followed by plenty of water, 3 times a day before meal.[5]

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Psidium guajava Linn.

MYRTACEAE

English name : Guava

Local name

Brunei	:	
Indonesia	:	Jambu biji
Malaysia	:	
Philippines	:	Bayabas
Singapore	:	
Thailand	:	Farang

Description of plant

Shrub or tree, 3-10 m high, with smooth and peeling bark; young branch quadrangular. Leaf simple, opposite, often elliptic to oblong, 4-14 cm long and 3-6.5 cm wide, acute at apex, acute to rounded at base, pellucid-dotted, prominent-nerved and pubescent beneath. Flower 1-3 in axillary. Peduncle 2-4 cm long. Calyx limb often longer than tube, 2-5 unequal lobes. Petal 4-5, obovate, 1.5-2 cm long, white. Stamen many. Inferior ovary. Fruit globose to ovoid, 4-12 cm across; pulp whitish or pinkish. Seed many, small.[1-2]

Part used : Young fruit, leaf

Cultivation

Soil and climate

Guava is grown in the tropics and quite adaptable to a wide variety of climate and soil conditions. It is somewhat drought-resistant and tolerant of high temperature, it can also survive flooding and grow even on waterlogged soil.

Propagation and planting

The plant is commonly propagated through the seed or by budding. It is recommended that fresh seeds be sown as soon as possible. Germination will occur in 15-20 days. Vegetative propagation of clone is highly recommended. Sufficient water should be given to the seedlings until they are one year old. They are then ready for

planting in pits of 60x60 cm with a spacing of 4-6 m.

Harvesting

The leaves or young fruits can be collected as needed.

Utilization

Recommended use in primary health care

INA : Young leaf (fresh or dried)

Antidiarrheal

— decoction or taken as such.[3]

PHIL : Young leaf (fresh or dried)

Wound wash

— apply the decoction topically.[3]

Antidiarrheal, Anticolic

— prepare the decoction by boiling chopped leaves (8 tbsp if fresh or 6 tbsp if dried) in 2 glasses of water for 15 min. Cool and strain, divide the decoction into 4 parts. Drink 1 part every 2-3 hrs.[3,4]

Antiseptic, Mouthwash

— gargle with 1/4 glass of the decoction after each meal.[3,4]

THAI : Young fruit, leaf (fresh)

Antidiarrheal

— drink the infusion of 10-15 g of roasted leaves or take the preparation obtained from rubbing 1/2 fresh immature fruit with 2 tbsp of water and mixed with 2 tsp of limewater.[5]

Related scientific study

— Mature dried guava leaves contained 13.94% tannin which were both catechol and pyrogallol tannin.[6]

— The leaves were utilized in traditional medicine of several Latin American countries for the treatment of the acute diarrheic syndrome.[7]

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Punica granatum Linn.

PUNICACEAE

English name : Pomegranate

Local name

Brunei	:	
Indonesia	:	Delima
Malaysia	:	
Philippines	:	Granata
Singapore	:	
Thailand	:	Thapthim

Description of plant

Shurb or tree, 0.5-5 m. high; young branch quadrangular, sometimes ending in a spine. Leaf simple, opposite, some in fascicle, oblong to lanceolate, 1-9 cm long and 0.5-3 cm wide, acute at base, acute or obtuse to emarginate at apex. Petiole 0.1-0.6 cm long, often reddish. Flower 1-5, at the top of branchlet, sessile or subsessile. Calyx campanulate, reddish or pale yellow, 2-3 cm long; calyx lobe 5-9, ovate. Petal 5-9, obovate, 1.5-3 cm long, 1-2 cm wide, red or white. Stamen many. Inferior ovary. Fruit subglobose, 5-12 cm across, yellowish-green to reddish and dark brown, crowned by calyx lobes. Seed many, up to 1 cm long, angular; outer fleshy layer pink or yellowish-white.[1-2]

Part used : Fruit rind

Characteristic of crude drug

Crude drug occurs as thin-curved pieces of dried fruit rind,some of which bear the remain of the woody calyx or a scar left by the stalk. Outer surface brown to dark brown, rather coarse. Inner surface yellowish-brown to brown with impressions left by the seeds. Odourless; taste astringent.

Cultivation

Soil and climate

This plant can be grown throughout the tropics and subtropics, it produces

good fruit only in semi-arid region where high temperature accompanies the ripening season, and it is able to withstand long period of drought. It thrives best on deep, rather heavy, loam.

Propagation and planting

The plant is propagated through the seed or by cutting or layering. The seeds should be sown on seedbeds, and the germination will take 15-20 days. Seedlings of 5-7 cm high should be transplanted to suitable containers for establishment. A cutting may be established directly in a container. The young plants of 30-40 cm high are planted in the field with a spacing of 2-3 x 4-6 m.

Harvesting

This plant starts bearing fruits at 3-4 years of age. The fruits must be picked before fully mature to avoid splitting.

Production

Post-harvest handling

Collect the fruit rind, clean and dry in the sun.

Utilization

Recommended use in primary health care

INA : Pericarp of fruit (dried)
Antidiarrheal
— decoction[3]

PHIL : Fruit (including seed) (fresh)
Antidysentery
— decoction[3]

THAI : Fruit rind (dried)
Antidiarrheal
— drink the decoction of dried fruit rind from ¼ fruit prepared in lime water by normal simmering.[3]
Antidysentery
— drink the decoction of 3-5 g of dried fruit rind prepared by normal simmering twice a day.[4]

Related scientific study

— Pomegranate rind contains gallotannic acid but no alkaloids.[5]

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Quisqualis indica Linn.

COMBRETACEAE

English name :

Local name

Brunei	:	
Indonesia	:	Ceguk
Malaysia	:	
Philippines	:	Niyog-niyogan
Singapore	:	
Thailand	:	Lepmunang

Description of plant

Climber; young branch pubescent. Leaf simple, often opposite, elliptic to ovate, 5-18 cm long and 2.5-9 cm wide, acuminate at apex, rounded or subcordate at base. Petiole 0.5-2 cm long; petiolar thorn up to 1.5 cm long. Inflorescence 2-20 cm long. Bract lanceolate or elliptic. Flower scented; receptacle and calyx tube up to 8 cm long, hairy; calyx lobe 5, triangular, small. Petal 5, oblong, 0.6-2 cm long and 0.3-0.6 cm wide, white, finally turning dark red. Stamen 10, biseriate. Style adnate to inner wall of receptacle; upper part free. Inferior ovary. Fruit ellipsoid, 2-4 cm long and 0.5-1.5 cm across, with 5 longitudinal wings. Seed 1.[1-3]

Part used : Fruit

Characteristic of crude drug

Crude drug occurs as dried dark brown fruits, ellipsoid with 5 longitudinal ridges, rather smooth and shiny. Fruit wall hard, thick. Odourless; tasteless. Seed black, wrinkled. Odour coffee-like; taste pleasant.

Cultivation

Soil and climate

This plant can grow well in the tropics. It thrives best on friable clay to red and laterite soil with good drainage.

Propagation and planting

It is propagated through the seed or by cutting. The mature and leafless stem

with 3-4 nodes is preferable for propagation. It is inserted in a container or directly planted in a permanent site with a spacing of 2 x 2 m. A trellis is recommended for its climbing.

Harvesting

The plant will bear fruits after two years. The golden yellow to brown fruits are collected by handpicking.

Production

Post-harvest handling

Collect the fruits and dry in the sun.

Utilization

Recommended use in primary health care

INA : Nut (dried)
Anthelmintic
— taken as such[3]

PHIL : Nut (dried)
Anthelmintic
— taken as such[3]

THAI : Fruit (dried)
Anthelmintic
— drink the decoction of 10-15 g of crushed fruits (5-7 fruits) prepared by normal simmering. Reduce the amount when it is to be used in children.[4]

Precaution

It may cause hiccups[3]

Related scientific study

— In 1918, *Q.indica* was said to be a satisfactory substitute for the more expensive santonin[5-8] as an anthelmintic (vermifuge) in China[7,8] and Philippines.[9]
— The anthelmintic principle was quisqualic acid.[10]
— At a dose of 0.125 g of crystalline potassium quisqualate, an anthelmintic active constituent isolated from *Q.chinensis* seeds, was found to be as effective as an anthelmintic similar to santonin but more effective and produce less side effects than the seed.[11]

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Tamarindus indica Linn.

LEGUMINOSAE

English name : Tamarind

Local name

Brunei	:	
Indonesia	:	Asam jawa
Malaysia	:	
Philippines	:	Sampalok
Singapore	:	
Thailand	:	Makham

Description of plant

Tree up to 20 m high. Leaf paripinnate, 5-12 cm long consisting of 10-18 pairs of leaflets. Stipule minute. Leaflet oblong, 0.8-3 cm long and 0.3-1 cm wide, unequal; base rounded; apex mucronate. Raceme terminal. Receptacle narrowly turbinate. Sepal 4, yellowish, elliptically oblong. Petal 3, unequal, yellowish-orange; the upper one cordate oblong; 2 lateral ones obovately oblong. Perfect stamen 3. Ovary linear. Pod oblong, incurved, thick, light brown, 5-15 cm long and 1-2.5 cm wide; mesocarp pulpy, acidic. Seed compressed, orbicularly obovate, about 1 cm long, glossy, dark brown.[1-3]

Part used : Fruit pulp

Characteristic of crude drug

Fruit pulp brown, moist pulpy mass with or without branched tough fibers. Odour and taste acid.[4]

Cultivation

Soil and climate

Tamarind is a tropical plant. It can grow in both lowland and upland plain on all kinds of soil.

Propagation and planting

Tamarind can be propagated through the seed or by grafting or budding. Young plant is cultivated in 50x50x50 cm pit. Under proper condition, it will flower about

fours year after planting.

Harvesting

By jolting the tree, the fallen mature fruits can be collected.

Production

Post-harvest handling

Remove the pericarp and then seed. The fruit pulp, moistened with small quantity of water or saline solution, is shaped into small lumps.

Utilization

Recommended use in primary health care

INA : Fruit pulp (fresh)
Cathartic
— decoction[5]

PHIL : Fruit pulp (fresh), leaf
Laxative
— fruit pulp eaten as such[5]
Antitussive
— decoction of the leaves[5]
Wound irrigation
— decoction of the leaves[5]

THAI : Fruit pulp
Laxative
— take 10-20 pods (70-150 g) of fruit pulp with salt.[6]
— drink the juice made from 10-20 pods (70-150 g) of fruit pulp with salt.[6]
Antitussive
— take the fruit pulp with salt.[7]
Endosperm
Anthelmintic (Vermifuge)
— take the endosperm of 20-30 roasted seeds, prepared by removing seed coat and soaking the endosperm in saline solution until soft.[7]

Related scientific study

— the fruit and the leaf showed antimicrobial activity.[8,9]

— Tamarind was formerly used as a laxative (a mild purgative).[10]
— Fruit pulp contains organic acids possessing laxative action.[11-13]

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Tinospora crispa (L.) Miers ex Hook.f. & Thoms.

MINISPERMACEAE

English name

Local name

Brunei	:	
Indonesia	:	Brotowali
Malaysia	:	
Philippines	:	Makabuhay
Singapore	:	
Thailand	:	Boraphet

Description of plant

Climber, prominently tuberculate, with long filiform aerial roots. Leaf broadly ovate to orbicular, cordate at base, acuminate at apex, 5-14 cm long and 4-12 cm wide, palmately 5 to 7-nerved at base. Petiole 5-15 cm long. Male inflorescence very slender. Male flower small; sepal 6, pale green; petal 6; stamen 6. Female inflorescence similar to male but shorter. Female flower small; sepal and petal as in male; staminode 6; carpel 3. Drupe orange, ellipsoidal, up to 2 cm long.[1-3]

Part used : Stem

Characteristic of crude drug

Crude drug occurs as slanting segments of stem, 1-4 cm long. Bark light brown to brown, wrinkled, furrowed with characteristic warts and loose scales. Inner transverse surface yellowish-brown, porous, radially divided by distinct lines. Odourless; taste intensely bitter.[4]

Cultivation

Soil and climate

It thrives well in hot and humid climate. The suitable conditions are well-drained sandy loam, alluvial and laterite soil with plenty of organic matters. It requires partial shade and protection from strong wind.

Propagation and planting

The plant is propagated by stem cutting. The cuttings are inserted into the soil at a depth of 5-10 cm. After 3 months, the young plants should be transplanted along with climbing support, generally a low-branching tree with sparse foliage and rough bark is preferred.

Harvesting

Mature stem can be collected for medicinal purposes.

Production

Post-harvest handling

Wash the stem thoroughly, cut into short slanting segments and dry in the sun.

Utilization

Recommended use in primary health care

INA : Stem (fresh or dried)
- Stomachic
  - — decoction[5]
- Antipyretic
  - — decoction[5]

PHIL : Stem (fresh or dried)
- Scabicide, Antifungal
  - — apply juice from fresh stem topically[5]
- Skin ulcer
  - — apply decoction topically[5]

THAI : Stem (fresh or dried)
- Antipyretic
  - — drink the pressed juice of 30-40 g of fresh stem.[6]
  - — drink the decoction of 30-40 g of fresh or 10-13 g of dried stem prepared by long simmering.[6]

Related scientific study

— There are references reported that bitter principle in *T.crispa* is picroretin.[7-9]

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Vitex negundo Linn.

VERBENACEAE

English name :

Local name

Brunei	:	
Indonesia	:	Legundi
Malaysia	:	
Philippines	:	Lagundi
Singapore	:	
Thailand	:	Khonthikhamao

Description of plant

Shrub up to 5 m high. Stem quadrangular. Leaf opposite, digitately 3 to 5-foliolate. Leaflet lanceolate to elliptic, acuminate at apex, acute at base, often coarsely serrate, hairy beneath; middle leaflet 5-10 cm long and 1-3 cm wide, with 0.5-2 cm long petiolule; next ones smaller with shorter petiolules to subsessile. Petiole 2.5-6 cm long, pubescent. Inflorescence terminal or in higher leaf axils, 5-25 cm long, hairy; peduncle 4-7 cm long. Calyx campanulate, small, shortly 5-dentate. Corolla pale blue to violet; tube 0.3-0.4 cm long; upper lip 2-lobed; lower one 3-lobed; middle lobe of lower lip large, obovate. Stamen 4. Fruit globose, 0.3-0.6 cm across, purple to black, with fruiting calyx.[1-2]

Part used : Leaf

Cultivation

Soil and climate

It thrives best under sunny area on almost any soil. Waterlogging should be avoided.

Propagation and planting

The plant is usually propagated by cutting. The cuttings are inserted in sandy soil for rooting which takes about 4 weeks. They are then transplanted with a spacing of 1x1 m. Pruning is required to improve the growth.

Harvesting

The mature leaves is collected for medicinal purposes.

Utilization

Recommended use in primary health care

PHIL : Leaf (fresh or dried)

Analgesic

— prepare the decoction by boiling chopped leaves (6 tbsp if fresh, 5 tbsp if dry) in 2 glasses of water for 15 min. Drink 1/4 glass of the decoction every 4 hrs.[3]

Antiasthma (as bronchodilator)

— drink the decoction prepared as described above. The initial dose is double.[3]

Antitussive

— drink the decoction 3 times daily.[4]

Antipyretic (if viral)

— drink 1/4 glass of the decoction 3 times daily.[4]

Related scientific study

— The leaves yielded 0.423% Vitex negundo oil which contained ∝-pinene, camphene, caryophyllene, citral and 2 unidentified components.[5]

— *V.negundo* was shown to be strongly active antihistamine.[6]

— Casticine, chrysoplenol D, luteolin and isoorientin were isolated from two fractions from the leaves of *V.negundo* which induced relaxation of cat trachea.[7]

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Zingiber cassumunar Roxb.

ZINGIBERACEAE

English name :

Local name

Brunei	:	
Indonesia	:	
Malaysia	:	Bangle
Philippines	:	
Sipgapore	:	
Thailand	:	Phlai

Description of plant

Herb. Rhizome greenish-yellow to yellow. Leaf lanceolately oblong, 20-30 cm long and 2-8 cm wide, often pubescent below; ligule bilobed, pubescent. Inflorescence ovoid to ellipsoid; peduncle 8-30 cm long. Bract narrowly obovate or rhomboid; bracteole shorter than bract, ovate, 3-dentate. Calyx truncate, glabrous. Corolla pale yellow; tube about 2.5 cm long. Labellum pale yellow, suborbicular; apex emarginate. Appendage slightly longer than anther. Ovary 3-celled.[1-3]

Part used : Rhizome

Characteristic of crude drug

Crude drug occurs as yellowish-brown sliced pieces of dried rhizome; fracture mealy. Transverse view shows a narrow cortex seperated by endodermis from a much wider stele. Odour and taste pungent.[4]

Cultivation

Soil and climate

This plant can grow on most kinds of soil. It thrives best on loamy or alluvial friable fertile soil. Waterlogged area should be avoided. Shade will reduce the yield of production.

Propagation and planting

It is propagated through the rhizome by cutting it into small pieces with one or

two buds attached, and usually planting on ridges, 30-50 cm apart, with 10-20 cm between plants. The leaves will appear above the ground in about four weeks.

Harvesting

Rhizomes should be harvested 9-10 months after planting when the lower leaves turn yellow.

Production

Post-harvest handling

Collect the rhizomes, cut off the rootlets and wash thoroughly. The rhizomes are sliced into pieces of 0.3-0.5 cm thick or put in boiling water and allow to boil for 5 min. Dry in the sun.

Utilization

Recommended use in primary health care

INA : Rhizome (fresh or dried)
Analgesic
— rub on affected area.[5]

THAI : Rhizome (fresh or dried)
Muscular stiffness
— rub or apply the pressed juice to the affected area.[6]
— finely crush 1 fresh rhizome with 1 tbsp of camphor. Wrap up the mixture in clean white cloth to form a compress and steam. Apply hot compress to the affected area.[6]

Related study

— *Z.cassumunar* cream had a genuine property for pain relieving.[7]
— Volatile oil from the rhizome showed anti-inflammatory effect.[8]
— *Z.cassumunar* rhizome decreased the intestinal tension, thus it may be useful as an antispasmodic.[9]
— Aqueous extract from the rhizome showed local anesthetic effect, thus it may be useful as a local anesthetic or for relieving pain due to surgery.[10,11]

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Zingiber officinale Rosc.

ZINGIBERACEAE

English name Ginger

Local name

Brunei	:	
Indonesia	:	Jahe
Malaysia	:	
Philippines	:	Luya
Singapore	:	
Thailand	:	Khing

Description of plant

Herb. Rhizome pale yellow. Leaf narrowly lanceolate, 5-15 cm long and 1-2 cm wide, acuminate at apex, obtuse at base; ligule membranous, slightly bilobed. Inflorescence ovoid; peduncle 10-25 cm long. Bract ovate or elliptic; bracteole about as long as bract but narrower. Calyx small, tubular, 3-toothed. Corolla tube 2-2.5 cm long; lobe yellow. Labellum dull purple, with creamy-yellow blotches. Anther cream; appendage dark purple. Ovary 3-locular.[1-3]

Part used : Rhizome

Characteristic of crude drug

Crude drug occurs as irregularly branched rhizome, laterally compressed, light brown with longitudinal striations; fracture hard, even, resinous, waxy, brown to dark brown with numerous vascular bundles. Odour and taste pungent.[4]

Cultivation

Soil and climate

Ginger is mainly cultivated in the tropics from sea level to an elevation of 1,500 m. Rainfall should not be less than 3,000 mm per annum and the temperature should not be over 35°C. Ginger thrives best on medium loam with a good supply of humus. It is very sensitive to waterlogging.[5]

Propagation and planting

Ginger is always propagated though the rhizome. Before planting, seed rhizome is cut into small pieces, each having at least one good bud. They should be dipped into a solution of ethoxyethyl mercuric chloride and dried, as a protection against Fusarium root rot. Cultivation should be carried out on a raised bed 5-10 cm deep with normal spacing of 15-20 x 20-30 cm. Usually the bed is 1 m wide, 15 cm high and of convenient length varying from 3-6 m. The width of the channel between the beds is about 30 cm.[5]

Harvesting

The rhizomes should be harvested 8-10 months after planting while the leaves begin to turn yellow and the shoots begin to fall down.[5]

Production

Post-harvest handling

Collect the rhizomes, cut off the rootlets and wash thoroughly. The rhizomes are sliced into pieces of 0.3-0.5 cm thick or put in boiling water and allow to boil for 5 min. Dry in the sun.

Utilization

Recommended use in primary health care

INA : Rhizome (fresh or dried)
Antiemetic
— chew as such[6]
Carminative
— decoction[6]

PHIL : Rhizome (fresh or dried)
Antitussive
— decoction[6]
Arthritis
— apply pounded rhizome as poultice.[6]
Antiseptic for superficial wound
— apply tincture topically[6]

THAI : Rhizome (fresh or dried)
Carminative, Antiemetic
— drink a glass of the decoction of 5 g of pounded fresh or

1 g of dried powdered rhizome prepared by slight simmering.[7]

Antitussive

— frequently sip the preparation obtained from rubbing fresh rhizome with lemon juice and a little salt.[7]

Related scientific study

— Very little toxic effect was observed in rabbits treated orally with ginger. When given intravenously, ginger had a stimulating effect upon the central nervous system. In rabbits and dogs, ginger accelerated respiration and caused vagal inhibition. It accelerated pulse rate and caused a rise in blood pressure.[8]

— Ethanol extract of ginger showed carminative action.[9]

— Essential oil components of ginger showed antispasmodic action.[10]

— Shogaol, an aromatic constituent of ginger, had potent antitussive activity.[11]

— Powdered ginger was superior to dimenhydrinate in preventing the gastrointestinal symptoms of motion sickness.[12]

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ANNEX

Description of Symptoms

Anorexia a chronic lack of appetite for food.

Asthma a chronic disorder characterized by wheezing, coughing, difficulty in breathing and a suffocating feeling. It may be due to allergic reaction, vigorous exercise, irritant particles, or psychological stresses.

Colic acute abdominal pain caused by various abnormal conditions in the bowels.

Constipation a condition in which the feces are hard and elimination is infrequent and difficult.

Cough to expel air suddenly and noisily from the lung through the glottis, either to clear the air passages or as a result of involuntary muscular spasm in the throat.

Diarrhea increased of frequency and liquidity of fecal discharges caused by microbial infection, food poisoning, parasites, allergy, or nervous reaction.

Dysentery any of various intestinal inflammations characterized by abdominal pain and intense diarrhea with bloody and mucous feces. Causes include chemical irritants, bacteria, protozoa, or parasitic worms.

Dyspepsia (indigestion) a state of discomfort, usually includes a feeling of fullness, nausea and vomiting, heartburn, accompanying or following the intake of food.

Edema an abnormal accumulation of fluid in the cells, tissues, or cavities of the body, resulting in swelling.

Fever a state of abnormal increase in body temperature, often accompanied by a quickened pulse, delirium, etc. It may be due to infection, inflammtion or physiological stress.

Flatulence the presence of excessive amounts of gases in the stomach or intestine, leading to distention of the organs, rumblings, a feeling of fullness and discomfort. It sometimes caused by fermentation of certain kinds of food in the stomach.

Helminthic infection a disease caused by helminth, a worm parasite of the intestine such as tapeworm, hookworm, or roundworm. Symptoms manifested may vary depending on the types of worm. Those symptoms are, e.g., failure to gain weight, fatigue, loss of appetite, abdominal pain, indigestion, diarrhea, disturbed sleep, and itching around the anus at night.

Haemorrhoids (piles) a painful swelling of a vein in the region of the anus, often with bleeding. Haemorrhoids cause itching and burning sensation.

Hypertension persistently high blood pressure. The cause is not exactly known and may be associated with other primary diseases. Although hypertension is usually without symptoms, severe hypertension may produce headaches, palpitation, and general feelings of ill-health.

Inflammation a condition of the body in response to severe irritation of the skin, tissue injury, or microbial infection. It is characterized by redness, pain, heat, and swelling.

Insomnia inability to sleep or abnormal sleep, usually as a result of a temporary worry or discomfort from a minor illness. Insomnia varies from restlessness or troubled sleep to reduced hours of sleep and sleeplessness.

Nausea an unpleasant sensation occurs in the upper alimentary tract with an impulse to vomit.

Pain a sensation of hurting, or strong discomfort, in some part of the body, caused by an injury, disease of functional disorder.

Pediculosis infestation of the hair of the head by lice, causing itching with abrasion on the scalp.

Pruritus (itching) an irritation of the skin or an unpleasant cutaneous sensation that provokes the desire to rub or scratch the skin to obtain relief. It probably occurs as a result of chemical changes in the skin caused by disease, allergy, inflammation or exposure to irritant substances.

Scabies a contagious skin disease caused by a parasitic mite that burrows under the skin to deposit eggs, causing intense itching and sometimes associated with eczema from scratching and secondary bacterial infection.

Tinea (ringworm) chronic fungal infection of the skin, hair, or nails. Ringworm of

the skin presents as itching, ringed, scaling, and centrally clearing lesions with raised borders.

Vomiting (emesis) the forcible repulsion of the contents of the stomach through the mouth. Common causes of vomiting and nausea are digestive tract infection, pregnancy, motion sickness, and vertigo. It can also occur as a side effect of a medication, or drug or radiation therapy for cancer.

INDEX

Diuretic

Dyspepsia

Expectorant

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Mosquito repellent

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Stomachic

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Tonic

พิมพ์ที่ รพ. องค์การสงเคราะห์ทหารผ่านศึก