



ASEAN Herbal and Medicinal *Plants*

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ASEAN
Herbal and Medicinal
Plants



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FOREWORD

I am pleased to present the first *ASEAN Herbal and Medicinal Plants*. This book marks our first attempt to produce a compilation of herbal and medicinal plants that are popular in the ASEAN region.

This book is the result of hard work and collaborative efforts of the ASEAN Experts Group on Herbal and Medicinal Plants who has been appointed to undertake the task of compiling the information. The Experts Group was formed in 1997 and comprises representatives from the ASEAN Member States. Despite the delay, I would say that the outcome is worthwhile indeed.

The book covers some 90 different medicinal plant species from ASEAN Member States (except Singapore) with information pertaining to their scientific names, vernacular names, plant description, propagation, geographical distribution, chemical constituents, medicinal usage by the ASEAN Member States as well as their illustrative profiles. I am sure that this book would serve as a valuable reference to members of the ASEAN countries who are involved in the research and development of herbal and medicinal plants.

With an abundance of untapped natural resources rich in medicinal plants in the region, the work of the ASEAN Experts Group on Herbal and Medicinal Plants is never-ending. Identifying new plant species, exploring their therapeutic potential, validating new methodologies and establishing new standards for many untouched plant species will pose a challenging task. I urge the Experts Group to continue to carry out more collaborative work on other plant species of interest in the ASEAN region. Our biodiversity is a blessing and a heritage for our posterity. We should learn to benefit from it and conserve it with all our ability.

I would like to congratulate the members of the ASEAN Experts Group on Herbal and Medicinal Plants for their excellent efforts and the Forest Research Institute of Malaysia for their commitment to making this book possible.

Thank you.



Dr. Surin Pitsuwan
Secretary-General of ASEAN

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*Brunei
Darussalam*



- 1.0 Scientific Name** : *Abelmoschus moschatus* Medik.
Family : Malvaceae
- 2.0 Vernacular Names** : Bason-bason, langamit (Brunei Darussalam)

3.0 Plant Description

A semi-woody plant, up to about 2 m tall with few branches. Young stems pubescent. Leaves spirally arranged with stalks, up to 5 cm long; petiole hairy and bears stipules; blades deeply lobed to near palmate, about 6 cm across, pubescent on both surfaces and with toothed margins. Flower, singly from the leaf axil with a pair of stipules at the base; stalk, up to 6 cm long, pubescent; epicalyx with 10 separate sepals; calyx joined with 5 teeth; petals 5, bright yellow-coloured with deep maroon-crimson base; stigma 5-lobed, maroon-coloured and is on top of the staminal column which is made up of numerous stamens closely joined together. Capsule, up to 6 cm long, hairy on the outside, 5-ridged with 5 cells containing many seeds.

- 4.0 Propagation** : Seed
- 5.0 Geographical Distribution/Ecology**

The plant grows well on both clay and loam soils in full sunlight.

6.0 Chemical Constituents

Distillation of the seed yields the volatile oil, farnesal. The seed coat contains palmitin which emits a musky scent and is used in perfumery. No information is available on the contents of the roots.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The roots are boiled and consumed orally as remedy for asthma, breathlessness and general chest discomfort.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agricultural Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



- 1.0 Scientific Name** : *Agathis borneensis* Warb.
Family : Araucariaceae

- 2.0 Vernacular Names** : Tolong, kayu raja, entolong (Brunei Darussalam)

3.0 Plant Description

A big tree, up to 50 m tall and girth, up to as large as 5 m. Crown is normally conical. Bark lenticellate, scaly and grey-brown, inner bark whitish with white resin. Leaves opposite, oblong-elliptic with blunt tips, up to 12 cm x 5 cm, glabrous, leathery and have parallel veins and short petioles. Pollen cones, axillary, sessile, cylindrical and each contains 10–12 pollen sacs on their undersurface. Ovulate cones at stem terminal, erect with many scales, each contains one ovule on the upper axil. Matured cones, ellipsoidal, 10 cm across, seed solitary on the scales in the middle section of the cone, ovoid with 2 unequal lateral wings.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

The plant prefers drained clay soil and requires some shade when young.

6.0 Chemical Constituents

The trunk of this plant produces resin which is used in the manufacture of spirit varnishes in lacquers and linoleum. It is probably this resin that is responsible for the alleged therapeutic property. The chemical contents of the roots are not known.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The outer, rough layer of the bark is peeled and the smoothed branch is used to rub onto the affected area to relieve itchy skin condition. Infusion of the young roots is consumed to treat diabetes and high blood pressure.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agricultural Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam - Revised**. Department of Agriculture, Ministry of Industry and Primary Resources.



- 1.0 Scientific Name** : *Aloe vera* (L.) Burmann
Family : Liliaceae

- 2.0 Vernacular Name** : Lidah buaya (Indonesia, Malaysia)

3.0 Plant Description

A rosette, perennial herb with several short branches forming a dense crown. Leaves narrow-lanceolate, up to 40 cm long, fleshy with toothed margins. Inflorescence an elongated raceme, arises from the stem terminal; flowers tubular, up to 2.6 cm long, drooping and yellow-coloured.

- 4.0 Propagation** : Seedling

5.0 Geographical Distribution/Ecology

Commonly planted as an ornamental plant all over the world.

6.0 Chemical Constituents

Leaf contains barbaloin, which has the properties of an aperient. A polysaccharide obtained from the juice has been used for treating skin wounds, ulcers, insect bites and arthritis. An extract of the leaves is used as a cosmetic base for decreasing wrinkles and smoothing skin.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The juice has antimicrobial properties against *Pseudomonas aeruginosa*, *Proteus vulgaris*, *Esherichin coli*, *Streptococcus faecalis* and *Bacillus subtilis*. It also has an antifungal activity.

7.2 Uses in traditional medicine:

The inner fleshy part of the leaves blended in water is used to make hair healthy and shiny. For burns or sunburn, the mucilage of the leaves is applied directly to the affected skin. The fresh mucilage is also used for poultice wounds and as a skin conditioner.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



1.0 Scientific Name : *Amaranthus spinosus* L.
Family : Amaranthaceae

2.0 Vernacular Name : Bayam berduri (Brunei Darussalam, Malaysia)

3.0 Plant Description

A tender upright herb, up to 80 cm tall, with light green cylindrical stem and several branches. Leaves alternate, ovate, glabrous, size variable, normally to 7 cm x 4 cm with retuse tips; petioles, up to 7 cm long with two 1 cm long sharp thorns at each base. Inflorescence from both leaf-axils and stem terminals, in dense spikes of 8 cm long; bracts greenish; sepals 5 and green; stamens 5. Fruits capsular with round, shiny black seeds.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Tropical region. The plant thrives in the open, on rich, friable sandy loam soil.

6.0 Chemical Constituents

The roots contain potash. The above-ground parts and the roots contain saponin.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The roots contain potash which is the element responsible for their diuretic property. The above-ground parts and the roots contain saponin which is used as an emollient for bruises, inflammations and boils. It also acts as an expectorant for bronchitis and breathing problems.

7.2 Uses in traditional medicine:

It is traditionally used widely in many countries. Decoction of the roots boiled with *Allium cepa* (onion) bulbs and seeds of *Nigella sativa* (fennel flower, black cummin) is used to cure urinary problem of excessive salt in the urine (locally termed “kencing masin”).

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 1992. **Medicinal Plants of Brunei Darussalam**. Part I. Department of Agriculture, Ministry of Industry and Primary Resources.



1.0 Scientific Name : *Andrographis paniculata* Nees
Family : Acanthaceae

2.0 Vernacular Names : Daun pahit (Brunei Darussalam); hempedu bumi, akar cerita (Malaysia)

3.0 Plant Description

A small tender herb, up to 70 cm tall with many branches. Stems squarish and generally light green. Leaves opposite, up to 5 cm x 1.5 cm, simple, elliptic with acuminate tips. Inflorescences axillary and stem terminal in panicles with upright flowers; bracts, up to 2 mm long; sepals 5; up to 4 mm long, with white hairs; corolla tube, up to 6 mm long, white-coloured with 2 lips; lower lip, 2-lobes; upper lip, 3-lobes, white with purple stripes; stamens 2. Pods up to 1.7 cm long, 2-celled, containing 12 seeds.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Tropical and subtropical areas. The plant prefers rich loamy soil with some shade.

6.0 Chemical Constituents

Andrographolide, andrographidine, 5-hydroxy-7,8,3',3'-tetramethoxyflavone, andrographine, apigenin-4,6-dimethyl ether, β -sitosterol, 5-hydroxy-2',3',7,8-tetramethoxyflavone, andrographinin

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The whole plant has an antiinfectious property and can promote phagocytosis. Intensive research in Thailand shows that the plant is effective against sore throat. Toxic test on

mice treated orally with 15 g/kg of the extract (LD 50 of the extract on mice was > 15 g/kg when treated orally, subcutaneously and 14.98 g/kg when administered intraperitoneally) has shown no detrimental effect.

Andrographolide is an interesting pharmacophore with anticancer and immunomodulatory activities.

7.2 Uses in traditional medicine:

A decoction of the leaves is often taken orally to cure diabetes and to reduce high blood pressure. A leaf poultice is applied topically to relieve skin irritation and insect bites.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 1992. **Medicinal Plants of Brunei Darussalam**. Part I. Department of Agriculture, Ministry of Industry and Primary Resources.

Cheung, S. C., *et al.* 1978. **Chinese Medicinal Herbs of Hong Kong**, Vol. 1–5. Hong Kong.

Rajagopal, S. *et al.* 2003. Andrographolide, a potential cancer therapeutic agent isolated from *Andrographis paniculata*. **J. of Exp. Ther. Anco.** 3(3):147–158.



- 1.0 Scientific Name** : *Asplenium nidus* L.
Family : Aspleniaceae

- 2.0 Vernacular Names** : Lukut, selimbar (Brunei Darussalam); paku lansuyar (Malaysia)

3.0 Plant Description

A radical fern with a thick mass of rhizomes and roots. Fronds simple, linear, up to 95 cm x 20 cm; midrib mostly black in colour, supports the lamina at an angle of about 20 degrees. Sori indusiate, brown-coloured, developed along two-third of all veins on the apical half of the lower surface of the frond.

- 4.0 Propagation** : Spores

5.0 Geographical Distribution/Ecology

Growing on trunk of trees in the shade or open of tropical forest.

6.0 Chemical Constituents

The plant contains acetylornithine, N-acetylornithine and L(+)-ornithine.

7.0 Reports on Medicinal Usage

- 7.1 Uses supported by experimental/clinical data:**
 Not available

7.2 Uses in traditional medicine:

A decoction or warm infusion of the frond is used to relieve pain associated with the appearance of blood in the stool. Three sq. cm of the leaf lamina is normally sufficient for each preparation, to be taken once a day. Macerated leaves can also be applied to wounds to stop bleeding.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 1992. **Medicinal Plants of Brunei Darussalam**. Part I. Department of Agriculture, Ministry of Industry and Primary Resources.



1.0 Scientific Name : *Blumea balsamifera* DC.
Family : Asteraceae

2.0 Vernacular Names : Nath luang (Lao PDR); sambung (Philippines, Brunei Darussalam), sembung, capa, telinga kerbau (Malaysia)

3.0 Plant Description

A subshrub perennial herb, up to 3 m tall, with hairy stem. Leaves alternate, lanceolate-oblongate. Margin serrate, base usually rounded to tapering, petiole sessile or short, exstipulate, 22 cm x 6 cm, hairy. Inflorescence branched with many reduced leaves, flower heads, up to 7 mm x 3 mm, bracts narrow and numerous, florets yellow; appus white with some brown tips.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

From India to Southeast Asia

6.0 Chemical Constituents

Essential oil is about 0.1–0.4% camphor and borneol, alcohol, cineol, limonene, phenolphloroacetophenone dimethyl ether and alkaloid

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:
 Not available

7.2 Uses in traditional medicine:

A decoction of the whole plant mixed with other herbs is popularly used in bath after childbirth for general health. The decoction mixed with *allium cepa* (onion) and *Nigella sativa* (fennel flower, black cummin) is consumed for aching joints and coughs. The decoction of the leaves is antiarrhythmic, expectorant, antispasmodic, astringent, antigastralgalic and antihelminthic.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 1992. **Medicinal Plants of Brunei Darussalam**. Part I. Department of Agriculture, Ministry of Industry and Primary Resources.

Burkill I. H. 1966. **A Dictionary of the Economic Products of the Malay Peninsula**. Ministry of Agriculture and Co-operative, Kuala Lumpur, Vol. I & II.



1.0 Scientific Name : *Caesalpinia crista* L.
Family : Leguminosae

2.0 Vernacular Names : Matahiang, padihiang (Brunei Darussalam)

3.0 Description:

A woody vine with long thorny stems. Leaves alternate, bipinnate with sharp thorns on the undersides of the ribs; leaflets elliptic, up to 6 cm x 3 cm and glabrous. Inflorescence in the form of racemes with many strongly scented flowers; sepals 5, brown-coloured; petals 5, yellow with red stripes on the standard; stamens numerous; ovaries superior and hairy. Fruit pods, up to 10 cm x 5 cm, thorny with 2–4 smooth and hard seeds.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

It was introduced from tropical America. A native of Madagascar, it is widely distributed in tropical region.

6.0 Chemical Constituents

Bonducin in seed, bark and leaves, 17% fat

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Kernel of the matured seeds, root or leaves is eaten fresh or pounded, mixed with a little cooking oil and rubbed onto the abdomen to treat spleen and liver diseases manifested by uncontrollable shivering symptom. The seeds are used in cosmetic preparation in India.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



- 1.0 Scientific Name** : *Centratherum intermedium* L.
Family : Asteraceae
- 2.0 Vernacular Name** : Bunga ungu (Brunei Darussalam)

3.0 Plant Description

A much-branched, slightly woody herb, about 60–70 cm tall, with ascending to upright scabrous stems. Leaves spiral; lamina to 6.5 cm x 3.5 cm, broadly elliptic and tapered towards the base of the petiole; margins double-serrated. Inflorescence, at stem terminal; flower head, about 1.5–1.8 cm across and supported at the base by a whorl of smaller leaves; bracts narrow, in 4–6 whorls; florets purple-coloured, up to 1.2 cm long with 5 lobes and pappus of short fine bristles.

- 4.0 Propagation** : Seed
- 5.0 Geographical Distribution/Ecology**

Brunei Darussalam

6.0 Chemical Constituents

No information on its contents has been cited. However, the herb gives off a strong acrid smell when crushed and a slight irritation may be felt when applied.

7.0 Reports on Medicinal Usage

- 7.1 Uses supported by experimental/clinical data:**
 Not available

7.2 Uses in traditional medicine:

The crushed or pounded leaf is gently applied to the skin and over wounds to treat skin allergy, shingles, herpes and skin eczema. The treatment should be carried out twice a day in 2–3 weeks for effectiveness.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



1.0 Scientific Name : *Corchorus capsularis* L.
Family : Tiliaceae

2.0 Vernacular Names : Penawar upas (Brunei Darussalam); kancing baju (Malaysia)

3.0 Plant Description

An annual undershrub, up to 1.7 m tall, with a few slender branches. Stems glabrous, reddish brown and easily peeled. Leaves simple, alternate; petioles, up to 1.2 cm long, with 2 fine, 7 mm long stipules at the node; lamina lanceolate, up to 10.5 cm x 3 cm, with serrate margins and base pair of teeth forming fine bristles. Flowers, 2 from each node with 4 yellow, separated sepals and numerous stamens; ovary superior. Capsules round, flat at the top and split into 5 parts to release the angular seeds.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

It thrives on most soils in direct sunlight.

6.0 Chemical Constituents

Corosin, b-sitosterol, capsularin, glucoside, corchorin, oleic acid, linolic acid, arachidic acid, palmitic acid, stearic acid and strophanthidine, cerotic acid, lignoceric acid, behenic acid, raffinose, corchsularose and glycosides

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:
 Not available

7.2 Uses in traditional medicine:

An infusion of the roots is taken orally to neutralize poison (from upas tree) usually applied to the dart of a blowpipe, as well as agrichemical poisons. Besides orally consumed, it is applied topically onto the wound. A decoction of the leaves is taken orally to reduce hypertension.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



- 1.0 Scientific name** : *Coscinium fenestratum* Colebr.
Family : Menispermaceae
- 2.0 Vernacular Names** : Ambok segubang, perawan, akar penawar (Brunei Darussalam); akar mengkunyit (Malaysia)

3.0 Plant Description

A perennial, moderate twining liana. Roots, 5–7, tuberous and attached closely to the base, each up to 10 cm long and 2 cm in diameter with bright yellow inner bark. Stem, up to 4 m long and 2 mm in diameter, green-coloured. Leaves alternate; petiole, up to 8 cm long, pubescent with swollen base and bent; blade cordate with broadly acuminate tip, up to 10 cm x 11 cm, upper surface glabrous with 5 sunken main veins, underneath hairy along prominent veins. Inflorescence, in tomentose panicle of 8 cm long and 4 cm across; outer sepals short, inner sepals oblong and longer. Fruit, a drupe, to 2 cm in diameter.

- 4.0 Propagation** : Stem cutting

5.0 Geographical Distribution

It thrives on sandy or clay loam under shade.

6.0 Chemical Constituents

Saponins could be present in the roots.

7.0 Reports on Medicinal Usage

- 7.1 Uses supported by experimental/clinical data:**
 Not available

7.2 Uses in traditional medicine:

The root is chewed and swallowed in order to alleviate the effect of food and other chemical poisonings. The root is sliced, soaked in clean water and the infusion consumed as a follow-up antidote. A patient who is unconscious may be force-fed with a strong infusion of the tubers. For blowpipe poisoning, the mashed tuber is immediately applied to the wound directly. The infusion is also traditionally drunk to treat dizziness of the head and dazed sight. This plant is quite well known as an antidote for poisons, but evaluation is required to ascertain this claim.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



1.0 Scientific Name : *Curcuma longa* L.
Family : Zingiberaceae

2.0 Vernacular Names : Kunyit biasa, tamu kunyit (Indonesia, Malaysia)

3.0 Plant description

A clumped herb with ellipsoidal, 6 cm x 2.7 cm primary tubers and many, 4–7 cm long, 1.5 cm thick rhizomes. Rhizome brownish and scaly outside and bright orange inside. Shoots erect, up to 90 cm tall with 6–8 leaves and their sheaths form the pseudostem; leaf-lamina lanceolate, acuminate, up to 28 cm x 7 cm. Inflorescences cylindrical spikes, up to 13 cm x 5 cm; bracts elliptic-lanceolate, up to 5 cm x 2.3 cm, upper bracts white-coloured and lower bracts light green; calyx toothed unequally and divided; corolla tube whitish, divides into 3 petals with dorsal lobe hooded; staminodes 2; labellum obovate with a yellow band long the centre, side lobes white-coloured; ovary inferior.

4.0 Propagation : Rhizome

5.0 Geographical Distribution/Ecology

Commonly cultivated as a spice and usually harvested annually. It grows well on rich moist sandy loam or alluvial soils. Flowers in March, without setting fruit.

6.0 Chemical Constituents

The rhizome contains curcumin which gives the yellow-orange colour, essential oil, fixed oil, bitter principles, resin, protein, cellulose, pentosans, starch and minerals. It also contains cycloisopropenmycren, P-tocylmethyl carbinol, demethoxycurcumin and bisdemethoxycurcumin.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The rhizome is useful as a remedy to relieve uncontrolled and frequent urination, probably due to infection of the urinary system. The skin of a rhizome is peeled and is used to rub, with an upward motion, the lower abdomen. A small portion of the skin can be chewed and swallowed after each rubbing session.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



1.0 Scientific Name : *Donax grandis* Ridley
Family : Marantaceae

2.0 Vernacular Names : Bamban batu, bemban (Brunei Darussalam)

3.0 Plant Description

A sprawling half-herbaceous plant about 2 m tall. Stem, straight between nodes, up to 1.5 cm in diameter at the base, very smooth and green-coloured; branches, leaf-opposed. Leaves alternate, sheath, up to 12 cm long, enclosing the stem; laminar ovate with abruptly acuminate tips, up to 13 cm x 7.5 cm, leathery and glabrous. Panicle leaf-opposed, up to 24 cm long, with 2 flowers on each branch which also bears a 4 cm long bract. Flower white, epicalyx 3–5 mm long and translucent, sepals 3–2.5 cm x 5 mm, corolla-tube to 2.5 cm long, 3-lobed with 2 narrow lobes and one broad lobe, style hooked and partly covered by the corolla-tube, ovary inferior. Fruit, bowl-shaped outline and bearing 3 seeds.

4.0 Propagation : Rhizome

5.0 Geographical Distribution/Ecology

The plant thrives on clay loam and soon forms a thick colony.

6.0 Chemical Constituents

Saponins have been detected in the rhizomes of the plants in Brunei Darussalam. The same phytochemicals have been found in plants in Malaysia. The juice of the stem has been regarded as an antidote for snake bites and blood poisoning in Malaysia.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Decoction of the rhizomes is consumed to treat diabetes and high blood pressure. The white flowers are picked fresh and eaten by children.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agricultural Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.

Goh, S.H. *et al.*, 1990. **Phytochemical Guide to Malaysia Flora**. IPT. University of Malaya, Malaysia.



- 1.0 **Scientific Name** : *Etlingera solaris* (Bl.) R. M. Sm.
Synonym : *Phaomeria solavis* (Bl.) K. Schura
Family : Zingiberaceae

- 2.0 **Vernacular Name** : Tepus kantan

3.0 Plant Description

A rhizomatous, clumped plant growing up to 5–6 m tall. Pseudostem swollen at the base, consists of layers of leaf-sheaths. Leaves, in 2 rows, alternate; petiole up to 5 mm long; lamina, linear, glabrous, up to 50 cm long and broad with narrow acuminate tip and rounded base. Inflorescence in upright, torch-shape spike; stalk, up to 20 cm long with overlapping green-coloured scales; bracts many and overlapping, pinkish-red, waxy, outside oblong and larger (8 cm x 3 cm), smaller and narrower toward the centre; epicalyx tubular with 2 lobes, thin and papery; calyx tubular, up to 3 cm long with 2 sepals and red-tipped; corolla tube, up to 2 cm long with 3, 2 cm long petals, labellum anther 2-lobed, thin and papery; calyx tubular, up to 3 cm long with 2 sepals and spatheaceous, red-coloured and folds the stamen and the pistil; anther 2-lobed; ovary inferior. Fruits, tightly packed in a sphere 7–8 cm across, Irregularly-shaped with flattened top and a persistent flower remains; seeds many, black and embedded in mucilage. It flowers regularly.

- 4.0 **Propagation** : Normally propagated from rhizome-cuttings. The seed can also be germinated.

5.0 Geographical Distribution/Ecology

The terrestrial plant is occasionally grown in gardens. It thrives on clay loam in the open lowland and quickly establishes into a big clump. Widely planted in house gardens in Southeast Asia.

6.0 Chemical Constituents

Not available

7.0 Reports on Medicinal Uses

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The young inflorescence and sometimes the fruits are used as food flavourings. With the introduction of the plant, its traditional medicinal uses are also adopted. The juice of the young fruits is dropped into the ears to treat certain ear-aches. Decoction of the rhizome is used as an antiseptic for external wounds. The flowers are sometimes included in the herbal bath for a mother after childbirth.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



- 1.0 Scientific Name** : *Languas galanga* stuntz
Synonym : *Alpinia galanga* (L.)Willd.
Family : Zingiberaceae
- 2.0 Vernacular Names** : Languas, lengkuas (Brunei Darussalam, Indonesia Malaysia); galangal (English)

3.0 Plant Description

A perennial herb with pseudostem, up to 2.2 m high, and thick underground rhizomes. Leaves alternately arranged in two rows, oblong-elliptic, up to 45 cm x 12 cm with short petioles; margins ciliated with a thin light green marking all around; stipule brownish green marking all around; stipule brownish green with patches of vicious hairs. Inflorescences in terminal panicles, corolla tube, up to 10 cm long and divides into 3 petals, each 1.9 cm x 1.6 cm; lip, up to 2 cm, with 2 deep limbs, white with red streaks. Fruits round, up to 1.4 cm and orange-red when ripe.

- 4.0 Propagation** : Rhizome

5.0 Geographical Distribution/Ecology

Commonly planted in open areas in backyards. Widely distributed in all over Southeast Asian region.

6.0 Chemical constituents

Rhizome contains galangol which on distillation yields cineol, the latter responsible for the medicinal properties. Pinene and eugenol are also present. The amount of oil in the fresh rhizome was quoted at 0.04%. The decoction is warm and hot-tasting.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

A decoction of the rhizomes and base of pseudostem is taken to cure stomach-ache, vomiting, diarrhea and indigestion. It is a common spice used in many local dishes. Some local herbalists regard the pseudostem as a useful aphrodisiac.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



- 1.0 Scientific Name** : *Macaranga gigantea* (Rchb. f. & Zoll.) M.A.
Family : Euphorbiaceae
- 2.0 Vernacular Names** : Mangkubong sedaman, merakubong, telinga gajah (Brunei Darussalam); mahang (Malaysia)

3.0 Plant Description

A small to medium-sized tree, up to about 9 m tall, usually with straight trunk and dome-shaped crown. Bark smooth and grey. Wood soft and white. Leaves spiral and peltate; stipules papery and persistent; blade shallowly 3-lobed and without yellow granular gland, large to about 40 cm across. Inflorescences axillary or behind the leaves; a raceme of clustered flowers; bracts minute apetalous with no disc; flowers dioecious, male flowers with sepals not overlapping, stamens free, anthers celled with no spittle; female flowers with ovary chambered, styles unbranched. Fruit, a leathery capsule with rough skin which splits into 2 parts when mature to release many black seeds.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

Brunei Darussalam, Malaysia and Indonesia. Often found growing by roadside clearings, secondary forests and on wastelands.

6.0 Chemical Constituents

The root-bark contains tannin; kino glue comes from the sap and alkaloids from the fruit; the leaves and stem contain terpenoids.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The roots of a young tree are boiled and the resultant decoction is consumed to relieve diarrhea. The stem is cut and the fresh latex is carefully applied to sores on lips or mouth cavity.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas 1992. **Medicinal Plants of Brunei Darussalam. Part II.** Department of Agriculture, Ministry of Industry and Primary Resources.

Burkill, I. H., 1996. **A Dictionary of the Economic Products of the Malay Peninsula.** Ministry of Agriculture and Co-operative, Kuala Lumpur, Vol. I & II.



- 1.0 Scientific Name** : *Melastoma malabathricum* L.
Family : Melastomataceae
- 2.0 Vernacular Names** : Kuduk-kuduk (Brunei Darussalam); Senduduk (Malaysia)
- 3.0 Plant Description**

A rhizomatous perennial herb with pseudostems, up to 80 cm tall. Leaves 16–18, narrowly elliptic, up to 25 cm x 5.5 cm and glabrous. Inflorescences, a cylindrical spike from the rhizome, up to 16 cm long on an equal length of stalk; bracts overlapping, lower light green, upper red; flowers singly from bract-axil; calyx tubular, up to 2.5 long, spathaceous, 3-toothed, faint-yellow and translucent; corolla tube, up to 3 cm long, 3-lobed dorsal lobe, up to 2 cm x 0.8 cm and curved over the anther; labellum dull purplish-yellow with yellow spots, and connected to the side lobes at half length; anther, up to 1 cm long with a narrow beak-like appendage protruding 1 cm above and containing the style; ovary inferior.

- 4.0 Propagation** : Stem cutting and seed
- 5.0 Geographical Distribution/Ecology**

Commonly found growing on wasteland, along roadsides and in orchards. It thrives on most soils in direct sunlight, flowers and fruits readily and can be propagated from stem cuttings. This plant is widely distributed.

6.0 Chemical Constituents

Not available

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The decoction of the twig mixed with 7–10 herbs is used in herbal baths after childbirth to revitalize the body system. The fresh petals are used to rub on dried wounds in order to accelerate healing and to reduce permanent scarring.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



1.0 Scientific Name : *Orthosiphon aristatus* (Blume) Miquel
Family : Lamiaceae

2.0 Vernacular Names : Janggut kucing, misai kucing (Brunei Darussalam)

3.0 Plant Description

A tender herb, up to about 1 m tall with squarish ascending stems. Leaves opposite, broadly elliptic, crenate, up to 7 cm x 3.5 cm with both surfaces pubescent, petioles, up to 2 cm long. Inflorescence in terminal raceme, up to 10 cm long, sepals 5, corolla white-coloured, 2-lips, upper-lip with 4 limbs, lower-lip narrow, stamens 4 with styles protruding 6 cm long resembling cat's whiskers.

4.0 Geographical Distribution/Ecology

The plant thrives well in moist, sandy loam soil with some shade.

5.0 Propagation : Stem

6.0 Chemical Constituents

The herb is sweet and mildly bitter. No information on the constituents of this plant has been found.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

A decoction of the leaves mixed with *Nagella sativa* (fennel flower, black cummin) and *Allium cepa* (onion) is taken orally after meals to control diabetes. For children, honey may be added to the decoction.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agricultural Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



1.0 Scientific Name : *Portulaca oleracea* L.
Family : Portulacaceae

2.0 Vernacular Name : Lingiruh (Brunei)

3.0 Physical description

An annual and often with fleshy purplish red stems, old stems decumbent, up to 7 mm thick and 50 cm long. Leaves opposite or in whorls, lamina near spatulate, to 2 cm x 1.2 cm and glabrous. Inflorescence at stem terminal, in tight bunch of several flowers; bracts 4 and very thin; sepals 2 and green; petals 5, up to 4 mm long and yellow; ovary half-superior. Fruits capsular and containing many black, 1 mm thick seeds.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Commonly found growing on moist fertile soils as weeds in vegetable gardens and along sides of drains.

6.0 Chemical Constituents

The whole herb contains cyanophoric constituent, fats, vitamins, alkaloid, antraquinone, glycosides, cardiac glycosides, coumarins and flavones and norepinephrine. The leaf has essential oil.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:
 Not available

7.2 Uses in traditional medicine:

The whole herb is boiled and eaten to relieve high blood pressure. It is often consumed as a vegetable.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agricultural Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



1.0 Scientific Name : *Zingiber aromaticum* Valetton
Family : Zingiberaceae

2.0 Vernacular Name : Lempuyang (Brunei)

3.0 Plant Description

A shrub, up to 2 m tall with squarish and often reddish stems; young bark rough with small bristly scales; old bark dark brown-coloured with netlike markings. Leaves opposite, narrowly elliptic, up to 9 cm x 2 cm, surface scurfy with 3 distinct ribs and 2 less prominent outer ribs. Flowers at stem terminals on short stalks; bracts 3, red with a green tinge, up to 1.5 cm x 1.0 cm; calyx reddish green, hairy with 5 sepals; petals 5, maroon-coloured, up to 2.5 cm x 1.5 cm; stamens 10; style protruding and pink-coloured. Fruits with numerous small seeds embedded in purplish pulp.

4.0 Propagation : Rhizome

5.0 Geographical Distribution/Ecology

Often grown in gardens and house compounds. It thrives on sandy loam and alluvial soils in full sunlight and flowers in September. Widely planted in house gardens in Southeast Asia.

6.0 Chemical Constituents

Other related species contain camphene, zingiberene, essential oils and many volatile oils in their rhizomes. It is likely that *Z. aromaticum* has similar constituents.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The rhizomes are boiled and the resultant decoction is used as a herbal bath after childbirth. The leaves are warmed over a fire and wrapped around the joints of the limbs to relieve pain due to arthritis.

8.0 Contraindications

Not available

9.0 Bibliography

Brunei Darussalam Agriculture Research Centre, Kilanas. 2000. **Medicinal Plants of Brunei Darussalam**. Revised edition. Department of Agriculture, Ministry of Industry and Primary Resources.



Cambodia



- 1.0 Scientific Name** : *Aegle marmelos* (L.) Correa ex. Roxb.
Family : Rutaceae

- 2.0 Vernacular Names** : Phnov, golden apple, bael fruit tree, bengal quince, bel

3.0 Plant Description

Tree, 10–15 m high. The leaves are trifoliate and alternate. The leaflets are elliptic or lanceolate-ovate, 2–7 cm wide and 4–13 cm long with inflorescence in terminal or axillary raceme. The aromatic flowers are greenish white on the inner side and green on the outer side. The orange-coloured fruits are fleshy and globose or ellipsoid with a hard pericarp. The flesh is reddish, with numerous seeds covered in a gummy layer. The taste is mucilaginous and slightly acidic.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

The plant grows wild throughout the forests and domestically around Buddhist monasteries for its fruits in Cambodia.

6.0 Chemical Constituent

Coumarins, including xanthoxol and alloimperatorin methyl ether, flavonoids, rutin and marmesin. The alkaloids include á-fargarine(=alocryptopine), *O*-isopentenylhalfordinol, *O*-methylhalfordinol and essential oils.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Recent investigations have shown that the coumarins present may have potential antiulcer properties.

7.2 Uses in traditional medicine:

Parts used are bark, rood, leaves, dried, unripe and ripe fruit.

Medicinal properties include stomachic, digestive and astringent activity. Infusion of the dried unripe fruit is reputedly used as an antidiarrhoeal, antidyseric, antifungal and antimicrobial. The ripe fruits possess laxative properties and promote digestion. Juice from the crushed leave is reported to relieve bronchitis. The common preparation is a liquid extract, with a dose of 4–8 ml. Infusion of the dried leaves also reputedly possesses hypoglycaemic properties. Recent investigations have shown that the coumarins present may have potential antiulcer properties.

8.0 Contraindications

Not available

9.0 Bibliography

Banerji, N., Maiti, M., Sem, S. & Datta, P.C. 1982. Pharmacognosy of *Aegle marmelos* (L.) Correa seed. A new protein source. **Acta. Pharm. Hung.** 52(3): Pp. 97–101.

Goel, R.K., Maiti, R.N., Manickam, M. & Ray, A.B. 1997. Anti-ulcer activity of naturally occurring pyrano-coumarin and isocoumarins and their effect on prostanoid synthesis using human colonic mucosa (*Aegle marmelos*). **Indian J. Exp. Biol.** 35(10): Pp. 1080–1083.

Karunanayake, E.H., Welihinda, J., Sirimanne, S.R. & Sinnadorai, G. 1984. Oral hypoglycaemic activity of some medicinal plants of Sri Lanka (*Aegle marmelos*). **J. Ethnopharmacol.** 11(2): Pp. 223–231.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp. 19–20.



1.0 Scientific Name : *Aquilaria crassna* Pierre ex. Lecomte
Family : Thymelaeaceae

2.0 Vernacular Names : Daem chan kroessna, agar wood (English)

3.0 Plant Description

Tree, 30–40 m tall. Leaves are alternate and the flowers are scented. Burnt wood also gives off a characteristic fragrance.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Mostly found in Viet Nam, Lao PDR and Cambodia in primary and secondary forest.

6.0 Chemical Constituents

Volatile oil, baimuxinol and baimuxinic acid

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

In traditional Cambodian medicine, the wood is mixed with other drugs and used against malaria. Another variety called *A. sinensis* is used in medicine for its active principles baimuxol and dehydrobaimuxinol.

8.0 Contraindications

Not available

9.0 Bibliography

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. 63 pp.

Okugawa, H., Ueda, R., Matsumoto, K., Kawanishi, K. & Kato, A. 1993. Effects of agar wood (*Aquilaria crassna*) extracts on the central nervous system. **Planta Med.** 59(1):Pp. 32–36.

Yang, J.S. & Chen, Y.W. 1986. [Studies on the chemical constituents of *Aquilaria sinensis* (Lour.) Gilg. II. Isolation and structure of baimuxol and dehydrobaimuxinol]. **Yao Xue Xue Bao** 21(7): Pp. 516–620.

Yang, J.S. & Chen, Y.W. 1983. [Studies on the constituents of *Aquilaria sinensis* (Lour.) Gilg. I. Isolation and structure elucidation of two new sesquiterpenes, baimuxinal]. **Yao Xue Xue Bao** 18(3): Pp. 191–198.

Yang, J.S., Wang, Y.L. & Su, Y.L. 1990. [Studies on the chemical constituents of *Aquilaria sinensis* (Lour.) Gilg. V. Isolation and characterisation of three 2-(2-phenylethyl) chromone derivatives]. **Yao Xue Xue Bao** 25(3): Pp. 186–190.

Yang, J.S., Wang, Y.L. & Su, Y.L. 1989. [Studies on the chemical constituents of *Aquilaria sinensis* (Lour.) Gilg. IV. Isolation and characterisation of 2-(2-enylethyl) chromone derivatives]. **Yao Xue Xue Bao** 24(9): Pp. 678–683.



1.0 Scientific Name : *Caesalpinia sappan* L.
Family : Leguminosae

2.0 Vernacular Names : Sbaeng, sappan wood

3.0 Plant Description

A small tree, 7–10 m tall, trunk and branchlets spiny. Leaves are bipinnate compound. Flowers are yellow, young flowering branchlets densely covered with ferruginous pubescence. The fruits are flat, oblong and woody pods, each with a pointed tip.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

This species is naturally distributed in tropical Asia. In Cambodia, it is sparsely found at forest edges, or in secondary forests and around villages. Also grown in many mountainous provinces in the northern part of Lao PDR, especially in Luangprabang, at the altitude of at least 800 ft.

6.0 Chemical Constituents

Brasillin, brasilenin hydrocyanic acid, ocimene, saponin, shikimic acid, tannin

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The heartwood is used to treat haemostasis, bruises and diarrhea. It is generally given to women after labour. A decoction of the wood is used in many Asian countries to treat problems related to blood, because of its red colour.

8.0 Contraindications

Not available

9.0 Bibliography

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh, Cambodia. Pp. 218–219.

National Center of Traditional Medicine. 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.



1.0 Scientific Name : *Cananga latifolia* (Finet & Gapnep.)
Family : Annonaceae

2.0 Vernacular Name : Chhke sreng

3.0 Plant Description

A branchy shrub, 8–15 m tall. The bark is grey with white inner portion. The leaves are ovate, denticulate and alternate. The fragrant flowers are sometimes used to make necklaces. Short-lasting wood, used for temporary structures.

4.0 Propagation : Plant cutting and seed

5.0 Geographical Distribution/Ecology

It is native to Cambodia and grows near clear and semi-dense forests.

6.0 Chemical Constituents

Polyphenol glycosides

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Amoebicidal activity has been investigated from extracts of this plant.

7.2 Uses in traditional medicine:

Infusion of the wood is considered a febrifuge. The bark forms one of the components of a remedy against dizziness. The scrapings from the wood are reputedly smoked to treat

allergic rhinitis. *Cananga latifolia* is one the three main herbs that are used in combination with *Zeylamica* for the treatment of tuberculosis. Amoebicidal activity has been investigated from extracts of *C. latifolia*.

8.0 Contraindications

Not available

9.0 Bibliography

Chu, D.M., Miles, H., Toney, D., Nguyen, C. & Marciano Cabral, F. 1998. Amoebicidal activity of plant extracts from Southeast Asia on *Acanthamoeba* spp. (*Cananga latifolia*). **Parasitol. Res.** 84(9): Pp. 746–752.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp.117–118.

Wood, S.H., Reynolds, M.C., Sun, N.J., Cassady, J.M. & Snapka, R.M. 1997. Inhibition of topoisomerase II by liriodenine (*Cananga latifolia*). **Biochem. Pharmacol.** 54 (4): Pp. 467–473.



1.0 Scientific Name : *Capparis micracantha* DC.
Family : Capparaceae

2.0 Vernacular Name : Kanchee baaydaac

3.0 Plant Description

2–3 m tall bush with thorny ends. The green leaves are lanceolate with an acute apex, 10–20 cm long and 5–7 cm wide. The berries are oval and 2–3 cm wide with numerous seeds. The berries are edible.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

This species grows in the open forests of Cambodia.

6.0 Chemical Constituents

Alkaloids and β -carotene

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Roasted seeds are infused and taken against coughs. Infusion of the roots is used as a diuretic. Leaf mixed with other medicinal plant leaves is used for body steam-bath. Young stem or branch is used to cure polyps of the nose caused by smoking or drinking.

8.0 Contraindications

Not available

9.0 Bibliography

Chaturvedi, Y. & Nagar, R. 2001. Levels of β -carotene and effects of processing of selected fruits (*Capparis micracantha*) and vegetables of the arid zone of India. **Plant Food. Hum. Nutr.** 56(2): Pp. 127–132.

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh, Cambodia. 286 pp.

Guan,R.J., Zheng, J.M., Hu, Z. & Wang, D.C. 2000. Crystallization and preliminary X-ray analysis of the thermostable sweet protein mabinlin II (*Capparis micracantha*). **Acta. Cryst. D. Biol. Crystall.** 56(Pt.7): Pp. 918–919.

Jankowski, W.J. & Chojnacki, T. 1991. Long chain polyisoprenoid alcohols in leaves of *Capparis species*. **Acta. Biochim. Pol.** 38(2): Pp. 265–276.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. 124 pp.

National Center of Traditional Medicine. 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.



- 1.0 Scientific Name** : *Cassia alata* L.
Family : Caesalpiniaceae
- 2.0 Vernacular Names** : Danghet, ringworm cassia

3.0 Plant Description

A small shrub, about 1–2 m tall. The leaves are simple pinnate alternate with leaflets oblong or obovate. The flowers are orange. Fruits are black pods with two broad wings.

- 4.0 Propagation** : Plant cutting and seed

5.0 Geographical Distribution/Ecology

Originating in tropical American, it is now widespread in Southeast Asian countries and cultivated near houses for ornamental and for utilitarian purposes in Cambodia. In Lao PDR, it can be found in all parts of the country, with an increasing frequency southwards, especially in Champasack province.

6.0 Chemical Constituents

Anthraquinone, chrysarobini, cinnamaldehyde, decanal, hydrocyanic acid, ricinoleic acid, saponin

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

In traditional Cambodian medicine, the crushed leaves are mixed with quicklime and water to treat sores and eczemas. The plant is toxic, commonly used to treat ringworm.

8.0 Contraindications

Not available

9.0 Bibliography

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh, Cambodia. Pp. 137–138.

National Center of Traditional Medicine. 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.



1.0 Scientific Name : *Combretum quadrangulare* Kurz
Family : Combretaceae

2.0 Vernacular Name : Sanke

3.0 Plant Description

Tree, 2–10 m tall. The branchlets are acutely quadrangular or very narrowly quadrialate. The leaves are simple, opposite, obovate, 3–8 cm wide and 6–15 cm long. The flowers are small, yellowish to white. The fruits are thinly quadrialate with brownish-red seeds. The leaves, dried and well spread under mattress or mat, are used as cigarette paper. The plant may host lacquer insects, which produces lacquer-gum, a natural dye for silk.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

The plant grows in deforested regions, and is common along riversides and banks of paddy fields throughout Cambodia.

6.0 Chemical Constituents

Triterpenes, tannin, combretol, daucosterol

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Recent studies have investigated possible hepatoprotective properties from the triterpenes present.

7.2 Uses in traditional medicine:

In traditional Cambodian medicine, the fruits are used to remove ascaris. The bark is part of an ointment used to bandage ulcerations. Veterinarians reputedly use it as tonic for oxen and horses. The seeds are reputedly used as an anthelmintic for roundworms and threadworms in children. The leaves are used to relieve muscular pains. Recent studies have investigated possible hepatoprotective properties from the triterpenes present.

8.0 Contraindications

Not available

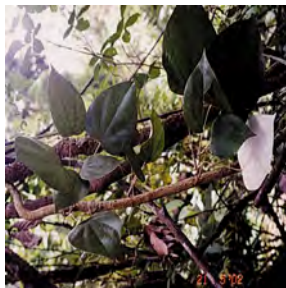
9.0 Bibliography

Adnyana, I.K., Tezuka, Y., Banskota, A.H., Tran, K.Q. & Kadota, S. 2001. Three new triterpenes from the seeds of *Combretum quadrangulare* and their hepatoprotective activity. **J. Nat. Prod.** 64(3): Pp. 360–363.

Banskota, A.H., Tezuka, Y., Tran, K.Q., Tanaka, K., Saiki, I. & Kadota, S. 2000. Methyl quadrangularates A- D and related triterpenes from *Combretum quadrangulare*. **Chem. Pharm. Bull. (Tokyo)** 48(4): Pp.496–504.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp. 175–176.

McGaw, L.J., Rabe, T., Sparg, S.G., Jager, A.K., Eloff, J.N. & van Staden, J. 2001. An investigation on the biological activity of *Combretum species*. **J. Ethnopharmacol.** 75(1): Pp.45–50.



1.0 Scientific Name : *Coscinium usitatum* Pierre
Family : Menispermaceae

2.0 Vernacular Names : Voa romiet thom; yellow vine (English)

3.0 Plant Description

Large climbing liana, often climbing on rocks or large trees up to 40 m high. The leaves are green, alternate and hairy underneath. The flowers are bright red and found in clusters. Incision of the trunk of the tree is bright yellow with a very bitter taste.

4.0 Propagation : Plant cutting and seed

5.0 Geographical Distribution/Ecology

Native to Cambodia, it is distributed thoroughly Pursat, Siem Reap, Kampot and Koh Kong provinces.

6.0 Chemical Constituents

Alkaloids, mainly berberine

7.0 Report on Medicinal Usage:

7.1 Uses supported by experimental/clinical data:

This plant reportedly contains analgesic and antipyretic properties. The antiinflammatory effect of berberine was confirmed through subcutaneous injection. Results showed a dose-dependant relationship against inflammation. *Coscinium usitanum* is also reputedly used as an antihypertensive agent in a dose-dependant manner. In Cambodia, the commercial extraction of berberine from *C. usitanum* is well documented, making the species rare.

7.2 Uses in traditional medicine:

All parts can be used. The plant is used to stop dysentery by drinking the decoction obtained by boiling with water.

8.0 Contraindications

Not available

9.0 Bibliography

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp. 180–181.

Singh, G.B., Singh, S., Bani, S. & Malhotra, S. 1990. Hypotensive action of *Coscinium fenestratum* stem extracts. **J. Ethnopharmacol.** 30(2): Pp. 151–155.



- 1.0 Scientific Name** : *Curcuma zedoaria* Rosc.
Family : Zingiberaceae
- 2.0 Vernacular Names** : Bratiel preah anjool, kranchura, kachura, shati, sati; round zedoary (English)

3.0 Plant Description

Herb, 1–2 m tall, with long sheathing leaves at the bottom, 30–60 cm long and 7–8 cm wide, red spotted along the median vein. The flowers are red or yellowish white, generally appearing before the leaves. The rhizomes are larger than *C. longa* and are yellow.

- 4.0 Propagation** : Plant cutting and seed

5.0 Geographical Distribution/Ecology

The plant is cultivated in Cambodia as a decorative plant.

6.0 Chemical Constituents

Essential oils with cineol, borneol, d-camphor, camphene and d- α -pinene as the main constituents. A bitter soft resin, organic acids, gum, starch, sugar, curcumin arabins, albuminoids, crude fiber, curcumenone, curcumol, curdione and sesquiterpens are also present.

7.0 Report on Medicinal Usage

- 7.1 Uses supported by experimental/clinical data:**
 Rhizome and leaves

7.2 Uses in traditional medicine:

The roots are useful for flatulence and dyspepsia. In cases of cold and fevers, treatment is given in a decoction together with long pepper, cinnamon, liquorice and honey or sugar candy to relieve coughs and bronchitis. The pounded root is combined with alum and is applied to bruises. Fresh roots dispel leucorrhoeal and gonorrhoeal discharges. The dry root powdered and mixed with the powdered wood of *Caesalpinia sappan* makes the red powder called abir, which is mixed with water. For worms, the juice from the tubers is given to children. *Curcuma zedoaria* is used similarly as ginger to relieve indigestion, nausea and bloating and generally improves digestion. Studies have shown anticancer, antifungal and antiinflammatory activities in plant extracts. Dried grind bulb is used to increase human power and cure illness. It is boiled as tea or soaked in white wine before drinking or mixed with honey to make into tablets for swallowing.

8.0 Contraindications

Not available

9.0 Bibliography

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh, Cambodia. 286 pp.

Gupta, S.K., Banerjee, A.B. & Achari, B. 1976. Isolation of ethyl p-methoxycinnamate, the major antifungal principle of *Curcuma zedoaria*. **Lloydia**. 39(4): Pp. 218–222.

Jang, M.K., Sohn, D.H. & Ryu, J.H. 2001. A curcuminoid and sesquiterpenes as inhibitors of macrophage TNF- α release from *Curcuma zedoaria*. **Planta. Med.** 67(6): Pp. 550–552.

Kham, L. 2004. **Medicinal Plants of Cambodi**. Select Books Pte. Ltd., Australia. Pp. 195–196.

Kim, K.I., Kim, J.W., Hong, B.S., Shin, D.H., Cho, H.Y., Kim, H.K. & Yang, H.C. 2000. Antitumor, genotoxicity and anticlastogenic activities of polysaccharide from *Curcuma zedoaria*. **Mol. Cells**. 10(4): Pp. 392–398.

Latif, M.A., Morris, T.R., Miah, A.H., Hewitt, D. & Ford, J.E. 1979. Toxicity of shoti (Indian arrowroot: *Curcuma zedoaria*) for rats and chicks. **Br. J. Nutr.** 41(4):Pp.57–63.

National Center of Traditional Medicine, 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.

Syu, W.J., Shen, C.C., Don, M.J., Ou, J.C., Lee, G.H. & Sun, C.M. 1998. Cytotoxicity of curcuminoids and some novel compounds from *Curcuma zedoaria*. **J. Nat. Prod.** 61(12): Pp. 1531–1534.

Yoshioka, T., Fujii, E., Endo, M., Wada, K., Tokunaga, Y., Shiba, N., Hohsho, H., Shibuya, H. & Muraki, T. 1998. Anti-inflammatory potency of dehydrocurdione, a zedoary-derived sesquiterpene (*Curcuma zedoaria*). **Inflamm. Res.** 47(12): Pp. 476–481.



1.0 Scientific Name : *Dracaena cambodiana* Pierre ex Gagnep.
Family : Dracaenaceae

2.0 Vernacular Name : ឈ្លើរ ធាក់

3.0 Plant Description

Shrub, 2–3 m tall. The leaves are slender spikes radiating from a central axis with an aerial inflorescence. The fruits are red and round with one seed. It is cultivated mainly indoors for its leaves grouped in bundles; the staples of the mature leaves are used to weave hammocks.

4.0 Propagation : Plant cutting and seed

5.0 Geographical Distribution/Ecology

Found in dense forests, especially in the mountain regions of Cambodia, mainly on Bokor mountain, especially on the calciferous rocks in Kampot province.

6.0 Chemical Constituents

1,2,4,5-tetrachloro-3,6-dimethoxy-benzene, docosyl alcohol, octadecyl acetate, eicosyl acetate, resveratrol, 4-7-dihydroxy-flavone and saponins

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Stalks

7.2 Uses in traditional medicine:

In traditional Cambodian medicine, the stalks are cut, macerated in alcohol and used as blood purifier for arthritic and joint pains. The recommended dosage is an infusion of 8–12 grams of the bark taken up three times daily.

8.0 Contraindications

Not available

9.0 Bibliography

Bruck, M. 1999. [Dragon's blood (*Dracaena species*). A glance into the history of phamacognosy]. **Bull. Soc. Sci. Med. Grand Duche. Luxemb.** 1: Pp. 96–101.

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh, Cambodia. 286 pp.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. 227 pp.

Miller, L.R. & Murashige, T. 1976. Tissue culture propagation of tropical foliage plants (*Dracaena cambodiana*). **In vitro** 12(12): Pp. 797–813.

National Center of Traditional Medicine. 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.

Nong, X. 1997. [Hemostatic effect of *Dracaena cochinchinensis* (Lour.) S.C. Chen]. **Zhongguo Zhong Yao Za Zhi** 22(4): Pp. 240–243, 256.

Okunji, C.O., Iwu, M.M., Jackson, J.E. & Tally, J.D. 1996. Biological activity of saponins from two *Dracaena species*. **Adv. Exp. Med. Biol.** 404: Pp.415–428.

Tang, R., Wen, D., Wei, H. & Bi, N. 1995. [Constituents of the petroleum ether and ethyl acetate extract fractions from *Dracaena cochinchinensis* (Lour.) S.C. Chen]. **Zhongguo Zhong Yao Za Zhi** 20(7): Pp. 421–423, 448.

Wei, H., Wen, D., Liu, X. & Tang, R. 1998. [Constituents in petroleum ether and ethyl acetate extract fractions of *Dracaena cochinchinensis* (Lour.) S.C. Chen.]. **Zhongguo Zhong Yao Za Zhi** 23(10): Pp. 616–618, 640.



1.0 Scientific Name : *Eurycoma longifolia* Jack
Family : Simaroubaceae

2.0 Vernacular Name : Antung sa; eurycoma (English)

3.0 Plant Description

A shrub, 2–5 meters tall unbranched, leaves up to 100 cm long, leaflets lanceolate to obovate-lanceolate 5–20 cm X 1.5–6 cm, flower bisexual or unisexual, fruits 10–17 mm X 5–12 mm.

4.0 Propagation : Plant cutting and seed

5.0 Geographical Distribution/Ecology

This shrub is common in understorey primary and secondary forests on a wide range of soils and locally abundant throughout tropical Southeast Asia.

6.0 Chemical Constituent

Eurycomanol, quassianoids, cytotoxic

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Bark, fruit, seed, root

7.2 Uses in traditional medicine:

In Cambodian traditional medicine, the barks are used to treat digestive troubles, the fruits are antidiarrheal, and the roots are used as antidote against drunkenness. The roots are used to increase human power taken by boiling or soaking in white wine before drinking.

8.0 Contraindications

Not available

9.0 Bibliography

Dy Phon Pauline. 2000. **Plants used in Cambodia**. Phnom Penh, Cambodia. 286 pp.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. 422 pp.

Locher, C.P., Burch, M.T., Mower, H.F., Berestecky, J., Davis, H., Van Poel, B., Lasure, A., Vanden Berghe, D.A. & Vlietinck, A.J. 1995. Anti-microbial activity and anti-complement activity of extracts obtained from selected Hawaiian medicinal plants (*Psychotria reversii*). **J. Ethnopharmacol.** 49(1): Pp. 23–32.

National Center of Traditional Medicine. 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.



1.0 Scientific Name : *Hopea odorata* Roxb.
Family : Dipterocarpaceae

2.0 Vernacular Name : Kokii

3.0 Plant Description

Tree, 20–35 m tall with small ovate leaves. The durable wood is much in demand for the construction of ships and houses. It is used especially to make Cambodian pirogues.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Grows in dense forests and is often cultivated along the avenues in some major provinces in Cambodia. It is occasionally found around Buddhist monasteries, due to its large shading properties.

6.0 Chemical Constituents

Tannins and resins

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The bark, rich in tannins, is used to treat diarrhea. It may also replace areca nut in betel liquid. It forms part of a remedy in the treatment of inflamed gums and incontinence. In powdered form, it is a popular styptic. Bark is used for curing dysentery or held in the mouth to cure toothache.

8.0 Contraindications

Not available

9.0 Bibliography

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh. 286 pp.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp. 291–292.



1.0 Scientific Name : *Hydnocarpus anthelminticus* Pierre ex Laness.
Family : Flacourtiaceae

2.0 Vernacular Names : Krabav plae thum, chaulmoogra tree

3.0 Plant Description

Tree, 7–30 m tall. The leaves are simple, alternate and oblong. The flowers, solitary or short inflorescence, are reddish purple. The edible fruits are globose berries with a thick pericarp covered with brownish hairs. The wood is yellow-reddish, resistant and not affected by insects. The oil expressed has been used for illumination and in the manufacture of soap. There are approximately 30–40 seeds in a pod.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Native to Cambodia, this tree grows in dense forest on sandy and rocky soils near water, especially in Kampot province.

6.0 Chemical Constituents

Cyclopentenylglycine, cyclopentenyl fatty acids and hydnocapric acid

7.0 Report on Medicinal Usage:

7.1 Uses supported by experimental/clinical data:

The seeds yield an oil which is reputedly used in the treatment of leprosy, dermatitis and tuberculosis. The bark is reportedly effective against incontinence and is also used as an antibacterial agent.

7.2 Uses in traditional medicine:

The oil is used in the treatment of rheumatism, sprains, bruises and chest complaints. Stem and bark are used to treat women after finishing their menstrual flow.

8.0 Contraindications

Not available

9.0 Bibliography

Desai, A.C. & Bhide, M.B. 1977. *Hynocarpus* oil as an antileprotic agent in footpad technique. **Lepr. India** 49(3): Pp. 154–158.

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh, Cambodia. 286 pp.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp. 293–294.

National Center of Traditional Medicine. 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.

Oommen, S.t., Rao, M. & Raju, C.V. 1999. Effect of oil of *hynocarpus* on wound healing. **Int. J. Other. Mycobact.** 67(2): Pp. 154–158.

Oommen, S.T. 2000. The effect of oil of *hynocarpus* on excision wounds. **Int. J. Lepr. Other. Mycobact.** 68(1): Pp. 69–70.

Spener, F., Staba, E.J. & Mangold, H.K. 1974. Lipids in plant tissue cultures. II. Unusual fatty acids in lipids of *Hydnocarpus anthelminthica*. **Chem. Phys. Lipids** 12(4): Pp. 344–350.



1.0 Scientific Name : *Melastoma sanguineum* Pav. ex D. Don
Family : Melastomaceae

2.0 Vernacular Name : Riec dāas

3.0 Plant Description

Branchy shrub, 1–2 m tall. The leaves are hairy, oblong and alternate. The flowers are dark pink.

4.0 Propagation : Plant cutting and seed

5.0 Geographical Distribution/Ecology

It grows all over the country, especially on wastelands.

6.0 Chemical Constituents

Unknown

7.0 Report on Medicinal Usage:

7.1 Uses supported by experimental/clinical data:

Roots and leaves

7.2 Uses in traditional medicine:

In traditional Cambodian medicine, the roots are given as an infusion in cases of dizziness and vertigo. It is also a constituent of a remedy for the treatment of hepatic diseases such as jaundice. Another species, *M. malabathricum* L., has been used for indigestion and nervous disorder and in hemorrhoids.

8.0 Contraindications

Not available

9.0 Bibliography

Alen, Y., Nakajima, S., Nitoda, T., Baba, N., Kanzaki, H. & Kawazu, K. 2000. Antinematodal activity of some tropical rainforest plants (*Melastoma sanguineum*) against the pinewood nematode, *Bursaphelenchus xylophilus*. **Z. Naturforsch [C]**. 55(3-4): Pp. 295-299.

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh, Cambodia. 286 pp.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. 342 pp.

National Center of Traditional Medicine, 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.

Sharma, H.K., Chhange, L. & Dolui, A.K. 2001. Traditional medicinal plants (*Melastoma sanguineum*) in Mizoram, India. **Fitoterapia** 72(2): Pp. 146-161.



1.0 Scientific Name : *Melodorum fruticosum* Lour.
Family : Annonaceae

2.0 Vernacular Name : Rumduel

3.0 Plant Description

Tree, up to 8 m high. The leaves are simple, alternate, oblong-lanceolate, 2–3 cm wide and 7–15 cm long. The flowers are solitary, axillary, pale yellow and fragrant. The fruits are aggregate and edible. The black berries when ripe, grow in bunches.

4.0 Propagation : Plant cutting and seed

5.0 Geographical Distribution/Ecology

This plant grows wild in dry regions or on top of hills, especially in Siem Reap province. The flowering season is around March to April.

6.0 Chemical Constituents

Essential oils and bioactive heptenes.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The dried flowers are considered a general tonic, particularly a cardiac tonic. It is also reputedly used to treat faintness. The stem is used to cure mothers after childbirth. It is taken by boiling or soaking in white wine before drinking.

8.0 Contraindications

Not available

9.0 Bibliography

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh, Cambodia. 286 pp.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp. 344–345.

Jung, J.H., Chang, C.J., Smith, D.L., McLaughlin, J.L., Pummangura, S., Chaichantipyuth, C. & Patarapanich, C. 1991. Additional bioactive heptenes from *Melodorum fruticosum*. **J. Nat. Prod.** 54(2): Pp. 500–505.

National Center of Traditional Medicine, 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.



- 1.0 Scientific Name** : *Phyllanthus emblica* L.
Family : Euphorbiaceae

- 2.0 Vernacular Names** : Kantuat prey, Indian gooseberry, emblic myrobalan (English)

3.0 Plant Description

Tree, 2–8 meters tall. The leaves are simple, alternate, oblong, 0.25–0.5 cm wide and 0.8–1.2 cm long. The inflorescence is in fascicle with staminate clusters at base and pistillate flowers upwards. The acidic fruits, rich in vitamin C, are eaten either fresh or as a condiment. Eaten fresh, they have a sweet taste. The bark, leaves and fruits give a yellow dye.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

This plant grows in the clear forests of Cambodia. It is found abundantly in Kompong Speu province and the southeastern province of Cambodia on the hillsides, especially in Mondol Kiri province.

6.0 Chemical Constituents

Polypheols including gallic acid, phyllembin, emblicol, chebulagic acid, emblican A and B and quercetin, organic acids, cytokinins, fatty acids, arachidic acid and behenic acid

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The leaves of *P. emblica* have inhibitory activity on polymorphonuclear neutrophils (PMN) and platelets, which supports the antiinflammatory and antipyretic properties of this plant.

7.2 Uses in traditional medicine:

The fresh fruit is used for inflammatory conditions of the pubic region, lungs and eyes. A paste of the fruit is reputedly effective when applied over the irritable bladder in urinary retention problem and to the forehead in cephalgia. The fruit possesses expectorant, diuretic, anti-diarrhoeal, antipyretic, and antiscorvic activities. The fruit is also carminative and stomachic.

8.0 Contraindications

Not available

9.0 Bibliography

Bandyopadhyay, S.K., Pakrashi, S. & Pakrashi, A. 2000. The role of antioxidant activity of *Phyllanthus emblica* fruits on prevention from indomethacin induced gastric ulcer [short communication]. **J. Ethnopharmacol.** 70(2): Pp. 171–176.

Ghosh, A., Sharma, A. & Talukder, G. 1992. Relative protection given by extract of *Phyllanthus emblica* fruit and a equivalent amount of vitamin C against a known clastogen-caesium chloride. **Food. Chem. Toxicol.** 30(10): Pp. 865–869.

Ithantola Vormisto, A., Summanen, J., Kankaanranta, H., Vuorela, H., Asmawi, Z.M. & Moilanen, E. 1997. Anti-inflammatory activity of extracts from leaves of *Phyllanthus emblica*. **Planta Med.** 63(6): Pp. 518–524.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp. 400–401.



1.0 Scientific Name : *Plumeria alba L.*
Family : Apocynaceae

2.0 Vernacular Names : Champy saa, kshira, champaka, white frangipani

3.0 Plant Description

The white flowers form part of ritual offering to the deities; necklaces are sometimes made to decorate coffins. They are also edible, under the form of fritters.

4.0 Propagation : Plant cutting and seed

5.0 Geographical Distribution/Ecology

Introduced into Cambodia, it is often cultivated as a decorative plant, especially around Buddhist monasteries.

6.0 Chemical Constituents

Alkaloids and glycosides

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Studies conducted have shown potential antiviral properties.

7.2 Uses in traditional medicine:

The heart of the wood is used as a vermifuge. The plant's milky bark is applied as a plaster over hard tumours and used to dispel indolent swellings. Internally, the root and bark are strong purgatives and used as laxatives. The stem, bark and flower are used to

cure fever and to stop dysentery. It is boiled before drinking. Its resin mixed with coconut oil is used to cure wounds.

8.0 Contraindications

Not available

9.0 Bibliography

Dy Phon Pauline. 2000. **Plants Used in Cambodia**, Phnom Penh, Cambodia. 286 pp.

Hamburger, M.O., Cordell, G.A. & Ruangrunsi, N. 1991. Traditional medicinal plants of Thailand. XVII. Biological active constituents of *Plumeria alba*. **J. Ethnopharmacol.** 33(3): Pp. 289–292.

National Center of Traditional Medicine. 1999. **List of Medicinal Plants in Cambodia**. Phnom Penh, Cambodia.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp. 413–414.

Radford, D.J., Gillies, A.D., Hind, J.A. & Duffy, P. 1986. Naturally occurring cardiac glycosides (*Plumeria alba*). **Med. J. Aust.** 144(10):Pp. 540–544.

Tan, G.T., Pezzuto, J.M., Kinghorn, A.D. & Hughes, S.H. 1991. Evaluation of natural products as inhibitors of human immunodeficiency virus type 1 (HIV-1) reverse transcriptase (*Plumeria alba*). **J. Nat. Prod.** 5491: Pp. 143–154.



- 1.0 Scientific Name** : *Syzygium jambos* (L.) Alston
Family : Myrtaceae
- 2.0 Vernacular Names** : Chumpuu saa, jambu; rose apple (English)

3.0 Plant Description

Small branchy tree, 6–15 m tall.

- 4.0 Propagation** : Plant cutting and seed

5.0 Geographical Distribution/Ecology

This species is cultivated in Cambodia for its edible fruits. It is found most abundantly in Kandal province, Phnom Penh.

6.0 Chemical Constituents

Phenolic glycosides and tannins.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Leaves and bark extracts of *S. jambos* showed antibacterial activities.

7.2 Uses in traditional medicine:

In Cambodian the juice yielded by macerating the leaves is reputedly antipyretic and antimicrobial. The pulverized leaves are rubbed on the body in cases of smallpox.

8.0 Contraindications

Not available

9.0 Bibliography

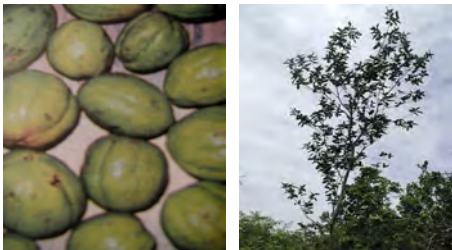
Djipa, C.D., Delmee, M. & Quertin L. J. 2000. Antimicrobial activity of bark extracts of *Syzygium jambos* (L.). Alston (Myrtaceae). **J. Ethnopharmacol.** 71(1-2): Pp. 307-313.

Dy Phon Pauline. 2000. **Plants Used in Cambodia**. Phnom Penh, Cambodia. 286 pp.

Frame, A.D., Rios Olivares, E., De Jesus, L., Ortiz, D., Pagan, J. & Mendez, S. 1998. Plants (*Syzygium jambos*) from Puerto Rico with anti-mycobacterium tuberculosis. **P.R. Health. Sci. J.** 17(3): Pp. 243-252.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. 472 pp.

Teixeira, C.C., Rava, C.A., Mallman da Silva, P., Melchior, R., Argenta, R., Anselmi, F., Almeida, C.R. & Fuch, F.D. 2000. Absence of antihyperglycemic effect of jambolan (*Syzygium jambos*) in experimental and clinical models. **J. Ethnopharmacol.** 71(1-2): Pp.343-347.



- 1.0 Scientific Name** : *Terminalia chebula* Retz.
Family : Combretaceae

- 2.0 Vernacular Names** : Sraamaa, chebolic myrobolan

3.0 Plant Description

Tree with a grayish bark, 15–20 m tall. The leaves are simple, opposite or subopposite, elliptic, 6–10 cm wide and 8–10 cm long. Inflorescence is axillary or terminal, raceme, bisexual with yellow flowers. Fruit fleshy, ovoid, 5-ribbed. The bitter black fruits are eaten raw with roasted fish. The fruits are 1–3 cm long. The wood is in much demand for cabinetwork and construction. The bark produces a gum and tannins used to dye fishing nets.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

This plant grows in the dense deciduous forests of Cambodia and is cultivated for its fruits.

6.0 Chemical Constituents

Triterpenoid glycosides including chebulosides I and II, argunin, arjunglucoside, 2a-hydroxyursolic acid and 2a-hydroxymicromiric acid, tannins chebolic acid, ellagic acid and gallic acid. Punicalin, terflavins A, B, C and D, maslinic acid, synergic acid, terchebulin I, β - sitosterol, anthraquinones and fixed oils are also present.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The leaves are used against diarrhea in children. The dose of the dried powder of the fruit is 1–6 grams per day. The infusion, 56–112 ml, is taken daily.

7.2 Uses in traditional medicine:

The tannin and anthraquinone constituents in the green fruits make the fruits both astringent and cathartic which are often used as laxative. They are also reputedly carminative, deobstruent, antibacterial, expectorant and a remedy for salivation and heartburn. The green fruits are also used as purgative. The dry green fruits are infused as tea to increase appetite.

8.0 Contraindications

Not available

9.0 Bibliography

Jagtap, A.G. & Karkera, S.G. 1999. Potential of the aqueous extract of *Terminalia chebula* as an anticaries agent. [Short communication]. *J. Ethnopharmacol.* 68(1-3): Pp.299–306.

Joshi, A.R. & Joshi, K. 2000. Indigenous knowledge and uses of medicinal plants (*Terminalia chebula*) by local communities of the Kali Gandaki Watershed Area, Nepal. *J. Ethnopharmacol.* 73(1–2): Pp. 175–183.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. Pp. 485–486.



1.0 Scientific Name : *Terminalia triptera* Stapf.
Family : Combretaceae

2.0 Vernacular Name : Preah phnov

3.0 Plant Description

A large deciduous tree, up to 10–30 m in height. Bark grayish, with white and black speckles, many lenticels and spines. Leaves opposite or subopposite ovate or lanceolate, 5–12 cm long and 2–4 cm wide. Flowers abundant, minute, white-yellow, slightly fragrant, tetramerous. Fruit 3 winged, wing thin, bright green, 2.5 cm long and 1.7–1.9 cm wide.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

This plant grows wild in the dense forests, especially along the coastal provinces of Cambodia.

6.0 Chemical Constituents

Tannins, especially catchintannic acid and phlobaphene

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

During 1970, one of the manufacturers, Angkor Laboratories, produced an elixir of *T. triptera* phnov, which has a comparable effect to the elixir paregorique.

7.2 Uses in traditional medicine:

The bark is used as astringent and may replace areca nut to chew betel. In traditional Cambodian medicine, the bark has reportedly been used as a decoction or infusion to treat dysentery. In combination with other ingredients, it is reputedly an effective remedy for diarrhea.

8.0 Contraindications

Not available

9.0 Bibliography

Fyrhquist, P., Mwasumbi, L., Haeggstrom, C.A., Vuorela, H., Hiltunen, R. & Vuorela, P. 2002. Ethnobotanical and antimicrobial investigation on some species of *Terminalia* and *Combretum* (Combretaceae) growing in Tanzania. **J. Ethnopharmacol.** 79(2): Pp.169–177.

Kham, L. 2004. **Medicinal Plants of Cambodia**. Select Books Pte. Ltd., Australia. 487 pp.

Munasinghe, J., T.C., Seneviratne, C.K., Thabrew, M.I. & Abeysekera, A.M. 2001. Antiradical and antilipoprotective effects of some plants extracts (*Terminalia triptera*) used by Sri Lankan tradition medical practitioners for cardioprotection. **Phytother. Res.** 15(6): Pp. 519–523.

Saleem, A., Ahotupa, M. & Pihlaja, K. 2001. Total phenolic concentration and antioxidant potential of extracts of medicinal plants of Pakistan (*Terminalia triptera*). **Z. Naturforsch. [C]**. 56(11–12): Pp. 973–978.



Indonesia



- 1.0 Scientific Name** : *Acorus calamus* L.
Family : Acoraceae
- 2.0 Vernacular Names** : Sweet flag, sweet root, calamus (English); dringo (general);
 daringo (Sundanese-Indonesia); dringo (Javanese-Indonesia);
 jerango (Sumatra-Indonesia)

3.0 Plant Description

A perennial glabrous herb up to 150 cm tall; rhizome creeping, extensively branched, up to 3 cm in diameter, pale yellowish to pinkish brown outside, whitish and sometimes slightly pinkish inside. Leaves erect, linear ensiform, with obliquely acuminate apex, distinct midrib and numerous parallel veins, glossy green, often reddish toward base and aromatic. Inflorescence arises from rhizome, erect, with a cylindrical straight or slightly curved spadix up to 10 cm long. Flowers densely arranged on a spadix, bisexual. Fruits a 2–3 celled berry, few seeded, reddish. Seeds ellipsoid.

- 4.0 Propagation** : Rhizome (vegetative part)

5.0 Geographical Distribution/Ecology

Sweet flag is probably native to China and India. In the Malaysian region, it is considered naturalized, not truly wild. It is found in many parts of Indonesia, Malaysia, Papua New Guinea and locally in the Philippines, and outside Malesia in Indo-China and Thailand.

6.0 Chemical Constituents

The rhizome contains pale yellow to pale brown essential oil. Major chemical constituents are phenylpropanes, monoterpenes, and thermolabile sesquiterpenoids. The major volatile components in the oil include α -asarone, (cis-isoasarone), methyleugenol, cis-methylisoeugenol, geranylacetate, α -farnesene, shyobunone, epishyobunone, isoshyobunone, calamusenone and acorenone.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The rhizomes are usually used externally to treat inflammation, rheumatism, lumbago and skin diseases and after child birth, are used as part of "jamu". Also known to be anti-bacteria, analgesic, antidepressant, diuretic and antipyretic.

8.0 Contraindication

Not available

9.0 Bibliography

Darmawan, E., Maryanto & Katno. 2003. Aktivitas anti-inflamasi minyak atisir daun dringo (*Acorus calamus* L.) hasil budidaya basah dan hasil pengeringan pada tikus jantan putih. **Prosiding Seminar Tumbuhan Obat Indonesia 23**. Jakarta, 25–26 March 2003.

Dharma, A.P. 1985. **Tanaman Obat Tradisional Indonesia**. PN Balai Pustaka, Jakarta. 291 pp.

Ika, Y.A. & Diniatik. 2003. Efek anti-depresi ekstrak methanol rimpang dringo (*Acorus calamus* L.) terhadap mencit (*Mus musculus*) galus Swiss dan uji fitokimianya. **Prosiding Seminar Tumbuhan Obat Indonesia 23**. Jakarta, 25–26 March 2003.

Kloppenburg-Versteegh, J. 1983. **Petunjuk Lengkap Mengenai Tanaman-Tanaman di Indonesia dan Khasiatnya Sebagai Obat-Obatan Tradisionil**. Yayasan Dana Sejahtera dan CD R.S. Bethesda, Yogyakarta. 199 pp.

Mardiswoyo, M. & Rajakmangunsudarso, H. 1985. **Cabe Puyang Warisan Nenek Moyang**. PN Balai Pustaka, Jakarta. 129 pp.

Nuratmi, B., Adjirni & Tri Wahyuni L. 2003. Efek anti-diare jus rimpang dringo (*Acorus calamus* L.) pada tikus putih. **Prosiding Seminar Tumbuhan Obat Indonesia 23**. Jakarta, 25–26 March 2003.

Rakhmawati, E., Widowati, L.E. & Teguh Setiawan, W. 2003. Uji efek dan potensi analgetik ekstrak air dringo (*Acorus calamus* L.) dengan metode induksi termal. **Prosiding Seminar Tumbuhan Obat Indonesia 23**. Jakarta, 25–26 March 2003.



- 1.0 Scientific Name** : *Aloe vera* (L.) Burm. f.
Family : Liliaceae
- 2.0 Vernacular Name** : Lidah buaya (Malaysia, Indonesia)

3.0 Plant Description

Succulent shrubby perennial, often with very short stem and fleshy fibrous roots. Leaves arranged spirally in a rosette, sometimes distichous, linear to lanceolate or triangular, very thick and fleshy, sheathing at the base margins, entire; surface sometimes spiny, containing colourless sap. Inflorescence a pseudo-lateral, simple or branched, long-cylindrical raceme. Flowers bisexual, protandrous, pedicellate; sepals usually connate into a tube, sometimes outer 3 free, fleshy, apices acute to obtuse; stamens 6, in two rows of three; ovary superior, 3-locular, style filiform, longer than stamens; stigma small. Fruit a loculicidal capsule, many seeded. Seeds elongate and ovoid, grey or black, arillate.

4.0 Propagation

It can be propagated vegetatively through sucker offsets or cutting, or by seed. Micropropagation through *in vitro* culture of vegetative meristems as well as *in vitro* regeneration of leaf base explants appears to be possible.

5.0 Geographical Distribution/Ecology

Approximately 330 species of *Aloe vera* originated from Africa, Madagascar and Arabia, and over 100 species are cultivated. All Malaysian *Aloe vera* have been introduced and are popular garden and pot plants. *Aloe vera* was formerly produced in Barbados, where it had been introduced early in the 16th century. Nowadays, it is cultivated widely and commercially in Malaysia, Indonesia, Thailand, the United States, the Caribbeans, Australia, and other regions.

6.0 Chemical Constituents

Aloe leaf juice contains a pyrone derivative (aloeine) and resins, free and 8-C-glucosylated-2-acetonyl-7-hydroxy-5-methylchromones. The aloe drug contains 15-40% aloe-emodin-athrone 10-C-glucosides (hydroxy-antraquinone derivatives) such as aloin, hydroxyaloin and aloinoside.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Aloe gel has proven effective in the treatment of skin burns by X-ray radiation.

7.2 Uses in traditional medicine

Aloe juice is used to make the laxative drug known as aloe, aloes or bitter aloes. Aloe gel, the mucigel from polyhedral cells is claimed to have healing properties. *Aloe vera* gel has gained popularity as a folk remedy worldwide.

8.0 Contraindication

Not available

9.0 Bibliography

Aguilar, N. O. & Brink, M. 1992. *Aloe L.* In De Padua, L. S., Bunyaphatsara, N. and Lemmens, R.H.M.J. (Eds). **Medicinal and Poisonous Plants 1. Plant Resources of South-East Asia** No. 12(1): PROSEA, Bogor, Indonesia.

Grindlay, D. & Reynolds, T. 1986. The *Aloe vera* phenomenon: A review of the properties and modern uses of the leaf parenchyma gel. **J. of Ethnopharmacol.** 16(2-3):117-151.

Hodge, H. 1953. The drug aloes of commerce, with special reference to the Cape species. **Economic Botany** 7:99-129.

1.0 Scientific Name : *Arcangelisia flava* Merr.
Family : Menispermaceae

2.0 Vernacular Names : Yellow fruited moonseed (English); akar kuning, tali kuning (general); ki koneng (Sundanese-Indonesia); sirawan (Javanese-Indonesia); daun bulan (Moluccas-Indonesia)

3.0 Plant Description

A large, woody, glabrous, dioecious liana up to 20 m long. Stem up to 5 cm in diameter; wood yellow, exuding yellow sap when cut. Leaves usually ovate, coriaceous palmately 5-veined at the base. Petioles swollen at both ends, stipulate absent. Inflorescence axillary or cauliflorous, paniculate, slender, 10–50 cm long; lateral branches spicate to subspicate. Flowers unisexual with 3–4 outer sepals and 6 large inner sepals; petals absent; male flower subsessile with a sessile globose cluster of 9–12 anthers; female flowers with 3 carpels and a number of staminodes. Fruits are slightly laterally compressed; drupe transversely subovoid, 2–3 cm in diameter; yellow with a club-shaped stalk; endocarp woody, covered with a dense mat of radial fibres. Seeds broadly ellipsoidal with ruminant endosperm, cotyledons much folded.

4.0 Propagation : Seed or stem cutting

5.0 Geographical Distribution/Ecology

Yellow fruited moonseed occurs up to 1000 m, in seaside, riverbanks, or in secondary forests. It is widely distributed from China, Indo-China, Thailand, Peninsular Malaysia, Sumatra, Java, Borneo, Sulawesi, Moluccas to the Philippines.

6.0 Chemical Constituents

Main stem contains alkaloids such as berberine, columbamine, jatrorrhizine, palmatine, shobakunine, dehydrocorydalmine, 8-hydroxyberberine, thalifendine, (-) RR limacine, (+) R,S homoaromaline and pycnarrhine. Seeds contain saponin.

7.0 Reports on Medicinal Usage

7.1 Uses support by experimental /clinical data:

Not available

7.2 Uses described in traditional medicine:

The stems are used to treat sprue, stomach problem and jaundice. In Sumatra, local people use the plant as aphrodisiac, and for treatment of rheumatism and broken bones.

8.0 Contraindication

Not available

9.0 Bibliography

Departemen Kesehatan. 1999. **Inventaris Tumbuhan Obat Indonesia (5)**. Badan Penelitian dan Pengembangan Kesehatan, Jakarta.

Hernani. 2001. Akar kuning. In: Supriadi (ed.) **Tumbuhan Obat Indonesia: Penggunaan dan Khasiatnya**. Pustaka Populer Obor, Jakarta. Pp. 6–8.

Kloppenburg-Versteegh. J. 1983. **Petunjuk Lengkap Mengenai Tanaman-Tanaman di Indonesia dan Khasiatnya Sebagai Obat-Obatan Tradisionil**. Yayasan Dana Sejahtera dan CD R.S. Bethesda, Yogyakarta. 199 pp.

Mandia, E.H., Ridsdale, C.E., Horsten, S.F.A.J & Aguinaldo, A.M. 1999. *Arcangelisia flava* (L.) Merr. In: de Padua, L.S., N. Bunyaphatsara and R.H.M.J Lemmens (Eds.) **Plant Resources of Southeast Asia 12(1) Medicinal and Poisonous plants (1)**. Prosea, Bogor, Indonesia. Pp. 129–132.

Mardiswoyo, M. & Rajakmangunsudarso, H. 1985. **Cabe Puyang Warisan Nenek Moyang**. PN Balai Pustaka, Jakarta. 29 pp.



- 1.0 Scientific Name** : *Centella asiatica* L. Urb.
Family : Apiaceae
- 2.0 Vernacular Names** : Daun kaki kuda, pegagan, antanan (Indonesia); pegaga (Malaysia), asiatic pennywort (English)

3.0 Plant Description

A small perennial herb, creeping with long stolons (up to 2.5 m long), rooting at the nodes, young parts more or less puberulous. Leaves in rosettes, simple, lamina orbicular-reniform, 1–7 cm in diameter; regularly crenate or crenate dentate, palmately veined, subglabrous; petiole 1–50 cm long, glabrous to puberulous, broadening at the base into a leaf-sheath; stipules absent.

4.0 Propagation

Can be easily propagated vegetatively by runners, which root on the nodes, although reproduction by seed is possible. It often regenerates from fragments of stems buried in the soil during hoeing.

5.0 Geographical Distribution/Ecology

Centella comprises approximately 40 species. Found abundantly in South Africa, *C. asiatica* is a pantropical and distributed in Southeast Asia and in some subtropical regions. Pegaga occurs in sunny or slightly shaded, fertile soils (preferring sandy loams with much organic matter) up to 2,500 m above sea-level.

6.0 Chemical Constituents

Triterpenoid compounds, such as asiaticoside, madecassoside, asiatic acid and madecassic acid

7.0 Reports on Medicinal Usage

7.1 Uses support by experimental /clinical data:

Not available

7.2 Uses described in traditional medicine:

Asiatic pennywort has been used for a wide range of complaints, but the most important use is in skin-related diseases. The leaf extract is used effectively in the treatment of keloids, leg ulcers, phlebitis, slow-healing wounds, scleroderma, lupus, leprosy, surgical lesions, striae distensae, cellulitis and aphthae. Purified extracts are known to accelerate cicatrizing and skin grafting. It has also been known as a medicinal plant with tonic and cooling properties. Orally, the extract is indicated to relieve the symptoms of nervous and lymphatic vessel insufficiency, and used to treat atonic wounds and for hypertrophy. Asiatic pennywort is a relished vegetable in many Southeast Asian countries. The slightly bitter leaves are eaten raw or cooked.

8.0 Contraindications

Not available

9.0 Bibliography

Buwalda, P. 1949. Umbelliferae. In van Steenis, C.G.G.J. (Eds): **Flora Malesiana**. Series 1 Vol. 4. Noordhoff-Kolff N. V., Djakarta, Indonesia.

Hargono, D. P., Lestari, Y., Astuti & van den Bergh M. H. 1999. *Centella asiatica*. (L.) Urb. In L. S. De Padua, N. Bunyaphatsara and R.H.M.J. Lemmens (Eds). **Plant Resources of South-East Asia No. 12(1): Medicinal and Poisonous Plants 1**. PROSEA, Bogor, Indonesia.



1.0 Scientific Name : *Curcuma mangga* Valetton & Zijp
Family : Zingiberaceae

2.0 Vernacular Name : Temu mangga (Indonesia, Malaysia)

3.0 Plant Description

A herb with branched rhizome, yellowish outside, top white inside lemon-coloured to sulphur-yellow with a white outer layer. Leaf-sheaths 30–65 cm long; blades elliptical-oblong to oblong-ob lanceolate, 15–95 cm x 5–23 cm, green; inflorescence on a separate shoot; bract green, coma bracts white at base, purple toward the top; corolla 3–4 cm long, white; labellum 15–25 mm x 14–18 mm; white with a yellow median band; other staminodes longitudinally folded, white; anther with long, narrow spurs.

4.0 Propagation : Rhizome

5.0 Geographical Distribution/Ecology

Southeast Asia, cultivated in Indonesia and Malaysia

6.0 Chemical Constituents

Not available

7.0 Reports on Medicinal Usage

7.1 Uses support by experimental/clinical data:

Not available

7.2 Uses described in traditional medicine:

The rhizomes are used to treat fever and chewed by women to strengthen the womb after childbirth. The starch of the rhizome is recommended by traditional healers to treat abdominal illness. *Curcuma mangga* is also edible.

8.0 Contraindications

Not available

9.0 Bibliography

Burkill, I. H. 1966. **A Dictionary of the Economic Products of the Malay Peninsula**. Ministry of Agriculture and Cooperatives, Kuala Lumpur, Malaysia.

Sara, N. & R.H.M.J. Lemmens (Eds.). 1994. **Medicinal and Poisonous Plants 1. Plant Resources of Southeast Asia** 12(1): PROSEA Bogor, Indonesia.

Valeton, T. 1918. New notes on the Zingiberaceae of Java and Malayan Archipelago. **Bulletin du Jardin Botanique de Buitenzorg**. 27:57–61.



- 1.0 Scientific Name** : *Curcuma zedoaria* Rosc.
Family : Zingiberaceae
- 2.0 Vernacular Names** : Temu putih (general); koneng tegal (Sundanese-Indonesia)

3.0 Plant Description

A herb with branched rhizome, outside grey, inside pale yellowish to bright yellow; leaf-sheaths 35–60 cm long; blades oblong to oblong lanceolate, 25–75 cm x 7–20 cm, green with a purple band along the midrib; bract green or green with a purple margin, some bracts purple or dark pink; corolla 3.5–4.5 cm long, yellowish-white with a darker yellow median band; other stamindones longitudinally folded, yellowish-white; anthers with long spurs.

- 4.0 Propagation** : Rhizome

5.0 Geographical Distribution/Ecology

Temu putih is found in various shady, damp localities on various soils but prefers well-drained sandy soils, up to 1,000 m above sea level. It is widely distributed in South Asia, Southeast Asia to China and Taiwan.

6.0 Chemical Constituents

Rhizome of *C. zedoaria* contains essential oil with cineol, borneol, d-camphor, camphene, and d- α -pinene.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Water extract inhibits the growth of mouse L5178Y leukaemia cells in a dose dependent-manner.

7.2 Uses in traditional medicines:

Uses described in folk medicine are not supported by experimental or clinical data: The plant is believed to repair blood circulation, act as stimulant, stomachic, increase appetite, and to be anticancer, diuretic, carminative, anti-diarrhoeal, antiemetic, antipyretic and depurative.

8.0 Contraindications

Not available

9.0 Bibliography

Darwis, S.N., Indo, M. & Hasiyah, S. 1992. Tumbuhan obat famili Zingiberaceae. **Seri Pengembangan Tanaman Perkebunan**, No. 17. Puslitbangtri, Bogor.

Hadad, E.A. & Noviyanti, R. 2001. Temuputih (*Curcuma zedoaria*). In: Supriadi (Ed.) **Tumbuhan Obat Indonesia: Penggunaan dan Khasiatnya**. Pustaka Populer Obor, Jakarta.

Hutapea, J.R. 1993. **Inventaris Tumbuhan Obat Indonesia (2)**. Departemen Kesehatan, Jakarta.

Kardinan, A. & Taryono. **Tanaman Obat Penggempur Kanker**. Agromedika Pustaka, Jakarta.

Kloppenburg-Versteegh, J. 1983. **Petunjuk Lengkap Mengenai Tanaman-Tanaman di Indonesia dan Khasiatnya sebagai Obat-Obatan Tradisionil**. Yayasan Dana Sejahtera dan CD R.S Bethesda, Yogyakarta. 199 pp.

Makhmud, A.I. & Tobo, F. 2002. Isolasi dan karakterisasi komponen kimia ekstrak rimpang temu putih (*Curcuma zedoaria*). **Prosiding Seminar Tumbuhan Obat Indonesia 21**. Surabaya, March 2002.

Nuratmi, B., Nugrobo, Y.A. & Sundari, D. 2002. Efek anti-diare jus temu putih dan temu mangga pada tikus putih. **Prosiding Seminar Tumbuhan Obat Indonesia 21**. Surabaya, March 2002.

Sunardi. 2002. Studi aktivitas anti mikroba minyak atsiri dari rimpang *Kaempferia rotunda*, *Curcum zedoaria* dan *Curcuma mangga*. **Prosiding Seminar Tumbuhan Obat Indonesia 21**. Surabaya, March 2002.

Wardini, T.H. & Prakoso, B. 1999. *Curcuma zedoaria* (Christm.) Roscoe. In: de Padua, L.S., N. Bunyapraphatsara and R.H.M.J Lemmens (Eds.) **Plant Resources of Southeast Asia 12(1) Medicinal and Poisonous plants (1)**. Pp. 218–219. Prosea, Bogor, Indonesia.

1.0 Scientific Name : *Justicia gendarussa* Burm.f.
Family : Acanthaceae

2.0 Vernacular Names : Gandarusa (general); besi-besi (Aceh), kawo (Seram)

3.0 Plant Description

Shrub up to 150 cm tall; young twig usually dark purple; leaves linear lanceolate, 5–20 cm x 1–3.5 cm, with up to 1 cm petiole; inflorescence a spike, bracts lanceolate, about 4 mm long; flowers 1.5–2 cm long, white with purplish streaks and spots inside. Fruit clavate to ellipsoid, about 1.3 cm long, glabrous.

4.0 Propagation : Seed and cutting

5.0 Geographical Distribution/Ecology

Pakistan, India, Sri Lanka, Indo-China, Thailand, Peninsular Malaya, Jawa, the Moluccas and the Philippines. It is naturally found in forests, forest borders and on river banks in Java, up to 1,500 m altitude.

6.0 Chemical Constituents

The leaves contain four simple o-disubstitute aromatic amines: 2-amino benzyl alcohol, 2-(2' amino berzylamino) benzyl alcohol and their respective O-methyl esters, also β -sitosterol.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicines:

The leaves are used to treat headache, rheumatism and pain.

8.0 Contraindication

Not available

9.0 Bibliography

Kloppenborg-Versteegh, J. 1983. **Petunjuk Lengkap Mengenai Tanaman-Tanaman di Indonesia dan Khasiatnya sebagai Obat-Obatan Tradisionil**. Yayasan Dana Sejahtera dan CD R.S.Bethesda, Yogyakarta. 199 pp.

Sangat-Roemantyo, H. 1999. *Justica gendarussa*. In: de Padua, L.S., N. Bunyapraphatsara and R.H.M.J Lemmens (Eds.) ***Plant Resources of Southeast Asia 12(1) Medicinal and Poisonous Plants (1)***. Prosea, Bogor, Indonesia.

Wijayakusuma, H., Wirian, A.S., Yaputra, T., Dalimartha, S. & Wibowo, B. 1996. **Tanaman berkhasiat obat di Indonesia**. Fifth edition. Pustaka Kartini, Bandung. 44 pp.



- 1.0 Scientific Name** : *Morinda citrifolia* L.
Family : Rubiaceae
- 2.0 Vernacular Names** : Mengkudu (Malaysia); pace (Javanese-Indonesia), cengkudu (Sundanese-Indonesia)

3.0 Plant Description

Morinda citrifolia grows to 5 m in height, with a short trunk and a head ovoid in outline; it bears ellipsoid fruits of a greyish transparent white, in appearance anything but appetizing, and in flavour as of soap and sugar mixed, with a smell like decaying cheese. Apparently in Indo-China it is eaten with salt. It is common in gardens throughout Indonesia and Malaysia.

- 4.0 Propagation** : *Morinda.citrifolia* can be propagated by seed. It grows well in well-tilled soil.

5.0 Geographical Distribution/Ecology

Morinda citrifolia is a native of Queensland (Australia). It may have been distributed by man and carried westwards into the Indian Ocean by sea currents, reaching the Pacific between 30°N and 30°S altitude, into the Marquesas, Hawaii and Easter Islands. It is present through Southeast Asia both wild and cultivated. It often occurs wild in coastal zones. It is naturalized in the Caribbean region and cultivated in villages throughout Southeast Asia and Malaysia. Mengkudu is commonly found up to altitude of 1,500 m in humid and seasonal climates of the region.

6.0 Chemical Constituents

The basis of the morindone dyeing matter, called Turkish red, is the hydrolyzed (red) form of the glycoside morindine. This is the most abundant anthraquinone which is mainly found in the root bark which reaches a concentration of 0.25–0.5% in fresh bark in 3–5 years. It is similar to that found in *Rubia tinctorum* and to synthetic alizarin. The curative properties of the plant parts

are ascribed to the presence of medicinally active anthraquinone derivatives. The fruit contains rancid smelling capric acid and unpleasant tasting caprylic acid. It is thought that antibiologically active compounds are present. The leaves are a rich source of vitamin A.

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicines:

The overripe fruit is stated to be used as an emmenagogue both in Indonesia, Malaysia, and in Indo-China. In the Medical Book of Malayan Medicine, the juice is recommended for leucorrhoea and sapraemia. It is also recommended by the Rumpit for dysuria and the fruit for diabetes. The fruit is sometimes used internally in various preparations for swollen spleen, liver disease, beri-beri, haemorrhage and coughs. It is also reported that in Java the ripe fruits are taken and their seeds removed, the pulp mashed with sugar and drunk, as a slightly laxative preparation.

8.0 Contraindications

Not available

9.0 Bibliography

Abbot, I. A. & Shimazu, C. 1985. The geographic origin of plants most commonly used for medicine by Hawaiians. **Journal of Ethnopharmacology**. 14(2/3):213–222.

Groenendijk, J. J. 1992. *Morinda citrifolia* L. Pp. 94–96 in: **Plant Resources of Southeast Asia 3: Dye and Tannin-producing Plants**. PROSEA Foundation, Bogor, Indonesia.

Hidayat, E. *Morinda citrifolia* L. and its special use as a traditional drug. **Bulletin Kebun Raya**. 3(4):141–144.



1.0 Scientific Name : *Orthosiphon aristatus* (Blume) Miq.
Family : Lamiaceae

2.0 Vernacular Names : Java tea (English); kumis kucing (general); kumis kucing (Sundanese-Indonesia), remuk jung (Javanese-Indonesia)

3.0 Plant Description

A perennial herb, up to 2 m tall with quadrangular, poorly ramified ascending stem. Leaves decussately opposite, ovate or rhombic cuneate at base acute or acuminate at apex; serrate glabrous or minutely pubescens, glandular punctuate petiole 0.5–2 (–4.5) cm long. Flowers pedicellate calyx 2.5–4.5 mm long, bilabiate, gland-dotted; corolla 10–20 mm long, tubular, bilabiate, white or pale lilac; stamens 4, long-protruding from the corolla tube; ovary superior, style long protruding, slender, with enlarged, club-shaped and shallowly cleft stigma. Fruits splitting into 4 oblong-ovoid nutlets, 1.5–2 mm long, brownish, rugose.

4.0 Propagation : Stem cutting

5.0 Geographical Distribution/Ecology

Java tea is distributed in India, Indo-China, Thailand, through Malaysia, Indonesia to Australia. It is grown in Southeast Asia, Africa, Georgia (Caucasus) and Cuba. In Indonesia it grows at 100–1,200 m.

6.0 Chemical Constituents

Sinensetin, flavonol glycosides, caffeic acid derivatives (mainly rosmarinic acid and 2,3 dicaffeoyl-tartaric acid), inositol, phytosterols (β -sitosterol), saponins and about 0.7% essential oil

7.0 Reports on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicines:

The leaves are used as diuretic and against various kidney complaints and illnesses, renal calculi, phosphaturic catarrh of the bladder, and gout. They are used in combination with other plant species (*Sonchus* and *Sericoccalyx* spp.) to stimulate the kidney and as a medicine for kidney stones.

8.0 Contraindication

Not available

9.0 Bibliography

Dharma, A.P. 1985. **Tanaman Obat Tradisional Indonesia**. PN Balai Pustaka, Jakarta. 291 pp.

Dzulkarnae, B., Widowati, L., Isnawati, A. & Thijssen, H.J.C. 1999. *Orthosiphon aristatus* (Blume) Miq. In: de Padua, L.S., N. Bunyapraphatsara and R.H.M.J Lemmens (Eds.) **Plant Resources of Southeast Asia. 12(1) Medicinal and Poisonous plants (1)**. Pp. 368–371. Prosea, Bogor, Indonesia.

Kloppenburg-Versteegh, J. 1983. **Petunjuk lengkap mengenai tanaman-tanaman di Indonesia dan khasiatnya sebagai obat-obatan tradisional**. Yayasan Dana Sejahtera dan CD R.S.Bethesda, Yogyakarta. 199 pp.

Mardiswoyo, M. & Rajakmangunsudarso, H. 1985. **Cabe Puyang Warisan Nenek Moyang**. PN Balai Pustaka, Jakarta. 129 pp.

Wijayakusuma, H., Wirian, A.S., Yaputra, T., Dalimartha, S. & Wibowo, B. 1992. **Tanaman berkhasiat obat di Indonesia**. Fifth edition. Pustaka Kartini, Bandung. 44 pp.



- 1.0 Scientific Name** : *Sauropus androgynus* (L.) Merrill
Family : Euphorbiaceae

- 2.0 Vernacular Names** : Daun katuk (Indonesia); cekur manis (Malaysia)

3.0 Plant Description

An erect, glabrous, perennial, monoecious shrub which can reach a height of 3.5 m, but is kept much lower in cultivation. Branches terete and flaccid, lateral ones at first tetragonous; with many small short-period leaves and persistent stipules. Leaves buseriate, alternate, oblong to orbicular, 1–7.5 cm x 1–3 cm, entire, glaucous, above dark green. Often with vague greyish spots, beneath light green. Inflorescence dense, and in branches, axillary, first producing one or a few female flowers, afterwards several male ones; flowers without corolla, but with more or less intensely red-coloured persistent calyx; calyx of the male flower disciform, 6–20 mm in diameter; stamens 3, connate; calyx of the female flower 6-cleft more than halfway down, lobe 6–8 mm broad; stigma 3-branched, red, each branch bilobed. Fruit a globose to faintly 6-angular capsule, about 1.5 cm in diameter, white or purplish, dehiscent with 3 valves.

- 4.0 Propagation** : Seed and stem cutting

5.0 Geographical Distribution/Ecology

The exact origin of *Sauropus androgynus* is unknown, but it occurs in Sri Lanka and India to southern China in Indo-China and throughout Southeast Asia, mainly cultivated, but also found wild. In Indonesia and Malaysia, *Sauropus androgynus* is cultivated from sea-level up to 1300 m altitude, but it is most abundant at low elevation.

6.0 Chemical Constituents

Sauropus androgynus is a very nutritious vegetable with a higher protein content than most other leafy vegetables. Per 100 g edible leaf portion, it contains: water 79.8 g, protein 7.6 g, fat

1.8 g, carbohydrates 6.9 g, fibre 1.9 g, vitamin A 10000 IU, vitamin B1 0.23 mg, vitamin B2 0.15 mg, vitamin C 136 mg, Ca 234 mg, P 64 mg, and Fe 3.1 mg.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicines:

Sauropus androgynus is claimed to stimulate breast milk production. In Indonesia, especially in Java, the young leaves with the flowers or fruits are consumed raw as well as cooked.

8.0 Contraindications

Not available

9.0 Bibliography

Martin, F. W. & Ruberte, R. M. 1975. **Edible Leaves of the Tropics**. Antillian College Press, Mayaguez, Puerto Rico, United States. Pp. 35–37.

Ochse, J. J. & Van Den Brink, R. C. B. 1980. **Vegetables of the Dutch East Indies**. 3rd English Edition. Asher and Co., Amsterdam. The Netherlands. Pp. 290–292.

Van Den Bergh, M. H. 1994. *Sauropus androgynus* (L.) Merrill. In Siemonsma J. S. and Piluek, K. (Eds). **Plant Resources of South-East Asia No. 8: Vegetables**. PROSEA Foundation, Bogor, Indonesia. Pp. 244–246.



Lao PDR



- 1.0 Scientific Name** : *Aegle marmelos* (L.) Corrêa ex Roxb.
Family : Rutaceae
- 2.0 Vernacular Names** : Bael tree, bel-fruit tree, Bengal quince, bilak, golden apple, Holy fruit, stone apple (English); marmelos de Bengal (French); bael, bel, sirphal (Hindu); phneau, pha-nong (Cambodia); mark toom (Lao PDR); kawista, maja, maja batu, maja gedang, maja ingus, maja kalepung, maja lumut, maja pait (Java-Indonesia); bila, bilak, bel (Malaysia); bilvam, sriphala (Sanskrit); kathan ta then, mapin, matum, tum (Thailand); trái márm (Viet Nam)

3.0 Plant Description

Bael tree is a small to moderate-sized tree, bark darkish grey, slightly corky, twigs having strong axillary thorn. Leaves alternate, 3-foliolate. Flowers white, sweet scented. Fruit globose, yellowish grey, shell woody. Seeds numerous, oblong, compressed, with a woolly mucous testa, embedded in a clear mucilage and a mass of yellow sweet and agreeable aromatic mealy pulp.

- 4.0 Propagation** : Seed (vegetative part)

5.0 Geographical Distribution/Ecology

Globally, *A. marmelos* is distributed in the Indo-Malaysian region. It grows sparsely in dipterocarpous forest in Lao PDR. It is also planted for its fruit for making drink.

6.0 Chemical Constituents

The fruit pulp possesses sugars and tannins. The seeds contain bitter oil. Marmosoline, cloramarmine and aegline are 7-Geranyloxy coumarine derivatives, and many lignane glycosides are isolated from the stem bark. Anthraquinone derivatives are also reported. The leaf contains essential oil having antifungal effect.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Lao indigenous medicine broadly uses different parts of *A. marmelos* for completing many traditional remedies. The ripe fruits are raw material for making normal tea; the tea has a delicious taste and an agreeable odour.

8.0 Contraindications

Not available

9.0 Bibliography

Krup, P. N. V. 1977. **Hand Book of Medicinal Plants**, Vol. 1. Research in Indian Medicine and Homoeopathy, New Delhi.

Nang Sothy, Vu Ngoc Lo, Nguyen Xuan Dung, Nguyen Thanh Do. 1989. **These de Doctorat en Pharmacie, Contribution a L'etude des Plantes Medicinales du Kampuchea, Avec Etude Chimique de Huit Plantes a Huiles Essentielles**. Phaculte de Pharmacie de Ha Noi, Ha Noi.

Vidal, J. 1956. **Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR**, Tame XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris.



1.0 Scientific Name : *Alstonia scholaris* (L.) R. Br.
Family : Apocynaceae

2.0 Vernacular Names : Tinpet (Lao PDR); pulai (Malaysia)

3.0 Plant Description

Big evergreen tree about 10–20 m high with whorled branching. Bark thick, lenticellate, much fluted, greyish brown. Leaves ablong, rounded at the apex, 5–8 verticillate, but usually crowded at the end of branches, 8–15 long, 2.5–4.5 cm wide, shining dark green above, glaucous beneath, secondary nerves parallel. Flowering period, September–October. Fruiting period, November–March.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

The plant is widely found in the tropical regions of Asia. In Lao PDR, the plant is found in most parts of the country including the city.

6.0 Chemical Constituents

The bark contains ditaine, echitenine, echitamine (ditamine) and echitamidine.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine

In Lao PDR, the plant in the form of decoction and elixir is used to treat fever, coughs, diarrhea and dysentery. The bark is used to treat diabetes, stomach-ache, coughs, malaria and cold. The leaves are used in treating cold, diarrhea and consumed as tonic.

8.0 Contraindications

Not available

9.0 Bibliography

Bounhong Southavong *et al.* 1993. **The Medicines in Your Garden**. Volume I. Research Institute of Medicinal Plants, Ministry of Public Health, Vientiane.

Nanthavanh Bounyapraphat *et al.* **Medicinal Plants of Thailand**. Volume 2, Pp. 243, 2542.

National Institute of Materia Medica, 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Science and Technology Publishing House, Ha Noi.

Vasilalangsy, Chalune *et al.* 1985. **Recipe of Traditional Medicine in Lao PDR**. State Council of Science and Technology, Vientiane.

Vidal, J. 1963. **Premiere Partie Noms Vernaculaires – Noms Scientifique en Usage au Lao PDR**.



- 1.0 Scientific Name** : *Asparagus cochinchinensis* Merr.
Family : Asparagaceae
- 2.0 Vernacular Names** : Cochinchinese asparagus; shiny asparagus (English), moeum sam seb (Cambodia), cheon-moon-dong (Korea), phark xee xang, ya nang xang (Lao PDR); thiên môn, tiên môn đông, túc tiên leo (Viet Nam)

3.0 Plant Description

Perennial scandent shrub with tuberous roots. Stems glabrous, spinous. Branchlets reduced to leaves (cladophyllus), falciform, angular. Flowers white, small, arising in the leaf-axils. Berry globose, pale green at first, finally white. Seeds black.

- 4.0 Propagation** : Seed (vegetative part)

5.0 Geographical Distribution/Ecology

It grows wild among shrubs. In Lao PDR, it is found in Saravane province.

6.0 Chemical Constituents

The root contains asparagine, spirostanol saponin: asparacochinchinenside A; spirosteroids: asparacochinchinensins A and B, phenolic compounds: 3'-methoxy-asparennydiol and 3'-methoxy-nyasol, polysaccharide, methyl-protogracillin.

7.0 Report on Medicinal Usage

- 7.1 Uses supported by experimental/clinical data:**
 Not available

7.2 Uses in traditional medicine:

The roots are used for fever in the form of decoction.

8.0 Contraindications

Not available

9.0 Bibliography

Đỗ Huy Bích et al. **Cây thuốc và Động vật làm thuốc ở Việt Nam**. TAP I VA II 2, National Institute of Meteria Medica, Sciences and Technology (Vietnamese version).

National Institute of Materia Medica, Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

Vidal, J. 1956. **Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR**, Tome XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris.



- 1.0 Scientific Name** : *Caesalpinia sappan* L.
Family : Leguminosae
- 2.0 Vernacular Names** : Farng daeng (Lao PDR); sapan wood, bukkum wood, brasil-wood (English)

3.0 Plant Description

There are 373 species belonging to the *Caesalpinia* genus; 4 species have been found in Lao PDR. *Caesalpinia sappan*, small tree, 5–10 m in height; stem bark prickly; young shoots tomentose; leaves pinnate, leaflets glabrous, above, tomentose beneath. Inflorescence in terminal raceme; corolla 5-lobed, yellow; stamens 10; filaments tomentose at lower part. Pod ovoid, compressed with hard shell and sharp horn. Seeds 3-4, yellowish brown.

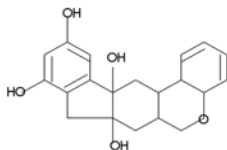
- 4.0 Propagation** : Not available

5.0 Geographical Distribution/Ecology

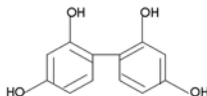
Caesalpinia sappan grows in many mountainous provinces in the northern part of Lao PDR, especially in Luang Prabang province, at the altitude of at least 800 ft. It has been found in low-land area.

6.0 Chemical Constituents

The lignin of old plants consists of phenolic compounds. The most important active compounds are brasilin and sappanin. An essential oil (D- α -phellandrene, ocimene), gallic acid and saponosides are also present in this species.



SAPPANIN



BRASILIN

7.0 Reports on medicinal usage

7.1 Uses supported by experimental/clinical data:

The hardwood of *C. sappan* possesses antibacterial activities. It is used for treating many intestinal-related diseases caused by various bacteria such as *Shigella dysenteriae*, *S. flexneri*, *Bacillus subtilis* and *Escherichia coli* etc. It also shows haemostatic and demulcent properties.

7.2 Uses in traditional medicine:

Sappan wood is indicated for the treatment of diarrhoea, type of bacillary dysentery, colic and hemorrhoids with a dose of 8–16 g per day. Recently, the Pharmaceutical Development Center (PDC) Ministry of Health of Lao PDR, produced 0.5 g tablets from the dry extract of sappan wood under the trade name **Tanin**. This tablet is used for the treatment of acute dysentery and diarrhoea.

It is orally administered for adults at a dose of two tablets per time, thrice a day.

The decoction of sappan wood is used in post-partum, contusions, and blood stasis caused by trauma. It is also used for ameliorating blood flow and eliminating high blood pressure.

8.0 Contraindications

Not available

9.0 Bibliography

Index Kewensis, Kew Garden, London.

Jeffrey, B. H. *et al.* 1993. **Phytochemical Dictionary**. Taylor & Francis, London. Pp. 542.

National Institute of Materia Medica Ha Noi, Viet Nam. 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi. Pp. 151–158.

Vidal, J. 1959. **Noms Vernaculaires des Plantes Lao, Meo, Kha, Ta**. XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris. Pp. 570.



- 1.0. Scientific Name** : *Calotropis gigantea* (L.) (W. T. Aiton)
Family : Asclepiadaceae
- 2.0. Vernacular Names** : Niujaogua (China); crown flower, giant Indian milkweed, giant milkweed (English); asclepiade gigantesque, faux arbre de soie, mercure végétal (French); biduri, saduri, sidaguri widuri (Java-Indonesia); dok hack (Lao PDR); rembega, lembega, kayu (Malaysia); dok rak, pan thuean, po thuean (Thailand); bông bông, cây lá hen, nam tý bà (Viet Nam)

3.0. Plant Description

Calotropis gigantea is a shrubby plant, stem woody, grows up to 3 m high. Leaves opposite, obovate, thick, sessile with the base clasping the stem, lobe clothed with fine cotton tomentum beneath. Inflorescence in axillary; flowers arranged in umbellate cyme, white; calyx, 5 sepals ovate; 5 stamens; ovary superior. The fruit is a swollen follicle, short and turn back. Seeds numerous with silky tuft of hair.

- 4.0. Propagation** : Stem (vegetative parts)

5.0. Geographical Distribution/Ecology

It is planted in Lao PDR in front of houses for their leaves and flowers for praying on ceremonial and wedding days and also for medicinal purposes. It is also found in other countries in Asia like Cambodia, India, Myanmar, Sri Lanka, Thailand and Viet Nam. It can be propagated by vegetative multiplication, planting the healthy cuttings at the beginning of rainy season.

6.0. Chemical Constituents

All parts of the plant contain white latex, rubber matter and resins. The latex comprises the esters valerianic and acetic of two alcohols, á and â-calotropéol. Cardioactive steroidal glycoside

or cardenolides, namely calotropin, calactin and usharidin, are also reported. The roots contain of triterpenic saponines.

7.0. Report on Medicinal Usage

7.1. Uses supported by experimental/clinical data:

Not available

7.2. Uses in traditional medicine:

The leaves and powder of the flower are used for coughs and asthma.

8.0. Contraindications

Not available

9.0. Bibliography

Đỗ Huy Bích et al. *Cây thuốc và Động vật làm thuốc ở Việt Nam*. TAP I VA II 2, National Institute of Meteria Medica, Sciences and Technology (Vietnamese version).

Vidal, J. 1956. *Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR*, Tome XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris.



- 1.0 Scientific Name** : *Cassia alata* L.
Family : Leguminosae

- 2.0 Vernacular Names** : KhyLeck (Lao PDR); gelanggang (Malaysia)

3.0 Plant Description

Small shrub, about 1.5 m high or more; stem stout branches horizontally spreading, strait and minutely pubescent. Leaves paripinnate, big sized, alternate 30–40 cm long, leaflets 8–12 pair, rectangular or oval 5–13 cm long, 2.5–7 cm wide, increasing in size from the base, broadly rounded oblique at the base, glabrous on both sides; petiole slightly winged; stipule erect, acute, persistent; twigs and petioles usually reddish brown. Inflorescence in axillary and terminal erect spike 20–30 cm long, 3–4 cm wide; peduncle stout; bracts caduceous; flower yellow; sepals 5 unequal; glabrous petals 5 oblong. Pod long, slightly compressed with winged margins 8–16 cm; seed numerous, rhombiform, black. Flowering and fruiting period: October–December.

- 4.0 Propagation** : Plant cutting and seed

5.0 Geographical Distribution/Ecology

Cassia alata is one of the typical tropical plants, widespread in Southeast Asian countries. In Lao PDR, it can be found on both mid- and highlands in all parts of the country, with an increasing frequently southwards, especially in Champasack province.

6.0 Chemical Constituents

Antraquinones, chrysophanol, alo-emodin, thein and emodin. The total anthraquinones are 0.2% in the leaf and 1.3% in the fruit, anthraquinone I and II were isolated from the root.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The leaves have diuretic and anti-inflammatory action. The leaf extract, given orally, produces no effects on blood glucose in normoglycaemic rats, but lowers blood glucose in rats made hyperglycemic by streptozotocin.

7.2 Uses in traditional medicine:

A combination of *C. alata* leaves with *Combretum quadrangulare* seeds is applied to treat ascariasis. The purgative action of *C. alata* leaves enhances the vermifuge effect of *C. quadrangulare* seeds, the rate of ascarid excretion attaining 50–60%. An ointment made from *C. alata* leaves has been tried for drug safety and fungicide activities.

The stem bark is used to treat skin diseases, diarrhea, parasitic skin diseases, scabies, dehydration and hemorrhoids. *Cassia alata* is employed to treat constipation, oedema, hepatalgia and jaundice. Its external application cures ringworm, tinea imbricata (tokelau) and circinate herpes. The juice of crushed leaves is topically applied to washed and scaled infected parts. Crush fresh leaves can also be rubbed directly to diseased parts. For the therapy of constipation: *C. alata* 20 g, *Rumex wallichii* 20 g and rhubarb 4–6 g. Their decoction is given orally per day.

8.0 Contraindications

Cassia alata is not advisable for pregnant women.

9.0 Bibliography

1998. **Medicinal Plants in the South Pacific**. WHO Regional Publication. Western Pacific Series No. 19, Regional Office for the Western Pacific, Manila.

Bounhong Southavong, Sisouk Vorlasing & Somsanith. 1993. **The Medicines in Your Garden**. Volume I, Research Institute of Medicinal Plants, Ministry of public Health, Vientiane.

Nanthavanh Bounyapraphat. *et al.* **Medicinal Plants of Thailand**. Volume 2. Pp. 852, 2542.

National Institute of Materia Medica. 1999. **Selected Medicinal Plants in Viet Nam**. Volume I, Science and Technology Publishing House, Ha Noi.

Vasilalangsy, Chalune *et al.* 1985. **Recipe of Traditional Medicine in Lao PDR**. State Council of Science and Technology, Vientiane.

Vidal, J. 1963. **Premiere partie noms vernaculaires – noms scientifique en usage Au Lao PDR**.



1.0. Scientific Name : *Codonopsis pilosa* (Franch.) Nannf.
Family : Campanulaceae

2.0. Vernacular Names : Dangshen (China); man kha kay, mak Kon thuy (Lao PDR);
 đẳng sâm, đông đẳng sâm, phong đẳng sâm (Viet Nam)

3.0. Plant Description

Codonopsis pilosa is a slender perennial twining herb. Roots tuberous, cylindrical and yield milky juice. Leaves opposite; base cordate; apex acuminate; margins entire or denticulate or wavy. Flowers solitary at the leaf-axil; corolla campanulate, ivory yellow with violet-veined inside. Berry globose, violet, seeds numerous.

4.0. Propagation : Seed

5.0. Geographical Distribution/Ecology

Codonopsis pilosa is found in some provinces of the northern part of Lao PDR, especially abundant in Hua Phan and Xieng Khuang provinces. It grows at the altitude of more than 1,000 m above sea level, preferring to grow in the bedding grass fields in mountainous region.

6.0. Chemical Constituents

According to foreign literature, the roots of *C. pilosa* possess taraxerol, friedelin, n-butylallophanate and some micro-elements including K, Na, Ca, Mg, Fe, Cu, Co, Zn, Mn, Cr, Mo, Sn, Al and Sr.

7.0. Report on Medicinal Usage

7.1. Uses supported by experimental/clinical data:

Not available

7.2. Uses in traditional medicine:

Codonopsis pilosa is used for treating general debility, fatigue, anemia, jaundice, dyspepsia, diarrhoea, etc.

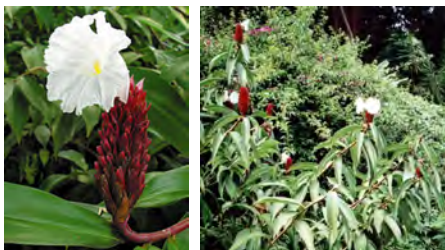
8.0. Contraindications

Not available

9.0. Bibliography

Đỗ Huy Bích et al. **Cây thuốc và Động vật làm thuốc ở Việt Nam**. TAP I VA II 2, National Institute of Meteria Medica, Sciences and Technology (Vietnamese version).

Vidal, J. 1956. **Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR**, Tome XLIX, Fascicule 2, Ecole Francaise D'Extreme Orient, Paris.



- 1.0. Scientific Name** : *Costus speciosus* (Koenig) Sm.
Family : Costaceae

- 2.0. Vernacular Names** : Pi-ch'iao-chiang (China); cane-reed, crape ginger, elegant costus, malay ginger, spiral flag (English); costus élégant (French); tabar-tabar, setawa, tawa-tawa (Indonesia); dok uong, uong Bon (Lao PDR); setawar, tawar, tawar-tawar, tawaga, stengteng, tenge (Malaysia); ueang chang, ueang mai na, ueang yai, ban dai sawan (Thailand); cát lỏi, đọt đấng, mia dò (Viet Nam)

3.0. Plant Description

Costus speciosus is a herbaceous perennial plant, up to 2 m high. Rhizome stout, fleshy, creeping up to 50 cm long. Stem hollow, less-branched. Leaves alternate, have tubular sheaths, oblong-ovoid, apex acuminate, young leaves are spiral. Inflorescence in terminal paniced spike; zygomorphic flowers supported by thick haired bracts, flowers white, large, fragrant. Fruit globose or ovoid capsules. Seeds obovoid or subglobose, black, with a narrow fleshy aril.

4.0. Propagation

Costus speciosus can be propagated both by replanting rhizome cuttings and transplanting seedlings.

5.0. Geographical Distribution/Ecology

Costus speciosus is widely grown in Lao PDR. It is found also in other tropical countries.

6.0. Chemical Constituents

The rhizome of *C. speciosus* consists of steroid saponin, dioscin and gracillin, genines diosgenin and tigogenin. β -sitosterol glycoside and curcuminoid, curcumin are also reported.

7.0. Report on Medicinal Usage

7.1. Uses supported by experimental/clinical data:

Not available

7.2. Uses in traditional medicine:

The juice of the burnt fresh stem is used as an ear drop for healing otitis.

The decoction of the rhizome of *C. speciosus* is used for crushing kidneys and bladder stones. It is used also as a cholagogue, antiamoebic and for antiinflammation.

8.0. Contraindications

Not available

9.0. Bibliography

Đỗ Huy Bích et al. *Cây thuốc và Động vật làm thuốc ở Việt Nam*. TAP I VA II 2, National Institute of Materia Medica, Sciences and Technology (Vietnamese version).

National Institute of Materia Medica, Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

Vidal, J. 1956. **Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR**. Tome XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris.



1.0 Scientific Name : *Dioscorea persimilis* Prain & Burk.
Family : Dioscoreaceae

2.0 Vernacular Names : Manh kap (Lao PDR)

3.0 Plant Description

Glabrous climber. Tuber single or paired, stout and slightly flat, with a round tip, resembling a gourd, 30–50 cm long or more, descending deep into the soil; stems glabrous, obscurely angular, sometimes purplish usually bearing axillary bulbils (aerial tubers). Leaves alternate or opposite, broadly ovate-cordate, 8–10 cm long, 6–8 cm wide, apex acuminate; main nerves 5–7, radiating from the base; petiole 1.5–3.5 cm long. Inflorescence in axillary raceme; flowers small, yellow, unisexual, dioecious; perianth of 6 equal segments; stamen 6, male spike 40 cm long, female reaching 20 cm in length. Flowering period: May–July. Fruiting period: August–October.

4.0 Propagation : Tuber

5.0 Geographical Distribution/Ecology

There are about 140 species identified worldwide, scattered mainly in tropical and sub-tropical regions. *Dioscorea persimilis* is found in Southeast Asia, South China and India. It is also common in the mountainous regions of Lao PDR and Viet Nam. This plant is regarded as food for the natives. It is hygrophilous and shade-tolerant. It usually climbs over different plants in secondary and limestone mountain forests at an altitude of up to 1,000 m. It grows vigorously in summer, withers in winter or in dry season and grows again in spring. Some varieties of *Dioscorea* have been cultivated in the northern part of Lao PDR for medicinal purposes.

6.0 Chemical Constituents

In addition to starch as the main component, the tuber contains mucin (a viscous protein), allantoin, amino acids (arginine, choline) and maltase. Analysis of the tuber yields 63.25% starch, 0.45% lipids and 6.75% proteins.

7.0 Reports on Medical Usage

7.1 Uses supported by experimental/clinical data:

The hormonal activity of *D. persimilis* was studied in immature albino rats of both sexes.

7.2 Uses in traditional medicine:

It acts as a tonic and is good for the spleen and stomach, and invigorates the lung and kidney. It is also useful for the treatment of dyspepsia, chronic enteritis, lientery, night sweating, polyuria, spermatorrhoea and metrorrhoea. As a tonic, it is used in the form of a decoction or powder, and given in combination with other plants. It also gives beneficial effects to children's diseases such as ascariasis, emaciation, anorexia and nausea.

8.0 Contraindications

Not available

9.0 Bibliography

Bounhong Southavong *et al.* 1993. **The Medicines in Your Garden**. Volume I, Research Institute of Medicinal Plants, Ministry of Public Health, Vientiane.

National Institute of Materia Medica, 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Science and Technology Publishing House, Ha Noi.

Vasilalangsy, Chalune *et al.* 1985. **Recipe of Traditional Medicine in Lao PDR**. State Council of Science and Technology, Vientiane.

Vidal, J. 1963. **Premiere Partie Noms Vernaculaires – Noms Scientifique en Usage au Lao PDR**.



- 1.0 Scientific Name** : *Eclipta prostrata* (L.) L.
Synonyms : *Eclipta alba* (L.)
Family : Asteraceae

- 2.0 Vernacular Names** : Dyer's weed, dye-wed, false daisy, trailing eclipta, white eclipta, white heads, (English); éclipse droite (French); goman, urang-aring (Java-Indonesia); smao khmanh (Cambodia); nha hom keo (Lao PDR); aghing-aghing, ari(ng)-aring, daun dakelin, dawah (Malaysia); bhingarajah, bhingaraj, tekrajah (Sanskrit/Hindu); ka meng, hom kiao (Thailand); nhọ nồ, cỏ mực, hạn liên thảo (Viet Nam)

3.0 Plant Description

Eclipta alba is slender, erect, prostrate, much branched, with rooted nodes. Leaves opposite, variable sessile linear, or oblong-lanceolate, narrowed at both ends, oppressed hairs on both sides. Inflorescence in axillary or terminal heads; flowers white; pappus 2–5, minute teeth, arches narrowly oblong, ribbed tipped with the pappus teeth.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

Eclipta alba grows wildly in wet land. It can be found almost everywhere in Lao PDR. It is found also in other Asian and Southeast Asian countries.

6.0 Chemical Constituents

The whole plant contains thiophen, including derivatives of diethienyl acetylenester, thienyl such as á-terthienyl, á-terthienyl-methanol, aldehyd, ecliptal. Organic acid, echinocystic acid, and wedelolactone are also found in the plant.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Lao traditional healers use *E. alba* to complete the following remedy for treating fever with convulsion: (1) fresh plant of *Centella asiatica* 50 g, (2) *E. alba* 50 g, (3) the roots of *Strobilantes flaccidifolius* (*hom ban*) 20 g and (4) the bark of *Oroxylum indicum*. All ingredients are thoroughly washed with clean water, adding 1 litre of clear water, grinding and filtering to get the juice.

8.0 Contraindications

Not available

9.0 Bibliography

Đỗ Huy Bích et al. *Cây thuốc và Động vật làm thuốc ở Việt Nam*. TAP I VA II 2, National Institute of Meteria Medica, Sciences and Technology (Vietnamese version).

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

Vidal, J. 1956. **Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR**. Tome XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris.



- 1.0. Scientific Name** : *Elephantopus scaber* L.
Family : Asteraceae
- 2.0. Vernacular Names** : Didancao (China); prickly-leaved elephant's foot (English); pied d'éléphant, herbe de jouissance (French); misumi-gusa (Japan); tapak gajah, tapak liman, tapak tana, tapak tangan, tutupbumi (Java-Indonesia); prakrap thom (Cambodia); khi fay nok khum (Lao PDR); berseh hitam, chapa, sebongbong, tapak babi, tapak sulaiman (Malaysia); gojiha, karipadam, satamulika (Sanskrit); do may ru lom, nat pha, ya fay nok khum (Thailand); cây thối lửa, chí thiên, khô đạ đâm, tiền hồ nam (Viet Nam)

3.0. Plant Description

Elephantopus scaber is an erect, stout herb, 0.5–1.1 m high. Leaves radical forming a rosette on the ground 12–15 cm long, 5–6 cm broad, obovate oblong, rounded or subacute, coarsely serrate-dentate, hairy on both sides. Inflorescence in terminal and axillary heads. Flowers numerous clusters of heads surrounded at the base by 3 large stiff broadly ovate-cordate conspicuously nerved leafy bracts, flowers are violet. Fruits are pappus.

- 4.0. Propagation** : Seed (vegetative parts)

5.0. Geographical Distribution/Ecology

Elephantopus scaber grows wildly in almost all provinces of Lao PDR. It is found in grass fields, growing alternately with other species of grass in abandoned land, along the roads and at the edges of rice fields. It strongly endures drought. It is found also in other countries of Indo-China, India and Himalaya

6.0. Chemical Constituents

According to some foreign references, the whole plant of *E. scaber* contains elephantine, elephantopin, deoxyelephantopin, iso-deoxyelephantopine, epifriedelanol, lupeolacetate, dotriacontan-ol. Recently, aurantiamide and crepaside E have been also isolated from the plant.

7.0. Report on Medicinal Usage

7.1. Uses supported by experimental/clinical data:

Not available

7.2. Uses in traditional medicine:

Elephantopus scaber is traditionally used for treating liver diseases and coughs.

8.0. Contraindications

Not available

9.0. Bibliography

Đỗ Huy Bích et al. *Cây thuốc và Động vật làm thuốc ở Việt Nam*. TAP I VA II 2, National Institute of Meteria Medica, Sciences and Technology (Vietnamese version).

Vidal, J. 1956. *Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR*. Tome XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris.



1.0 Scientific Name : *Eleutherine subaphylla* Gagnep.
Family : Iridaceae

2.0 Vernacular Names : Phak boua luad (Lao PDR)

3.0 Plant Description

Perennial herb, 30–40 cm high. Bulb oblong-ovoid, about 5 cm long, 2.5–3 cm in diameter. Scale thin, brownish red. Leaves lanceolate, acute at both ends with numerous parallel nerves. Inflorescence in raceme arising from bulb, 20 cm long; bracts resembling leaves; flowers white long-pedicelled; sepals 3, thin linear; petals 3; stamens 3; anthers yellow; ovary obovoid, trigonous.

4.0 Propagation : Bulb

5.0 Geographical Distribution/Ecology

The plant originates from America and is now commonly grown in Indonesia, the Philippines and other Southeast Asian countries. It is also planted widely in Lao PDR for medicinal uses. Plants growing in gardens endure shade. It is adaptable to various climatic conditions except the cold in high mountainous areas. The plants often wither in winter, the bulbs remain in the ground and re-sprout in the next spring. Flowers bloom every year, but seeds have not been observed.

6.0 Chemical Constituents

The bulbs contain quinoid substances, eleutherine, isoeleutherine, and eleutherol.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Extract with 40 alcohol of *E. subaphylla* markedly inhibits in vitro growth of various strains of *Diplococcus pneumoniae*, *Streptococcus haemolyticus*, *Staphylococcus aureus* and mildly depresses *Shigella flexneri*, *S. dysenteriae*, *Bacillus anthracis* and *B. mycoides*. The extract exerts beneficial effects for mild infectious diseases of the upper respiratory tract, especially when combined with *Belamcanda chinensis* extract.

7.2 Uses in traditional medicine:

In Lao PDR, the plant in the form of decoction and bills is used to treat jaundice, gastritis ulcer, headache, and as a tonic.

8.0 Contraindications

Not available.

9.0 Bibliography

Bounhong Southavong *et al.* 1993. **The Medicines in Your Garden**. Volume I, Research Institute of Medicinal Plants, Ministry of Public Health, Vientiane.

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume I. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

Vasilalangsy, Chalune *et al.* 1985. **Recipe of Traditional Medicine in Lao PDR**. State Council of Science and Technology, Vientiane.

Vidal, J, 1963. **Premiere Partie Noms Vernaculaires - Noms Scientifique en Usage au Lao PDR**.



- 1.0. **Scientific Name** : *Euodia leptia* L.
Family : Rutaceae
- 2.0. **Vernacular Names** : San-ya-k'u (China); vôt anhor (Cambodia); khom la van jo, kok khao may (Lao PDR); andang, chabang tiga, medang ketimang, pepauh, setenggek (Malaysia); sam ngam (Thailand); cây dầu dáu, chề đấng, ba gạc tằm ghè (Viet Nam)

3.0. Plant Description

Euodia leptia is a woody shrub, 3–5 m in height. Stem erect, glabrous, less branched; stem bark yellowish white; young twigs covered with smooth hairs. Leaves alternate, three leaflets, leaflet lanceolate. Inflorescence in terminal or axillary cyme; flowers small, white; folicles one seeded, seeds black, shining.

- 4.0. **Propagation** : Seed

5.0. Geographical Distribution/Ecology

Euodia leptia grows scarcely in secondary and dipterocarp forests. It is found in many provinces of Lao PDR, particularly in the northern part of the country. It is found also in the southern part of China, Viet Nam, Cambodia, in most parts of peninsula Malaysia and India.

6.0. Chemical Constituents

The roots of *E. leptia* contain alkaloids: edulinine, isoplatydesmine and ribalinine. The leaves contain flavonoid derivatives, tannin and organic acids.

7.0. Report on Medicinal Usage

7.1. Uses supported by experimental data:

Not available

7.2. Uses in traditional medicine:

Euodia lepta is used in Lao traditional medicine in the treatment of asthma.

8.0. Contraindications

Not available

9.0. Bibliography

Đỗ Huy Bích et al. **Cây thuốc và Động vật làm thuốc ở Việt Nam**. TAP I VÀ II 2, National Institute of Materia Medica, Sciences and Technology (Vietnamese version).

Vidal, J. 1956. **Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR**. Tome XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris.



1.0 Scientific Name : *Morinda citrifolia* L.
Family : Rubiaceae

2.0 Vernacular Names : Mark nho ban (Lao PDR); awltree, hag apple, ice leaf, India mulberry (English)

3.0 Plant Description

Medium to rather big-sized tree, 5–10 m high. Young twigs, quadrangular, slightly compressed and grooved. Leaves opposite, stipuliferous, shining above and pale below, undulate at margins. Inflorescence in dense ovoid head, white at the beginning of the flowering period and then yellow. Fruit ovoid, drupelets, pink when ripe, seed numerous.

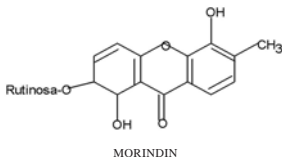
4.0 Propagation : *Morinda citrifolia* is planted by the villagers for its edible fruit and grows sparsely in many localities of Lao PDR, but no information about the method of propagation was found.

5.0 Geographical Distribution/Ecology

Morinda citrifolia grows abundantly in secondary forest at the altitude of about 700 ft. It also grows in many other provinces throughout the countries.

6.0 Chemical Constituents

Phytochemical screening shows that the roots, stem and leaves of *M. citrifolia* contain anthraquinone derivatives. Root bark contains morindine, morindone, alizarine derivative (alizarine-a-ethylethr), and flavonoid, rutine; hardwood contains morindone, physcion-8-O-[[a-L-arabinosyl(1 3)]{b-D-galactopyranosyl(1 6)}(b-D-galactopyranoside)]. The flower contains anthraglycoside and flavonoside. The fruit contains a small amount of essential oil.



7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Extracts of *M. citrifolia* show the following biological activities: antitumour, antitumour-promoting, hypotensive, antibacterial (*Staphylococcus*, but weak versus *Bacillus subtilis*), antiascaridiasis, antimutagenic (*Salmonella*), antinematode (*Bursaphelenchus xylophilus*).

7.2 Uses in traditional medicine:

The dry fruits of *M. citrifolia* are used for treatment of arthritis, diabetes and breast cancer. They are abortifacient and used as cardiotonic and emmenagogue. Aqueous leaf or root extracts are consumed for the treatment of acute malaria and cathartic. The leaves are used for stomach-ache, sore gums, sore throat, chest cold in infants, pleurisy, dysentery, induced abortion, infected wound healing, inflammation, broken bones and leprosy sores. The fresh roots are used for ichtheotoxin/sting and external cancerous swelling. The decoction of the roots is used for treatment of coughs. The dried bark is used for urinary disorders.

A decoction of the dried fruits and seeds of *M. citrifolia* is used for arthritis. Dried roots and fruits are beneficial in the form of decoction or infusion for hypertension. The roots are also used for treating lumbago and relieving body pain.

Dose: 30 g dry root, 20-30 g dry fruit.

8.0 Contraindications

Not available

9.0 Bibliography

Index Kewensis. Kew Garden, London.

Jeffrey, B. H. *et al.* 1993. **Phytochemical Dictionary.** Taylor & Francis, London. Pp. 542.

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam.** Volume 2. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi. Pp. 102-105.

NAPRALERT = NATural PProduct ALERT ^{A2230B} database (www.napralert.org), University of Illinois at Chicago, Chicago.



1.0 Scientific Name : *Passiflora foetida* L.
Family : Passifloraceae

2.0 Vernacular Names : Phack buang, kheua nian harnq, phack ho harm, phack tarm nin thornq (Lao PDR); timun dendang (Malaysia)

3.0 Plant Description

Perennial climber with tendrils. Stem hollow, cylindrical. Leaves alternate, trilobed; margins wavy with ciliate silky hairs; nerves palmate; petiole doubly glandular; tendril axillary. Flowers bisexual, solitary at the axil of the leaves; corolla white, pale violet in the centre; coronal violet; stamens 5; ovary superior. Fruit ovoid or globose; pericarp crisp and yellow when ripe; seeds numerous, edible.

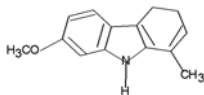
4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

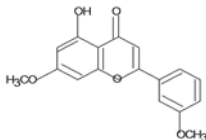
It grows wild in open places in tropical countries.

6.0 Chemical Constituents

The aerial parts of the plant contain indol alkaloid, tryptamine, 5-hydroxy indole and harman; tetraphylline B (sulphate) alicyclic; flavonols: ermanine and pachypodol. The leaves contain deidacline aicyclic, linamarine alkanol, 3-5-hydroxy-4-7-Di-O-methyl flavonone, two apigenine derivatives: 4-7-dimethoxy flavone and 4-7-Di-O-methyl flavone. The fruit contains volkenine, and seed contains oil and linoleic acid.



HARMAN



APIGENIN 7,4-DIMETHYL FLAVONE

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The whole plant is used to treat hypertension, antispasmodic insomnia, headache, epilepsy, giddiness, emmenagogue, constipation, coughs, flu and sores. The dry roots are used to stimulate menstruation and for abortion. The fresh fruit is used as food, in relieving constipation, sores and cough.

The plant is known to have a tranquilizing effect. A mixture of the plant with the young leaves of indian bean (*Erythrina variegata*), the embryo of sacred lotus (*Nelumbo nucifera*) and young leaves of mulberry tree (*Morus alba*) is used for treating insomnia. In the case of insomnia with heart trouble, a mixture of leaves of *N. nucifera*, *P. foetida* and the aerial part of *Leonurus heterophyllus* is used.

A decoction of *P. foetida* is used as a natural tranquilizer and for hiccup. It is formulated in the form of 1.03–3.0 g per bowl, 2–3 bowls per time, and thrice a day. Young leaves of *P. foetida* are consumed as vegetable.

8.0 Contraindications

Not available

9.0 Bibliography

Jeffrey, B. H. *et al.* 1993. **Phytochemical Dictionary**. Taylor & Francis, London. Pp. 542.

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 2. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi. Pp. 164-169.

NAPRALERT = NATural PRoduct ALERT^{A2230B} database (www.napralert.org), University of Illinois at Chicago, Chicago.



- 1.0 Scientific Name** : *Polygonum multiflorum* Thunb.
Synonyms : *Pleuropterus multiflorum*, *Pleuropterus multiflorus*
Family : Polygonaceae

- 2.0 Vernacular Name** : Man orn ling (Lao PDR)

3.0 Plant Description

Scandent perennial herb with big brownish red tuberous root. Stems elongate, branchlets and petioles violet-purple. Leaves alternate, simple, ovate-cordate. Inflorescence in axillary or terminal panicle, flowers numerous, small, greenish white. Nutlet triangular, three winged, entirely closed by sepals. Flowering seasons from July to October.

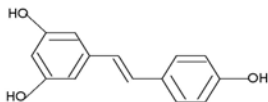
- 4.0 Propagation** : Tuber

5.0 Geographical Distribution/Ecology

It grows wild in highland or mountain thickets, especially in Huaphanh and Xieng Khouang provinces, Lao PDR.

6.0 Chemical Constituents

The tuber contains steroid, daucosterol; isoquinoline alkaloid, N-trans-ferulyl-3-methyl, dopamine; quinoid: emodin and its derivatives, emodine monomethylether, 2-acetyl emodin, emodin monoethylether, emodin-1-6-dimethylether, emodin-6-methylether, emodin-8-O- β -D-glucoside, juglone (6-acetyl-1-2-methoxy-7-methylquinone), chyrosphannol, rhein and physcion; triterpenic saponine; flavonol: quercitrin, foeniculin, hyperoside, etc. The entire plant contains resveratrol (3-5-4-trihydroxystilbene) and rhapontin.



RESVERATROL

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

In China, the dry aerial part is used as decoction to treat insomnia, increases vigour and fertility. The tuber possesses antihepatotoxic and antioxidant activities, and is used for treating coronary disease and hyperlipidemia. The extract of *P. multiflorum* also shows hair stimulant properties. Dose: 8–16 g daily.

Decoctions of the roots are given to women after childbirth. A mixture of the plant and *Codonopsis javanica* extracts has been used as tonic for neuralsthenia, insomnia, rheumatism, lumbago, hypogalactia, anemia, etc. The average daily dose is 20–30 g.

8.0 Contraindications

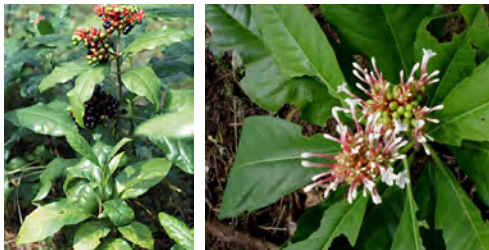
Not available

9.0 Bibliography

Jeffrey, B. H. *et al.* 1993. **Phytochemical Dictionary**. Taylor & Francis, London. Pp. 542.

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 2. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi. Pp. 202-207.

NAPRALERT = NATural Product ALERT^{A2230B} database (www.napralert.org), University of Illinois at Chicago, Chicago.



- 1.0. Scientific Name** : *Rauwolfia serpentina* Benth. ex Kurz
Family : Apocynaceae
- 2.0. Vernacular Names** : Bon-ma-ya-zar (Burma); she gen mu, yin-tu lo-fu mu (China); rauwolfia, serpentine, serpentine root, serpent wood, snake wood, snake-root, (English); racine de serpent (French); chhotachand, sarap-gandha (Hindu); Indo-Jyaboku (Japan); kha gnom phoo (Lao PDR); sarpagandha, chandrika (Sanskrit); rayom (Thailand); ba gac An đở (Viet Nam)

3.0. Plant Description

Rauwolfia serpentina is an undershrub, 0.3–1 m high. Root much-fluted. Stem lenticellate, less branched. Leaves 3-verticillate, occasionally opposite, lanceolate, attenuate at both sides. Inflorescence in terminal or axillary umbellate cymes; flowers tubular, white to pink cymes. Drupes ovoid, purplish-black when ripe, glabrous, single-seeded. The plant yields milky juice.

- 4.0. Propagation** : Seed (vegetative parts)

5.0. Geographic Distribution

Rauwolfia serpentina prefers to grow in tropical or subtropical areas with mean annual rainfall of 1,500–2,000 mm and mean temperature ranging from 25° to 30° C. The plant is indigenous to Indo-China, Borneo, Sumatra, Sri Lanka and India. It is a rare plant, but is found in some provinces of Lao PDR, especially on the Nam Ngum river banks, in Veun Kham area, Vientiane capital city.

6.0. Chemical Constituents

The plant, especially the root bark, contains indol alkaloids; the total alkaloids range from 1 to 3%. The alkaloids are classified into four types:

1. Yohimbine-type: including reserpine, the main active compound of the plant, reserpinine, reserpidine, rescinnamine, yohimbines (α -yohimbine, β -yohimbine and δ -yohimbine), aniso rauhimbine.
2. Heteroyohimbine-type: including ajmalicine, serpentine, serpentinine and raubasine.
3. Sarpagan-type (sarpagine type): including raupine (sarpagine), a hypotensive active compound.
4. Ajmalane-type (ajmaline type): including ajmaline, an antiarrhythmic compound, iso-ajmaline.

7.0. Report on Medicinal Usage

7.1. Uses supported by experimental/clinical data:

Not available

7.2. Uses in traditional medicine:

In Lao traditional medicine the root of *R. serpentina* combining with other materia medica is used for relieving headache. It used also for hypertension.

8.0. Contraindications

Not available

9.0. Bibliography

Đỗ Huy Bích et al. **Cây thuốc và Động vật làm thuốc ở Việt Nam**. TAP I VA II 2, National Institute of Meteria Medica, Sciences and Technology (Vietnamese version).

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 2. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi. Pp. 227–231.

Vidal, J. 1956. **Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR**. Tome XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris.



- 1.0 Scientific Name** : *Solanum procumbens* Lour.
Synonym : *S. Hainanense* Hance
Family : Solanaceae

- 2.0 Vernacular Name** : Khang khom kheua (Thailand)

3.0 Plant Description

The plant is a straggling shrub, stem and branches numerous, short, stout and recurved prickles. Leaves simple, alternate, thin, ovate or oblong in texture; margins irregularly lobed. Inflorescence in axillary cyme, of 2–8 flowers, pale violet. Fruit globose, glabrous, reddish yellow when ripe; seed numerous, yellow, reniform.

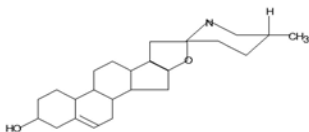
- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

It is widely distributed in every part of Lao PDR. It is also found in many Asian countries.

6.0 Chemical Constituents

The leaf contains tomatid-5-en-3-b-ol. *Entire plant*: glyco-alkaloids (solanine or (b-solanine) or steroidal saponines. b-Solanine can be hydrolyzed to yield solanidine and solasodine.



SOLASODINE

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The root, leaf or whole plant is used for treating some respiratory-related diseases such as coughs and asthma; they are also expectorant, detoxicant or antidote, antidiabetic, tonic and diuretic agents.

The plant has been used for treating snake bites, phlegmatic and stingy wounds. A handful of the root segments is crushed and then macerated in about 200–300 ml cool drinking water, the macerate is immediately given to the victim. The treatment will continue for a couple of days by giving patients the decoction of the root.

The fruit is an expectorant, cough relief. It is also used to stop bleeding in cases of hemorrhoids.

8.0 Contraindications

Not available

9.0 Bibliography

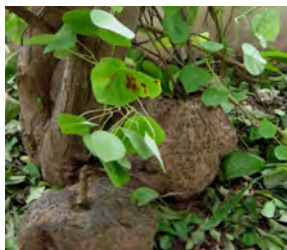
Farnsworth, N. R. *et al.* 1992. **Thai Medicinal Plants**. Prachachon Publishing, Bangkok. Pp. 225.

Index Kewensis, Kew Garden, London.

Jeffrey, B. H. *et al.* 1993. **Phytochemical Dictionary**. Taylor & Francis, London. Pp. 542.

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 2. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

Vidal, J. 1956. **Noms Vernaculaires des Plants (Lao, Meo, Kha) en Usage Au Lao PDR**. Tome XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris. Pp. 201.



1.0 Scientific Name : *Stephania rotunda* Lour.
Family : Menispermaceae

2.0 Vernacular Names : Di bu rong (China); Indian tape-vine, moon seed creeper, (English); koma pich (Cambodia); hua tom ngeun, king kang dong (Lao PDR); daun nasi-nasi (Malaysia); pha nang nang (Thailand); binh voi, củ bông bênh (Viet Nam)

3.0 Plant Description

Stephania rotunda is a perennial evergreen shrub, 2–10 m long; tuber stout, attaining 100 kg. Leaves alternate, thin, peltate; radiately nerved; glabrous on both sides; petioles long, inserted at one quarter from the base of the lamina. Inflorescence in axillary umbellate cyme. Flowers orange, female and male on different plants. Drupes globose, compressed, red when mature. Seeds hippocrepiform with transverse ribs.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Stephania rotunda prefers to grow in limestone mountains, and is found scarcely in deciduous forest, in lowland forests. It can be shade-enduring. The plant is found in many localities in Lao PDR, and also in many countries of Southeast Asia, in the southern part of China, Viet Nam and Cambodia.

6.0 Chemical Constituents

The main active compound of *S. rotunda* is 1-tetrahydropalmaine (gindarine or hindarine), Roemerine is also reported.

7.0. Report on Medicinal Usage

7.1. Uses supported by experimental/clinical data:

Not available

7.2. Uses in traditional medicine:

In Lao traditional Medicine, *Stephania* tuber is used for serious dysentery (stool with blood); it is used as a decoction.

8.0. Contraindications

Not available

9.0. Bibliography

Đỗ Huy Bích et al. *Cây thuốc và Động vật làm thuốc ở Việt Nam*. TAP I VA II 2, National Institute of Materia Medica, Sciences and Technology (Vietnamese version).

Vidal, J. 1956. *Noms Vernaculaires des Plantes (Lao, Meo, Kha) en Usage Au Lao PDR*. Tome XLIX, Fascicule 2, Ecole Francaise D' Extreme Orient, Paris.



Malaysia



1.0 Scientific Name : *Ardisia elliptica* Thunb.
Family : Myrsinaceae

2.0 Vernacular Names : Mata pelanduk (Malaysia); sea-shore ardisia (English)

3.0 Plant Description

A bush or small tree. Leaves simple, alternate, leathery pink when young, elliptic or obovate obtuse, 5–12.5 cm long, 2.5–6 cm; margins entire. Flowers small in stalked cluster from the leaf axils, pink. Fruits berries rounded, flattened from above, green when young turning red when mature, edible with sweet taste.

4.0 Propagation : Seed

5.0 Geographic Distribution

It grows wild and is widely distributed in lowland to hill forest in Malaysia.

6.0 Chemical Constituents

Syringic acid, isorhamnetin and quercetin

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Syringic acid, isorhamnetin and quercetin obtained from dried fruit extract of *A. elliptica* showed antisalmonella activity.

7.2 Uses in traditional medicine:

The roots are used by women with irregular menses and herbal tonic for body maintenance.
The leaves are used in treatment of earache and mouth ulceration.

8.0 Contraindications

Not available

9.0 Bibliography

Burkill, I.H. 1935. **A Dictionary of the Economic Products of the Malay Peninsula**. Crown Agents, London.

Corner, E.J.H. 1988. **Wayside Trees of Malaya**. Vol. II. The Malayan Nature Society, Kuala Lumpur.

Gimlette, G. D. 1939. **A Dictionary of Malayan Medicine**. Oxford Univ. Press, Kuala Lumpur. 160 pp.

Henderson, M.R. 1951. **Malayan Wild Flowers: Dicotyledons**. Malayan Nature Society, Kuala Lumpur. 478 pp.

Phadungkit, M. & Luanratana, O. 2006. Anti-salmonella activity of constituents of *Ardisia elliptica* Thunb. **Nat. Prod. Research** 20(7): Pp. 693–696.

Ridley, H.N. 1967. **The Flora of the Malay Peninsula**. Vol. I and II. Reeve & Co., London.



1.0 Scientific Name : *Chromolaena odorata* (L.) R. King & H. Rob.
Family : Asteraceae

2.0 Vernacular Names : Pokok kapal terbang, pokok jerman (Malaysia);
 christmas bush, siam weed, baby tea (English)

3.0 Plant Description

Subshrub with long rambling branches; stems terete, pubescent. Leaves opposite, flaccid-membranous, velvety-pubescent, deltoid-ovate, acute, very coarsely toothed, each margin with 1–5 teeth, or entire in youngest leaves; 1–1.5 cm long; blade mostly 5–12 cm long, 3–6 cm wide. Inflorescence subcorymbose axillary and terminal clusters; peduncles 1–3 cm long; bracteates, bracts slender, 10–12 mm long; involucre of about 4–5 series of bracts; pale with green nerves, acute, the lowest ones about 2 mm long, upper ones 8–9 mm long, all acute, distally ciliate, flat, appressed except the extreme divergent tip; florets all alike (disc-florets), pale purple to dull off-white, the styles extending about 4 mm beyond the apex of the involucre, spreading radiately; receptacle very narrow; florets about 20–30 or a few more, 10–12 mm long; ovarian portion 4 mm long; corolla slender trumpet form; pappus of dull white hairs 5 mm long. Seeds achenes glabrous.

4.0 Propagation : Stem cutting

5.0 Geographical Distribution

It grows wild in open and disturbed areas mainly in lowlands all over Southeast Asia.

6.0 Chemical Constituents

(+)-eupaten, 2',3',4,4',6'-pentahydroxchalcone, acacetine, eupaten, isosakuranetine, mikanine, odoratine, sakuranetine, salvigenine, tamarixetine, velutine, 4-sitosterol, anisic acid, ̂-amyrin, ̂-sitosterol, ceryl-alcohol, copper, epoxylupeol, eupatenol, ̂-sitosterol, lupeol, magnesium,

manganese, phosphorus, tannin, protocatechuic, p-hydroxybenzoic, p-coumaric, ferulic, vanillic acids

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

- i. From the flowers of *C. odorata* (*Eupatorium odoratum*) four flavanones, isosakuranetin (5,7-dihydroxy-4'-methoxyflavanone) (1), persicogenin (5,3'-dihydroxy-7,4'-dimethoxyflavanone) (2), 5,6,7,4'-tetramethoxyflavanone (3) and 4'-hydroxy-5,6,7-trimethoxyflavanone (4), two chalcones, 2'-hydroxy-4,4',5',6'-tetramethoxychalcone (5) and 4,2'-dihydroxy-4',5',6'-trimethoxychalcone (6), and two flavones, acacetin (5,7-dihydroxy-4'-methoxyflavone) (7) and luteolin (5,7,3',4'-tetrahydroxyflavone) (8) were isolated and identified. Compound 1 exhibited moderate antimycobacterial activity against mycobacterium tuberculosis with the MIC value of 174.8 microM, whereas compounds 4, 7, and 8 exhibited weak activity with the MIC values of 606.0, 704.2 and 699.3 microM respectively. Compound 7 showed moderate cytotoxicity against human small cell lung cancer (NCI-H187) cells with the MIC value of 24.6 microM, whereas compound 8 exhibited moderate toxicity against NCI-H187 cells and weak toxicity against human breast cancer (BC) cells with the MIC values of 19.2 and 38.4 microM respectively.
- ii. Clinical studies using this plant extract have shown antimicrobial and anticoagulation effects as well as the promotion of tissue remodelling in the wound healing process. However, the mechanism by which this agent affects cells involved in the wound healing process is unknown. Fibroblasts and endothelial cells, two cell types that play a crucial role in wound healing, were used to investigate some of the effects of eupolin extract *in vitro*. Cell growth was estimated by a colorimetric assay at different time intervals. Enhanced growth of fibroblasts and endothelial cells was found at concentrations of 10 microg/ml and 100 microg/ml of eupolin extract. This was particularly evident in medium supplemented with only 0.5% fetal calf serum where the cells were quiescent. Toxicity of the extract to fibroblasts was observed at 250 microg/ml in Dulbecco's modified Eagle's medium/0.5% fetal calf serum, but there was no significant damage at this dose to the endothelial cells. The results of the study demonstrated that eupolin extract increased fibroblast and endothelial cell growth, and this could explain in part the beneficial clinical effects that have been observed.

7.2 Uses in traditional medicine:

The leaves are used as wound healing and a local antiseptic agent, ailments including malaria, fever and infection and as a haemostatic agent.

8.0 Contraindications

Not available

9.0 Bibliography

Bamba, D., Bessiere, J. M., Marion, C., Pelissier, Y. & Fouraste, I. 1993. Essential oil of *Eupatorium odoratum*. **Planta Medica** 59(2): Pp. 184–185.

Bose, P. H., Chakrabarti, P., Chakraverti, S., Dutta, S. P. & Barua, A. K. 1973. Flavonoid constituents of *Eupatorium odoratum*. **Phytochemistry**, 12. Pp. 667–671.

Glasby, J.S. 1991. **Dictionary of Plants Containing Secondary Metabolites**. Great Britain: Bunes Science Press.

Muhamad Zakaria, Mustafa Ali Mohd, 1994. **Traditional Malay Medicinal Plants**. Kuala Lumpur, Penerbit FajarBakti Sdn Bhd.

Phan TT, Hughes MA, Cherry GW. 1998. Enhanced proliferation of fibroblasts and endothelial cells treated with an extract of the leaves of *Chromolaena odorata* (Eupolin), an herbal remedy for treating wounds. **Plastic and Reconstructive Surgery**. 101(3): Pp. 756–765.

Phan, T T; Wang, L; See, P; Grayer, R J; Chan, S Y; Lee, S T, 2001. Phenolic compounds of *Chromolaena odorata* protect cultured skin cells from oxidative: implication for cutaneous wound healing, **Biological & Pharmaceutical Bulletin** 24: Pp. 1373–1379.

Sam Teng Wah, 1995. Constituents and uses of *Eupatorium odoratum* L. **Trends in Traditional Medicines Research**. USM Penang.

Suksamrarn A, Chotipong A, Suavansri T, Boongird S, Timsuksai P, Vimuttipong S, Chuaynugul A. 2004. Antimycobacterial activity and cytotoxicity of flavonoids from the flowers of *Chromolaena odorata*. **Arch. Pharm. Res.** 27(5): Pp. 507–511.

Talapatra, S. K., Bhar, D. S. & Talapatra, B. 1977. Terpenoids and related compounds 13-epoxylyupeol, a new triterpenoid from *Eupatorium odoratum*. **Indian J. Chem.** 15 (9): Pp. 806–807.



- 1.0 Scientific Name** : *Curcuma xanthorrhiza* Roxb.
Family : Zingiberaceae

- 2.0 Vernacular Names** : Temu lawak (Malaysia); rimpang lawak (Indonesia)

3.0 Plant Description

A herb with branched rhizome, outside dark yellow to reddish-brown, inside orange or orange-red; leaf sheaths up to 75 cm long, blades elliptical-oblong to oblong-lanceolate, 25–100 cm x 8–20 cm, green with reddish-brown band along the midrib; inflorescence on a separate shoot, bracts pale green, coma bracts purple; corolla 4–6 cm long, pale red, labellum 2–2.5 cm x 1.5–2 cm, yellowish with darker yellow median band, staminodes yellow-white, anther with long spurs.

- 4.0 Propagation** : Rhizome

5.0 Geographical Distribution/Ecology

The plant is cultivated throughout the tropic.

6.0 Chemical Constituents

b-Atlantone, bisacumol, bisacurool, b-curcumene, 5'-methoxycurcumin, b-methoxycurcumin, curcuminoid, essential oil, germacrone, phenolic diarylheptanoid, sesquiterpenoid, ar-tumerone, a-tumerone, b-tumerone, xanthorrhizol

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Curcuma xanthorrhiza showed antioxidant and antibacterial properties. Xanthorrhizol has a preventive effect on cisplatin-induced nephrotoxicity and exerts anti-metastatic activity *in vivo*.

7.2 Uses in traditional medicine:

Used as tonic, carminative and anti-inflammatory for constipation, colic, stomachache, vermifuge, fever, malaria, rheumatism, constipation, numb feet, gonorrhoea. Used as a poultice for swelling, cosmetic, mosquito repellent and ingredient in shampoo and perfume.

8.0 Contraindications

Not available

9.0 Bibliography

Burkill, I. H. 1966. **A Dictionary of the Economic Products of the Malay Peninsula**. Ministry of Agriculture and Cooperative, Kuala Lumpur. Vol. I & II.

Choi M. A., Kim, S. H., Chung, W. Y., Hwang, J. K. & Park, K. K. 2004. Xanthorrhizol, a natural sesquiterpenoid from *Curcuma xanthorrhiza*, has an anti-metastatic potential in experimental mouse lung metastasis model. **Biochemical and Biophysical Research Communications** 326(1): 210–217.

Departemen Kesehatan Republik Indonesia. 1979. **Materia Medika Indonesia** Vol. III.

Herbal Medicine Research Centre, Institute for Medical Research, Kuala Lumpur. 2002. **Compendium of Medicinal Plants Used in Malaysia 1**: 233–234.

Hwang, J. K., Shim, J. S. & Pyun, Y. R. 2000. Antibacterial activity of xanthorrhizol from *Curcuma xanthorrhiza* against oral pathogens. **Fitoterapia** 71(3): 321–323.

Ibrahim, J., Abu Said, A., Mohd. Ali N.A., Ahmad, A., R. & Halijah I. 1999. Chemical composition of the rhizome oils of four *Curcuma* species from Malaysia. **J. Essential Oil Research** 11: 719–723.

Kim S. H., Hong, K. O., Chung, W. Y., Hwang, J. K. & Park, K. K. 2004. Abrogation of cisplatin-induced hepatotoxicity in mice by xanthorrhizol is related to its effect on the regulation of gene transcription. **Toxicology and Applied Pharmacology** 196(3): 346–355.

Kim, S. H., Hong, K. O., Hwang, J. K. & Park, K. K. 2005. Xanthorrhizol has a potential to attenuate the high dose cisplatin-induced nephrotoxicity in mice. **Food and Chemical Toxicology** 43(1): 117–122.

Masuda, T., Isobe, J., Jitoe, A. & Nakatani, N. 1992. Antioxidative curcuminoids from rhizomes of *Curcuma xanthorrhiza*. **Phytochemistry** 31(10): 3645–3647.

Padua, L.S., Bunyapraphatsara, N. & Lemmens, R.H.M.J. (Eds.) 1999. Medicinal and Poisonous Plants 1. Plant Resources of South-East Asia (PROSEA) No. 12 (1). Bogor, Indonesia.

Pandji C., Grimm, C., Wray, V., Witte, L. & Proksch, P. 1993. Insecticidal constituents from four species of the zingiberaceae. **Phytochemistry** 34(2): 415–419.

Ruslay, S., Abas, F., Shaari, K., Zainal, Z., Maulidiani, Sirat, H., Israf, D. A. & Lajis, N. H. 2007. Characterization of the components present in the active fractions of health gingers (*Curcuma xanthorrhiza* and *Zingiber zerumbet*) by HPLC–DAD–ESIMS. **Food Chemistry** 104(3): 1183–1191.

Sirat, H. M., Hong, N. M., & Jauri, M. H. 2007. Chemistry of xanthorrhizol: synthesis of several bisabolane sesquiterpenoids from xanthorrhizol. **Tetrahedron Letters** 48(3): 457–460.

Suksamrarn A., Eiamong, S., Piyachaturawat, P., & Charoenpibosin, J. 1994. Phenolic diarylheptanoids from *Curcuma xanthorrhiza*. **Phytochemistry** 36(6): 1505–1508.

Yasni, S., Imaizumi, K., Nakamura, M., Aimoto, J. & Sugano, M. 1993. Effects of *Curcuma xanthorrhiza* Roxb. and curcuminoids on the level of serum and liver lipids, serum apolipoprotein A-I and lipogenic enzymes in rats. **Food and Chemical Toxicology** 31(3): 213–218.

Yasni, S., Imaizumi, K., Sin, K., Sugano, M., Nonaka, G. & Sidik. 1994. Identification of an active principle in essential oils and hexane-soluble fractions of *Curcuma xanthorrhiza* Roxb. showing triglyceride-lowering action in rats. **Food and Chemical Toxicology** 32(3): 273–278.



1.0 Scientific Name : *Cymbopogon citratus* Stapf.
Family : Poaceae

2.0 Vernacular Names : Serai, serai makan (Malaysia); lemon grass (English); sereh, semiai, sere, sarai, sorai (Indonesia); chakai, takrai (Thailand)

3.0 Plant Description

Perennial. Culms densely clumped and leafy at the base, up to 2 m tall; leaf-sheaths terete, glabrous; blades linear-acuminate up to 90 cm long by 2 cm wide; ligule 2 mm deep. Inflorescence a loose nodding panicle; racemes up to about 2 cm long; rachis-internodes and spikelet pedicels 2.5–3 mm long; densely hairy.

4.0 Propagation : Cutting

5.0 Geographic Distribution/Ecology

It is widely distributed in tropical regions and is cultivated in open and dry areas.

6.0 Chemical Constituents

a-Camphorene, caprylic acid, caryophyllene, cerylalcohol, 1,8-cineole, citronellal, citronellic acid, citronellol, citral, cymbopogone, cymbopogonol, a- and b-dihydropseudoionone, decanal, N-decylaldehyde, diacetyl, dipentene, farsenal, farsenol, furfural, geranic acid, geranial, geraniol, geranylacetate, hexacosanol, isopulegol, isovaleraldehyde, isovaleric acid, linalol, linalylacetate, limonene, luteolin, luteolin-C-glycoside, methylheptenone, methylheptenol, b-myrcene, neral, nerol, a-pinene, quercetin, rutin, b-sitosterol, a-terpineol, tricotanol, minerals and saponins

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

- i. The objective of study was to test the efficacy of a slow-release citronella formulation as a repellent against the head louse. During four months in 2003 a randomized, placebo-controlled double-blind clinical study was conducted in four elementary schools; 103 children were treated with the test formulation and 95 with a placebo. A significant difference was observed during the second examination two months later, when 12.0% of the children treated with the test repellent and 50.5% of those treated with placebo were infested with lice. A significant difference was also observed at the third examination two months later, when 12.4% of the children treated with the test repellent and 33.7% treated with placebo were infested. Overall, there were significant differences between those treated with the repellent and those treated with the placebo (15.4% and 55.1% respectively, $P < 0.0001$). Side effects were observed in 4.4% of children who disliked the odour of the formulation, and an additional 1.0% who complained of a slight itching and burning sensation. Use of an effective repellent could significantly lower the incidence of reinfestations, which would lower expenditure on lice control, including pediculicides, combs and products for nit removal, and the time spent on treatment and removal of the nits.
- ii. The essential oils obtained by hydrodistillation from fresh leaves of *C. citratus* and *Ocimum gratissimum* growing in Cameroon were analysed by GC and GC/MS. The main constituents of the oil of *O. gratissimum* were gamma-terpinene (21.9 %), beta-phellandrene (21.1 %), limonene (11.4 %) and thymol (11.2 %), while the oil of *C. citratus* contained geranial (32.8 %), neral (29.0 %), myrcene (16.2 %) and beta-pinene (10.5 %). The effects of these oils on the growth of *Plasmodium berghei* were investigated. Both oils showed significant antimalarial activities in the four-day suppressive *in vivo* test in mice. At concentrations of 200, 300 and 500 mg/kg of mouse per day, the essential oil of *C. citratus* produced the highest activity with the respective percentages of suppression of parasitaemia: 62.1, 81.7 and 86.6 %. The corresponding values for the oil of *O. gratissimum* at the same concentrations were 55.0, 75.2 and 77.8 %, respectively. Chloroquine (10 mg/kg of mouse, positive control) had a suppressive activity of 100 %.

7.2 Uses in traditional medicine:

Lemon grass is used as digestion aid, emmenagogue, fermentations and food flavouring. It is also used as a mild diuretic and tonic, promoting perspiration, treating kidney problems and herbal tea. The essential oils are used for flatulence, irregular bowel movement, gastric irritability, arresting vomiting, rheumatism, sprains and insect repellent.

8.0 Contraindications

Not available

9.0 Bibliography

Adegoke, G.O. & Odesola, B.A. 1996. Storage of maize and cowpea and inhibition of microbial agents of biodeterioration using the powder and essential oil of lemon grass (*Cymbopogon citratus*). **International Biodeterioration & Biodegradation** 37: Pp. 81–84.

Baratta, M.T.; Dorman, H.J.D.; Deans, S.G.; Figueiredo, A.C.; Barroso, J.G.; & Ruberto, G. 1998. Antimicrobial and antioxidant properties of some commercial essential oils. **Flavour and Fragrance Journal** 13: Pp. 235–244.

Burkill, I.H. 1935. **A Dictionary of the Economic Products of the Malay Peninsula**. Crown Agents, London.

Cheah, P.B., Ng, C.H. & Wong, C.F. 2001. Antioxidant activity of tropical lemon grass (*Cymbopogon citratus*) extracts in linoleic acid and chicken fat systems. **Journal of Food Science and Technology** 38: Pp. 62–64.

De F. Melo, S.; Soares, S.F.; Da Costa, R.F.; Da Silva, C.R.; De Oliveira, M.B.N.; Bezerra, R.J.A.C.; Caldeira-de-Araújo, A.; & Bernardo-Filho, M. (2001). Effect of *Cymbopogon citratus*, *Maytenus ilicifolia* and *Baccharis genistelloides* extracts against the stannous chloride oxidative damage in *Escherichia coli*. **Mutation Research** 496: Pp. 33–38.

De-Oliveira, A.C.A.X., Ribeiro-Pinto, L.F., Otto, S.S. Goncalves, A. & Paumgarten, F.J.R. 1997. Induction of liver monooxygenases by b-myrcene. **Toxicology** 124: Pp. 135–140.

De-Oliveira, A.C.A.X.; Ribeiro-Pinto, L.F.; & Paumgarten, F.J.R. 1997. *In vitro* inhibition of CYP2B1 monooxygenase by b-myrcene and other monoterpenoid compounds. **Toxicology Letters** 92: Pp. 39–46.

Gilliland, H.B. 1971. **A Revised Flora of Malaya: Grasses of Malaya**. Vol. 3. Government Printing Office, Singapore. Pp. 294–299.

Jaganath, I.B. & Ng, L.T. 2000. **The Green Pharmacy of Malaysia**. Vinpress Sdn. Bhd., Kuala Lumpur.

Kauderer, B., Zamith, H., Paumgarten, F.J. & Speit, G. 1991. Evaluation of the mutagenicity of beta-myrcene in mammalian cells *in vitro*. **Environmental and Molecular Mutagenesis** 18: Pp. 28–34.

Kishore, N., Mishra, A.K. & Chansouria, J.P. 1993. Fungitoxicity of essential oils against dermatophytes. **Mycoses** 36: Pp. 211–215.

Lima, E.O., Gompertz, O.F., Giesbrecht, A.M., & Paulo, M.Q. 1993. *In vitro* antifungal activity of essential oils obtained from officinal plants against dermatophytes. **Mycoses** 36: Pp. 333–336.

Lorenzetti, B.B., Souza, G.E., Sarti, S.J., Santos Filho, D., & Ferreira, S.H. 1991. Myrcene mimics the peripheral analgesic activity of lemon grass tea. **Journal of Ethnopharmacology** 34: Pp. 43–48.

Mishra, A.K. & Dubey, N.K. 1994. Evaluation of some essential oils for their toxicity against fungi causing deterioration of stored food commodities. **Applied and Environmental Microbiology** 60: Pp. 1101–1105.

Mumcuoglu KY, Magdassi S, Miller J, Ben-Ishai F, Zentner G, Helbin V, Friger M, Kahana F, Ingber A. 2004. Repellency of citronella for head lice: double-blind randomized trial of efficacy and safety. **Isr. Med. Assoc. J.** 6(12): Pp. 756–759.

Perry, L.M. & Metzger, J. 1980. **Medicinal Plants in East and Southeast Asia**. The MIT Press, Cambridge & Massachusetts.

Puatanachokchai, R., Kishida, H., Denda, A., Murata, N., Konishi, Y., Vinitkummu, U. & Nakae, D. 2002. Inhibitory effects of lemon grass (*Cymbopogon citratus* Stapf) extract on the early phase of hepatocarcinogenesis after initiation with diethylnitrosamine in male Fischer 344 rats. **Cancer Letters** 183: Pp. 9–15.

Rajapakse, R. & Van Emden, H.F. 1997. Potential of four vegetable oils and ten botanical powders for reducing infestation of cowpeas by *Callosobruchus maculatus*, *C. chinensis* and *C. rhodesianus*. **Journal of Stored Products Research** 33: Pp. 59–68.

Rao, V.S. Menezes, A.M. & Viana, G.S. 1990. Effect of myrcene on nociception in mice. **The Journal of Pharmacy and Pharmacology** 42: Pp. 877–878.

Suaeyun, R.; Kinouchi, T.; Arimochi, H.; Vinitkummu, U.; & Ohnishi, Y. 1997. Inhibitory effects of lemon grass (*Cymbopogon citratus* Stapf) on formation of azoxymethane-induced DNA adducts and aberrant crypt foci in the rat colon. **Carcinogenesis** 18: Pp. 949–955.

Tchoumboungang F, Zollo PH, Dagne E, & Mekonnen Y. 2005. *In vivo* antimalarial activity of essential oils from *Cymbopogon citratus* and *Ocimum gratissimum* on mice infected with *Plasmodium berghei*. **Planta Med.** 71(1): Pp. 20–23.

Vinitkummu, U., Puatanachokchai, R., Kongtawelert, P., Lartprasertsuke, N. & Matsushima, T. 1994. Antimutagenicity of lemon grass (*Cymbopogon citratus* Stapf) to various known mutagens in salmonella mutation assay. **Mutation Research** 341: Pp. 71–75.

Zamith, H.P., Vidal, M.N., Speit, G. & Paumgarten, F.J. 1993. Absence of genotoxic activity of beta-myrcene in the *in vivo* cytogenetic bone-marrow assay. **Brazilian Journal of Medical and Biological Research** 26: Pp. 93–98.



1.0 Scientific Name : *Cymbopogon nardus* (L.) Rendle
Family : Poaceae

2.0 Vernacular Names : Serai wangi (Malaysia); citronella grass (English);
 sereh, wangi, seriwang (Indonesia)

3.0 Plant Description

Perennial. Tufted with fibrous roots from a thickened base. Culms erect up to 2.5 m high, the tops drooping; leaf-sheaths glabrous; blades, the lower up to 1 m long by 2 cm wide, the upper smaller, edges and surfaces rough, glabrous except near the base; ligule up to 5 mm deep, glabrous. Inflorescence ultimate branches slender; zig-zag internodes about 1.5–2.5 cm long with reduced leaf at each node and at its axil one or more short branches each bearing a pair of racemes.

4.0 Propagation : Cutting

5.0 Geographical Distribution/Ecology

It is widely distributed in tropical regions including India, Ceylon and Southeast Asia.

6.0 Chemical Constituents

Citronellol and citronella; geraniol; borneol, boumonene, camphene, camphor, 1-carvotanacetone, d-3-carene, citronellybutyrate, D-citronellolacetate, D-citronellol-N-butyrate, *p*-cymene, elemol, ethanol, farnesol, furfural, geranylacetate, geranylbutyrate, geranylformate, hexanol, limonene, linalol, linalylacetate, methyleugenol, methylisoeugenol, methylheptanone, menthol, myrcene, nerol, nerolidol, *cis*-ocimene, perillaldehyde, phellandral, *a*-phellandrene, *a*-pinene, *b*-pinene, sabinene, *a*-terpineol, terpinen-4-ol, terpinolene, tujylalcohol, *trans*-ocimene and tricyclene

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The mosquito-repellent activity of 38 essential oils from plants at three concentrations was screened against the mosquito *Aedes aegypti* under laboratory conditions using human subjects. On a volunteer's forearm, 0.1 mL of oil was applied per 30 cm² of exposed skin. When the tested oils were applied at a 10% or 50% concentration, none of them prevented mosquito bites for as long as 2 h, but the undiluted oils of *C. nardus* (citronella), *Pogostemon cablin* (patchuli), *Syzygium aromaticum* (clove) and *Zanthoxylum limonella* (Thai name: makaen) were the most effective and provided 2 h of complete repellency. From these initial results, three concentrations (10%, 50% and undiluted) of citronella, patchouli, clove and makaen were selected for repellency tests against *Culex quinquefasciatus* and *Anopheles dirus*. As expected, the undiluted oil showed the highest protection in each case. Clove oil gave the longest duration of 100% repellency (2–4 h) against all three species of mosquito.

7.2 Uses in traditional medicine:

The whole plant is used traditionally for stomach comfort and digestion aid, as well as an emmenagogue and a wash after childbirth. It is found to have diuretic, sudorific and antiperiodic properties.

8.0 Contraindications

Not available

9.0 Bibliography

- Blacow, N.W. & Wade, A. 1973. **The Extra Pharmacopoeia**. 26th ed. London : The Pharmaceutical Press.
- Burkill, I.H. 1935. **A Dictionary of the Economic Products of the Malay Peninsula**. Crown Agents, London.
- Chowdury, J.U., Yusuf, M., Begun, J., Mondello, L., Previti, P. & Dugo, G. 1998. Studies on the essential oil bearing plants of Bangladesh. Part IV. Composition of the leaf oils of three *Cymbopogon* species : *C. flexuosus* (Nees ex Steud.) Wats., *C. nardus* (L.) Rendle var. *confertiflorus* (Steud.) N. L. Bor and *C. martini* (Roxb.) Wats. var. *martini*. **Journal of Essential Oil Research** 10: Pp. 301–306.
- De Billerbeck, V.G., Roques, C.G., Bessière, J.M., Fonvieille, J.L., & Dargent, R. 2001. Effect of *Cymbopogon nardus* (L.) W. Watson essential oil on the growth and morphogenesis of *Aspergillus niger*. **Canadian Journal of Microbiology** 47: Pp. 9–17.
- Gilliland, H.B. **A Revised Flora of Malaya: Grasses of Malaya**. Vol. 3. Government Printing Office, Singapore. Pp. 294–299.
- Hasnah, H. 1980. Analisis dan pencirian minyak bauan dari *Cymbopogon nardus* dan *Cymbopogon winteriansis* (minyak serai wangi). Tesis Smsn. Jabatan Kimia, Fakulti Sains Fizis dan Gunaan. Universiti Kebangsaan Malaysia, Bangi.

Ibrahim, J. & Zaridah, M.Z. 1995. Development of environmentally-friendly insect repellents from the leaf oils of selected Malaysian plants. in Ghazali, I.; Murtedza, M. & Laily, B.D. (Ed.) **Chemical Prospecting in the Malaysian Forest**. Sarawak : Pelanduk Publication (M) Sdn Bhd. Pp. 205–212.

Jaganath, I.B. & Ng, L.T. 2000. **The Green Pharmacy of Malaysia**. Vinpress Sdn. Bhd., Kuala Lumpur.

Jantan, I.; Zaki, Z.M.; Ahmad, A.R.; & Ahmad, R. 1999. Evaluation of smoke from mosquito coils containing Malaysian plants against *Aedes aegypti*. **Fitoterapia** 70: Pp. 237–243.

Ketoh, G.K.; Glitho, A.I.; & Huignard, J. 2002. Susceptibility of the bruchid *Callosobruchus maculatus* (F.) (Coleoptera: Bruchidae) and its parasitoid *Dinarmus basalis* (Hymenoptera: Pteromalidae) to three essential oils. **Journal of Economic Entomology** 95: Pp. 174–182.

Press, Cambridge & Massachusetts.

Raja, N., Albert, S., Ignacimuthu, S., & Dorn, S. 2001. Effect of volatile oils in protecting stored cowpea *Vigna unguiculata* (L.) Walpers against *Callosobruchus maculatus* (F.) (Coleoptera: Bruchidae) infestation. **Journal of Stored Products Research** 37: Pp. 127–132.

Ridley, H.M. 1925. **The Flora of the Malay Peninsular**. Vol. V. Reeve & Co. Ltd, London.

Perry, L.M. & Metzger, J. 1980. **Medicinal Plants in East and Southeast Asia**. The MIT
Trongtokit Y, Rongsriyam Y, Komalamisra N, Apiwathnasorn C. 2005. Comparative repellency of 38 essential oils against mosquito bites. **Phytother Res** 19(4): Pp. 303–309.



- 1.0 Scientific Name** : *Elephantopus scaber* L.
Family : Asteraceae
- 2.0 Vernacular Names** : Tutup bumi, tapak sulaiman (Malaysia)
- 3.0 Plant Description**

An upright, stiff herb about 20–40 cm high, very pubescent due to abundance of trichomes throughout the entire plant. Leaves crowded at stem; base forming a rosette close to the ground, oblong, or broadest near the rounded or bluntly pointed tip, tapered to the base 4–15 cm long, 1–5 cm wide; leaf stalk very short, white, hairy; leaf margins sometimes wavy. Flower heads at the end of white-woolly branches rising from the leaves, several heads in a cluster, surrounded by broad, pointed, leaf-like bracts which are often tinged purplish; petal protruding nearly 1 cm beyond the inner, narrow, pointed bracts, pink with a white tube.

- 4.0 Propagation** : Seed
- 5.0 Geographical Distribution/Ecology**

It is distributed in Malaysia, Southeast Asia, mainland China, Japan and Indo-China.

6.0 Chemical Constituents

Dotriacontanol, epifriedelinol, triacontanol, potassium chloride, 11, 13 – dihydrodeoxy-elephantopin, 11,13-dihydroelephantopin, stigmaterol, deoxyelephantopin, isodeoxy- elephantopin, epifriedelanol and lupeol

7.0 Reports on Medicinal Usage

- 7.1 Uses supported by experimental/clinical data:**
Not available

7.2 Uses in traditional medicine:

As an antibacterial, diuretic and aphrodisiac. It is useful in the treatment of venereal disease for women, fever, vomiting, dropsy and inflammation of the scrotum, as a tonic for women after childbirth, and to ward away evil spirits.

8.0 Contraindications

Not available

9.0 Bibliography

Burkill, I.H. & Haniff, M. 1930. **Garden Bulletin Straits Settlement** 6: 219.

Chandler, R.F. & Hooper, S.N. 1979. Friedelin and rhoiptelenyl acetate, a new pentacyclic triterpenoid associated triterpenoids. **Phytochemistry** 18: Pp. 711–724.

DeSilva, L., Herath W.H.M.W., Jennings, R.C., Mahendran, M. & Wannigama, G.E. 1982. A new sesquiterpene lactone from *Elephantopus scaber*. **Phytochemistry** 21: Pp. 1173–1175.

Gimlette, J.D., & Burkill, I.H. 1930. **Garden Bulletin Straits Settlement** 6: 494.

Gimlette, J.D. & Thomsom, H.W. 1939. **A Dictionary of Malayan Medicine**. London. Oxford University Press. 234 pp.

Govindachari, T.R., Jadhav, S.J., Joshi, B.S., Kamat, V.N., Mohamed, P.A., Parthasarathy, P.C., Patankar, S.J., Prakash, D., Rane, D.F. & Viswanathan, N. 1969. **Indian Journal of Chemistry** 7: 308–310.

Govindachari, T.R., Viswanathan, N. & Fuhrer, H. 1972. Isoleoxyele-phantopin, a new germacranediolide from *Elephantopus scaber* Linn. **Indian Journal of Chemistry** 10: Pp. 272–279.

Malaysia Monograph Committee. 1999. **Malaysia Herbal Monograph Vol. 1**. Kuala Lumpur. Republic of China & the National Science. 1978. **Flora of Taiwan** 4:853. Epoch Pub.Co.Ltd., Taiwan.

Perry, L. M. 1980. **Medicinal Plants of East and Southeast Asia**. Massachusetts MIT Press. 92 pp.

Pongboonrod, S., Mai-tet-muang-thai. 1979. **Kasem Bannakich** 222 pp.

Sim, K.Y. & Lee, H.T. 1969. Constituents of *Elephantopus scaber* (Compositae) **Phytochemistry** 8(5): Pp. 934–935.



- 1.0 Scientific Name** : *Eurycoma longifolia* Jack
Family : Simaroubaceae

- 2.0 Vernacular Names** : Tongkat ali, penawar pahit, bedara pahit, tongkat baginda, petala bumi, pasak bumi, setunjang bumi

3.0 Plant Description

A medium-sized slender shrub reaching 10 m in height, often unbranched with reddish brown petioles. Leaves compound, even pinnate reaching 1 m in length, each consists of 30–40 leaflets, lanceolate to obovate-lanceolate, each leaflet is about 5–20 cm long, 1.5–6 cm wide, much paler on the ventral side. Inflorescence axillary, in large brownish red panicle, very pubescent with very fine, soft, glandular trichomes. Flowers are hermaphrodite; petals small, very fine pubescent, drupe hard, ovoid, yellowish brown when young and brownish red when ripe.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

Malaysia, lower Myanmar, Thailand, Indo-China to Sumatra and Borneo

6.0 Chemical Constituents

Aerwin, stigmasterol, campesterol, b-sitosterol, 9-hydroxycanthin-6-one, 9-hydroxycanthin-6-one n-oxide, 9-methoxycanthin-6-one, 9-methoxycanthin-6-one n-oxide, b-carboline-1-propionic acid, b-7-methoxycarboline-1-propionic acid, eurycomalactone, eurycomanol, eurycomanol 2-O-b-D-glucoside, 13-b-18-dihydroeurycomanol, 14-15-dihydroxyklaineaneone eurycomanone, 13-21-dihydroeurycomanone, 13-b-21-dihydroxyeurycomanone, 14-15-b-dihydroxyklaineaneone, longilactone

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Antimalarial and antihistaminic

7.2 Uses described in traditional medicine:

The roots are useful for fever, medication after birth, boils, wounds, ulcer, syphilis and bleeding gums.

8.0 Contraindications

Not available.

9.0 Bibliography

Burkill I. H. 1966. **A Dictionary of the Economic Product of the Malay Peninsula**, Ministry of Agriculture, Malaysia , Volumes I & II: Pp. 1000.

Burkill, I. H. & Haniff, M. 1930. **Garden Bulletin Straits Settlement**. 6: Pp.182.

Chan K. L., O'Neill M. J., Phillipson J. D. & Warhurst D. C. 1986. Plants as sources of antimalarial drugs. Part 3: *Eurycoma longifolia*. **Planta Medica** 52: Pp. 105–107.

Chan, K. L., Lee, S. P., Sam, T. H. & Han, B. H. 1989. A quassinoid glycoside from the roots of *Eurycoma longifolia* **Phytochemistry** 28: Pp. 857–2859.

Chan, K. L., Lee, S. P., Sam, T. H. & Tan, S. C., Noguchi, H. & Sankawa, U. 1991. 13 β , 18-dihydroeurycomano – a quassinoid from *Eurycoma longifolia*. **Phytochemistry** 30: Pp. 3138–3141.

Darise, M., Kohda, H., Mizutani, K. & Tanaka, O. 1982. Eurycomanone and eurycomanol, quassinoids from the roots of *Eurycoma longifolia*. **Phytochemistry** 21: Pp. 2091–2093.

Gimlette J. D. & Burkill, I. H. 1930. **Garden Bulletin Straits Settlement**.6: 329.

Gimlette, J. D. & Thomson, H. W. 1939. **A Dictionary of Malayan Medicine**, London: Oxford Univ. Press. Pp. 242.

Kardono L. B. S., Angerhoper C. K., Tsauri S., Padmawinata K., Pezzuto J. M. & Kinghorn A. D. 1991. Cytotoxic and antimalarial constituents of the roots of *Eurycoma longifolia*. **Journal of Natural Products** 54: 1360–1367.

Marziah Mohammad. 1987. **Tanaman Perubatan Tradisional**, Serdang : Universiti Pertanian Malaysia.

Morita, H., Kishi, E., Takeya, K., Itokawa, H. & Tanaka, O. 1990. New quassinoids from the roots of *Eurycoma longifolia*. **Chemistry Letters** 5: Pp. 749–752.

Oei-Koch A. & Kraus L. 1978. Constituents of *Eurycoma longifolia*. I. Sterols and saponins. **Planta Medica**. 34: Pp. 39.



- 1.0 Scientific Name** : *Fibraurea tinctoria* Lour.
Family : Menispermaceae
- 2.0 Vernacular Names** : Kamin kura, kuma kua, manmiet, akar stupai, olor lobai (Thailand); areuj gember (Java), akar badi, akar kunyit, akar penawar, mengkunyit, akar kuning, akar mengkunyit, akar kencing kerbau (Malaysia)

3.0 Plant Description

Big liana. Leaves ovate oblong, base rounded, apex acuminate; nerves from base, prominent beneath, deep green coriaceous glabrous, 18 cm long, 10 cm wide; petioles 6.4 cm long. Flowers, male, white in lax panicles from old wood, 5 to 15.2 cm long. Bracts narrow linear cute. Sepals 6, rounded-obovate. Inner petals narrower than outer ones, elliptic. Stamens 6, bluish green. Female flowers green. Carpels 3, obovoid bluish green. Drupe orange colour, elliptic smooth, pulp bitter, 3.8 cm long. Seed oblong, 2.5 cm long, grooved deeply on the lower surface, ends rounded.

- 4.0 Propagation** : Stem cutting

5.0 Geographic distribution

It is very common in secondary forest in lowland to hill forest throughout Malaysia.

6.0 Chemical constituents

Berberrubine, fibleucin, fibraurin, 6-hydroxyfibraurin, palmatrubine, pseudojatrorrhizine, carboxyfibleucin, chasmatine, colombamine, jatrorrhizine, magnoflorine, palmatine

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The stem and roots are used after childbirth, to treat stomach-ache, dysentery, diabetes, headache and eye-ache; smoke from dry wood is inhaled for ulceration of the nose. The yellow colour from the wood is used as colouring agent.

8.0 Contraindications

Not available

9.0 Bibliography

Bakhari N. A., Wah S. T., Cinnakali K., Fu H.-K. & Razak I. A. 1999. *Acta Cryst.* C55: Pp. 228–230.

Gimlette, G. D. 1939. *A Dictionary of Malayan Medicine*. Oxford Univ. Press, Kuala Lumpur.

Lemmens R.H.M.J. 1991. *PROSEA 3. Dye and tannin-producing plants. Fibraurea tinctoria Lour.* (Eds. Lemmens & Wulijarni-Soetjipto). Pudoc Wageningen. Pp. 74–75.

Ridley, H.N. 1922. *The Flora of the Malay Peninsula*. Vol 1. Reeve & Co. Ltd, London. Pp. 101–115.

Unone. 2000. *Dictionary of Natural Products*. Chapman & Hall. UK.

Van Steenis C. G. G. J. & De Wilde W. J. J. O. 1984-1989. *Flora Malesiana*. Kluwer Academic Pub. Dordrecht/Boston/London. Vol 10(2): Pp. 207–209.



1.0 Scientific Name : *Gynura procumbens* Merr.
Family : Asteraceae

2.0 Vernacular Names : Sambung nyawa, daun dewa (Malaysia)

3.0 Plant Description

Herbaceous, fleshy, purple tinge stem. Leaves fleshy, hairy, oval to elliptic, up to 9 cm long, 3.7 cm wide, and margin with small, widely spaced teeth. Flower heads about 1 to 2.5 cm long, narrow, hanging on long stalks in a branched inflorescence, tubular shaped, orange. Fruits narrow, with 10 ribs and a fine, white, silky pappus.

4.0 Propagation : Stem cutting

5.0 Geographic Distribution

It is common in tropical countries and grows well in open places in lowlands to hills.

6.0 Chemical Constituents

Gynurone, 4-hydroxy-4-methyl-2-pentanone, methyl hexadecanoate, methyl 9-octadecenoate, bis(2-ethylhexyl)-1,2-benzenedicarboxylate, dibutyl malonate, 6,10,14-trimethyl-2-pentadecanone, dodecanal, 3,7,11,15-tetramethyl-2-hexadecen-1-ol, stigmasterol, β -sitosterol, ethyl p-methoxycinnamate, 4-hydroxy-4-methyl-2-pentanone, stigmasterol acetate, flavonol quercetin, quercetin 3-O-rhamnosyl(1-6)galactoside, quercetin 3-O-rhamnosyl(1-6)glucoside, nonadecane, phytol valerate, kaempferol 3-O-glucoside, kaempferol 3-O-neohesperidoside, adenosine

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

- i. The crude ethanolic extract of *G. procumbens* has antiinflammatory action. To relate the activity to particular fractions using a croton oil-induced mouse ear inflammation model, the original ethanolic extract of *G. procumbens* was partitioned between water and ethyl acetate. The residues were subjected to antiinflammatory evaluation. While the water extract did not show any antiinflammatory activity, the administration of the original organic extract significantly inhibited the increase in ear thickness in response to croton oil (n = 5). The activity of 0.75 mg/ear original organic extract showed similar antiinflammatory activity (inhibition 65.2%) to that of 6 mg/ear hydrocortisone 21-hemisuccinate sodium salt (inhibition 64.8%). The organic extract was then fractionated with a series of solvents in order of increasing polarity. Each fraction was dried, dissolved in acetone and monitored using the same bioassay. These experiments showed that the hexane and toluene fractions showed significant inhibitions of 44.6% and 34.8%, respectively. These two fractions had similar activities to 4 mg/ear of hydrocortisone (inhibition 35.0%). The possible chemical constituents in the extracts and fractions were investigated using thin layer chromatography and specific color reagents. These tests showed that steroids might be one class of antiinflammatory compounds in this plant.
- ii. The ethanolic extract of the leaves of *G. procumbens*, at single doses of 50, 150 and 300 mg/kg orally, significantly suppressed the elevated serum glucose levels in diabetic rats; 150 mg/kg was found to be the optimum hypoglycaemic dose. The extract, however, did not significantly suppress the elevated serum glucose levels in normal rats, unlike glibenclamide. Metformin, but not glibenclamide, improved glucose tolerance in the diabetic rats. When the optimum dose was given to diabetic rats for seven days, the extract significantly reduced serum cholesterol and triglyceride levels in these rats. These results indicate that the leaves of *G. procumbens* may have biguanide-like activity.

7.2 Uses in traditional medicine:

The plant has antidiabetic and antimalarial properties. The leaves are used as a febrifuge in eruptive fever, to treat kidney problem, rheumatism and colon cancer.

8.0 Contraindications

Not available

9.0 Bibliography

Akowuah, A. G. 2000. **Phytochemical and Hypoglycaemic Studies of *Gynura procumbens* (Lour.)**, Merr., Universiti Sains Malaysia, Penang.

Aminah, H. I. 1994. **Kajian Fitokimia Daun Sambung Nyawa**. Universiti Sains Malaysia, Penang.

Burkill, I. H. 1996. **A Dictionary of the Economic Products of the Malay Peninsula**. Ministry of Agriculture and Cooperative, Kuala Lumpur.

Christophe, W. 2000. **Medicinal Plants of Southeast Asia**. Pelanduk Pubs. Sdn Bhd. Kuala Lumpur.

Henderson, M.R. 1951. **Malayan Wild Flowers.: Dicotyledons**. Malayan Nature Society. Kuala Lumpur. Pp. 478.

Iskander MN, Song Y, Coupar IM, Jiratchariyakul W. 2002. Antiinflammatory screening of the medicinal plant *Gynura procumbens*. **Plant Foods Hum Nutr.** 57(3-4): Pp. 233-244.

Materia Medica Indonesia. Jilid 4. 1978. Departemen Kesehatan Republik Indonesia, Indonesia.

Zhang XF, Tan BK. 2000. Effects of an ethanolic extract of *Gynura procumbens* on serum glucose, cholesterol and triglyceride levels in normal and streptozotocin-induced diabetic rats. **Singapore Med. J.** 41(1): Pp. 9-13.



1.0 Scientific Name : *Kaempferia galanga* L.
Family : Zingiberaceae

2.0 Vernacular Names : Kencur (Indonesia); cekur (Malaysia); dusol (Philippines); pro hom, waan hom, waan teen din (Thailand); dia lien, son nai, tam nai (Viet Nam)

3.0 Plant Description

Herbaceous with fleshy rhizomes. Leaves 2 or 3, spreading out close to the ground, usually more or less broadly elliptical in outline and asymmetrical, tip broadly pointed, base rounded, usually covering the earth, 8–10 cm long, 6–7 cm wide with wavy margins; petiole very short, 3–10 mm long. Flowers white with a purple patch on one petal of the corolla. Corolla is about 3 cm long, consists of 3 bracteas which are half as long as the corolla. Rhizomes short and stout, light brown, the rhizome consists of dense small tubers sometimes adhering to one another to form a larger tuber.

4.0 Propagation : Rhizome

5.0 Geographical Distribution/Ecology

It is cultivated throughout Malaysia and is also found in Indonesia, Southern China and Indo-China.

6.0 Chemical Constituents

The rhizome contains chlorogenic acid, *p*-hydroxybenzoic acid, vanillic acid, car-3-en-5-one, cinnamic acid ethyl ester, *p*-methoxycinnamic acid, *p*-methoxycinnamic acid ethyl ester, *trans-p*-methoxycinnamic acid ethyl ester, *trans-p*-methoxycinnamic acid, *n*-pentadecana, ethyl-*p*-methoxycinnamate, ethyl cinnamate, carene, camphene, borneol, *p*-methoxystyrene

7.0 Reports on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The rhizomes are carminative. They are useful for skin problems, leucorrhea, sinusitis, sore eyes, tonic, bruises, inflammation, childbirth, coughs, rheumatism, sore throat and fever.

8.0 Contraindications

Not available.

9.0 Bibliography

Burkill, I. H. & Haniff, M. 1930. **Garden Bulletin Straits Settlement** 6: 264.

Burkill, I. H. 1966. **A Dictionary of the Economic Products of the Malay Peninsula**. Ministry of Agriculture and Cooperative, Kuala Lumpur. Vol. I & II.

Duke, J. A. 1985. **C.R.C. Handbook of Medicine Herbs**. Florida CRC Press.

Gimlette, J. D. & Thomson, H. W. 1939. **A Dictionary of Malayan Medicine**. Oxford University Press, London.

Gimlette, J. D. & Burkill, I. H. 1930. **Gardens Bulletin Straits Settlement**. 6: 451.

Kiuchi, F., Nakamura, N. & Tsuda, Y. 1987. 3-Caren-5-one from *Kaempferia galanga*. **Phytochemistry** 26(12): 3350–3351.

Kiuchi, F., Nakamura, N., Tsuda, Y., Kondo, K. & Yoshimura, H. 1988. Studies on crude drugs effective on visceral larva migrans. II. Larvicidal principles in *Kaempferia galanga*. **Chemical and Pharmaceutical Bulletin** 36(1): 412–415.

Kosuge, T., Yokota, M., Sugiyama, K., Saito, M., Iwata, Y., Nakura, M. & Yamamoto, T. 1985. Studies on anticancer principles in Chinese medicine. II. Cytotoxic principles in *Biota orientalis* (L.) Endl. and *Kaempferia galangal* L. **Chemical and Pharmaceutical Bulletin** 33(12): 5565–5567.

Malaysian Monograph Committee. 1999. **Malaysian Herbal Monograph**. Vol. 1: 41–44.

Merh, P. S., Daniel, M. & Sabnis, S. D. 1986. Chemistry and taxonomy of some members of the zingiberales. **Current Science** 55: 835–839.

Noro, T., Miyase, T., Kuroyanagi, M., Ueno, A. & Fukushima, S. 1983. Monoamine oxidase inhibitor from the rhizomes of *Kaempferia galangal* L. **Chemical and Pharmaceutical Bulletin** 31(8): 2708–2711.



- 1.0 Scientific Name** : *Labisia pothoina* Lindl.
Synonym : *L. pumila* Benth. & Hook.f.
Family : Myrsinaceae
- 2.0 Vernacular Names** : Kacip fatimah, selusuh fatimah (Malaysia).
- 3.0 Plant Description**

Small herbaceous under-shrub, rooting from the stem. Leaves few, usually 4–12, pointing upwards, elliptic-lanceolate and acuminate, tip pointed and base tapered or rather broad-rounded, the whole leaf is about 5–35 cm long and 2–8 cm wide, finely toothed with numerous veins, dark green on adaxial, lighter green on abaxial; petiole usually 2–8 cm but may reach 12 cm long; the leaf blade running down to form a broad or narrow wing, or often absent. Flowers are very small, pink or white, in spike like panicle of small clusters, 6–30 cm long; sepals, petals and stamens 5; the petals wrapped round and enclosing the stamens. Fruit about 0.5 cm diameter, bright red or purple.

- 4.0 Propagation** : Not available

5.0 Geographical Distribution/Ecology

It is found in Malaysia and Indo-China and is common in dense forests all over the countries in the lowlands, sometimes in the hills.

6.0 Chemical constituents

(Z)-5-(pentadec-4'-enyl)benzene-1,3-diol, (Z)-5-(pentadec-8'-enyl)benzene-1,3-diol, (Z)-5-(pentadec-10'-enyl)benzene-1,3-diol, pelargonidin

7.0 Reports on Medical Usage

7.1 Uses supported by experimental/clinical data:

Extract of *L. pothoina* roots showed antiinflammatory activity and antibacterial activity.

7.2 Uses in traditional medicine:

The plant is used for gynaecological problems, to quicken delivery, as after-birth medicine, for flatulence, dysentery, menstruation problem and venereal diseases.

8.0 Contraindications

Not available

9.0 Bibliography

Burkill I. H. 1966. **A Dictionary of the Economic Product of the Malay Peninsula**. Ministry of Agriculture, Malaysia, , I & II, Pp. 1311.

Fasihuddin,A., Rahman, A. H. Hasmah, R. 1995. Medicinal plants used by Bajau community in Sabah. In **Trends in Traditional Medicine Research**. Chan, K.L. *et al.* (Eds.). University Science Malaysia, Penang. Pp. 493–504.

Gimlette J. D. & Thomson H. W. 1939. **A Dictionary of Malayan Medicine**. Oxford Univ. Press, London. Pp. 58.

Ibrahim, J. Yong, H. K., Dae, Y. S. & Byung, H. H. 1996. Inhibitory effects of Malaysian medicinal plants on the platelet-activating factor (PAF) receptor binding. **Natural Product Science** 2(2): Pp. 86–89.

Nik Musaadah, M., Nur Muna, H. A. M. & Rasadah, M. A. 2004. Topical anti-inflammatory activity of *L. pumila*. In **Proceedings of the Seminar on Medicinal Plants**, 20–21 Aug. 2002. Chang, Y. S. *et al.* (Eds.) FRIM, Kepong. Pp.168–170.

Perry L. M. **Medicinal Plants of East and Southeast Asia**. 1980. M.I.T. Press, Massachusetts. Pp. 282.



- 1.0 Scientific Name** : *Languas galanga* Stuntz
Family : Zingiberaceae
- 2.0 Vernacular Names** : Lengkuas (Malaysia); khaa (Thailand); palla (Philippines); rieng, rieng kho, rieng nep, son nai (Viet Nam)

3.0 Plant Description

Grows from rhizomes. The young stem sprouts out from the base of the old stem. Stem non-woody, soft, watery, smooth and green in colour. Leaves lanceolate with pointed end, 24–27 cm long, 3.5–11.5 cm wide; upper surface of leaf is dark green and lighter green underneath; leaf margin is wavy; petiole short, 1–1.5 cm long; ligule (tongue shaped), brown with very fine hairs. Flower terminal with a large peduncle, bell shaped, 12 cm long, greenish white. The number of flowers lower down the stalk is more (3–6) compared with the upper part (1–2); bract lanceolate, pointed, thin and glabrous. The size of the bract decreases towards the peak of the peduncle.

4.0 Geographical Distribution/Ecology

It is cultivated in rather wet ground in Malaysia, Indo-China, Indonesia and Thailand.

- 5.0 Propagation** : Rhizome

6.0 Chemical Constituents

1-acetoxychavicol acetate, 1-hydroxychavicol acetate, a-terpineol, 4-hydroxybenzaldehyde, *trans*-coniferyl diacetate, *trans-p*-coumaryl diacetate, a-bergamotene, b-bisabolene, borneol, borneol acetate, butanol acetate, camphene, carveol I, carveol II, chavicol, chavicol acetate, citronellol acetate, a-copaene, curcumene, *p*-cymene, *p*-cymenol, eugenol methyl ether, 1-acetoxyeugenol acetate, trans-b-farnesene, geraniol acetate, a-humulene, limonene, myrcene, nerol acetate, pentadecane, linalool, propanol acetate, 2-methyl sabinene, santalene, b-sesquiphellandrene, g-terpinene, terpinolene, tridecane, caryophyllene oxide, 1-acetoxychavicol acetate, 1-hydroxycineol acetate, *p*-hydroxycinnamaldehyde, di-(*p*-hydroxy-*cis*-styryl)-methane, a-pinene, b-pinene,

quercetin, kaempferol, quercetin-3-methyl ether, isorhamnetin, kaempferide, galangin and galangin-3-methyl ether

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Flavonoids from the rhizome showed antifungal activity against *Trichophyton rubrum*, *T. mentagrophytes*, *Epidermophyton floccosum* and other gram-positive and gram-negative bacteria.

7.2 Uses in traditional medicine:

The rhizome is antiseptic. It is useful for fever, pityriasis versicolor, afterbirth, colic, ringworm, puerpera, flatulence, headache, borborygmus, desquamation of soles and hand, stomach-ache and diarrhoea, insanity and menstrual pain. It strengthens stomach and intestine, improves digestion and purifies blood.

8.0 Contraindications

Not available

9.0 Bibliography

- A. Samad Ahmad. 1988. **Warisan Perubatan Melayu**. Dewan Bahasa dan Pustaka, Kuala Lumpur. Pp. 126.
- Barik, B. R., Kundu, A. B. & Dey, A. K. 1987. Two phenolic constituents from *Alpinia galanga* rhizome. **Phytochemistry** 26: Pp. 2126–2127.
- Burkill, I. H. & Haniff, M. 1930. **Garden Bulletin Straits Settlement** 6: Pp. 268.
- Burkill, I. H. 1966. **A Dictionary of the Economic Products of the Malay Peninsula**. Ministry of Agriculture, Malaysia. I & II: Pp. 1327–1332.
- De Pooter, H. L., Omar, M. N., Coolsaet, B. A. & Schamp, N. M. 1985. The essential oil of greater galanga (*Alpinia galanga*) from Malaysia. **Phytochemistry** 24: Pp. 93–96.
- Gimlette, J. D. & Haniff, M. 1930. **Garden Bulletin Straits Settlement** 6: Pp. 473.
- Gimlette, J. D. & Thomson, H. W. 1939. **A Dictionary of Malayan Medicine**, Oxford University Press. London. Pp. 145–146.
- Holtum, R. E. 1950. **The Garden Bulletin Singapore** 12: Pp. 142.
- Janssen, A. M. & Scheffer, J. J. C. 1985. Acetoxychavicol acetate, an antifungal component of *Alpinia galanga*. **Planta Medica** 50: Pp. 507–511.
- Janssen, A. M., Scheffer, J. J. C. & Baerheim-Svensden, A. 1985. **Abstract International. Res. Congress Natural Product Coll. Pharm.**, University North Carolina. July 7–12. Pp. 45.
- Leungsakul, S. 1987. Antipyrogenic bacterial activities of extracts from six species of medicinal plants. 13th Symposium on Sciences and Technology of Thailand, Songkhla, Thailand, 20–22 October 1987.



1.0 Scientific Name : *Mitragyna speciosa* Korth.
Family : Rubiaceae

2.0 Vernacular Names : Biak, biak-biak, ketom, kutum (Malaysia), kratom, krathom, ithang, kakuam or thom (Thailand)

3.0 Plant Description

Large tree about 20 m height. Leaves orbicular or ovate blunt acuminate; base round cordate or narrowed, 5–15 cm long, 2.5–10 cm wide. Stipule obovate. Peduncles usually in threes, axillary, 3–5.5 cm long; head 1.2 cm. Fruit head 1.2 cm, oblong-ovoid.

4.0 Propagation : Stem cutting

5.0 Geographical Distribution/Ecology

It occurs in lowlands throughout Malaysia and Thailand.

6.0 Chemical Constituents

Ajmalicine, ajmaline, aquamigine, apigenin, apigenin-7-O-glucoside, apigenin-7-O-rhamnoglucoside, caffeic acids, ciliaphylline, corynantheidine, corynoxene, corynoxines, 3-dehyromitragynine, epicatechin, 3-epiisorotundifoline, 9-hydroxyryhncophylline-type oxindoles, hyperoside, 3-isoajmalicine, isocorynantheidine, isopaynantheine, isomitrafoline, isomitraphylline, isorotundifoleine, isospeciofoline, isoquercitrin, isospecionoxene, javaphylline, kaempferol, kaempferol-3-glucoside, mitraciliatine, mitrafoline, mitragynine, mitrajavine, mitraphylline, mitraspecine, mitraversine, oxyindole alkaloids, paynantheine, quercitin, quercitin-3-galactoside-7-rhamnoside, quercitrin, rynchociline, rynchophylline, rotundifoleine, rutin, speciociliatine, speciofoline, speciogynine, specionoxene, speciophylline, stipulatine, uncarine

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Mitragyna speciosa possesses mild anti-narcotic activity. It has a morphine-like action on gastric acid secretion in the CNS (central nervous system). Its anti-depressant activity has no effect on the spontaneous motor activity. It has acute and long-term effects on food and water intake and body weight in rats.

Alkaloid extract of the plant indicates an antinociceptive and/or antidepressive actions partly through activation of the dorsal raphe nucleus in rat CNS.

7-hydroxymitragynine isolated from plant demonstrated induced more potent opioid antinociceptive effects and was less constipating than morphine.

Indole-alkaloid mitragynine of the plant inhibits the contraction of the vas deferens produced by electrical transmural stimulation in guinea pig probably through its blockage of neuronal Ca^{2+} channels.

Administration mitragynine in mice contributes descending noradrenergic and serotonergic systems which are involved in the antinociceptive activity of supraspinally on the mechanical noxious stimulation, while the descending noradrenergic system predominantly contributes to the effect of supraspinal mitragynine on the thermal noxious stimulation and may differ from morphine in mice.

7.2 Uses in traditional medicine:

The leaves are used as poultice to treat wound, fever and expel worms in the stomach and enlarged spleen. They are also used as analgesic, antiarrhoea, antihelminthic, stimulant, fumitory, masticatory, mild narcotic and remedy for opium addiction.

8.0 Contraindications

Not available

9.0 Bibliography

Abdul Karim, A. G., Alam Shah, S. & A. Hasimah, 1991. Tissue culture and alkaloid production from *Mitragyna speciosa* Korth. In **Medicinal Products from Tropical Rain Forests: Proceedings of the Conference**, May 13–15 1991. Khozirah, S. *et al.* (Eds.) FRIM, Kepong. Pp. 228–230

Beckett, A. H., Shellard, E. J., Phillipson, J. D. Calvin & Lee, M. 1965. Alkaloids from *Mitragyna speciosa* (Korth.). **Journal of Pharmacy and Pharmacology** 17: 753–755

Burkill I. H. 1966. **A Dictionary of the Economic Product of the Malay Peninsula**. Ministry of Agriculture and Cooperative, Kuala Lumpur. Vol. I & II.

Burkill, I.H & Haniff, M. 1930. **The Garden's Bull. Straits Settlement**. Vol. 6.

Chaudhury, R. R. 1986. Folklore herbal contraceptive and remedies. **Trends in Pharmacological Sciences** 7(4): 120–123.

Emboden, W. 1979. **Narcotic Plants**. Macmillan Pub. Co., New York.

Goh, S. H., Chuah, C. H., Mok, J. S. L. & Soepadmo, E. 1995. **Malaysian Medicinal Plants for the Treatment of Cardiovascular Disease**. Pelanduk Pub., Kuala Lumpur.

Harbone, J. B. & Baxter, H. 1993. **Phytochemical Dictionary**. Taylor & Francis, Baringstoke.

Horie, S., Koyama, F., Takayama, H., Ishikawa, H., Aimi, N., Ponglux, D., Matsumoto, K. & Murayama, T. 2005. Indole alkaloids of a Thai medicinal herb, *Mitragyna speciosa* that has opioid agonistic effect in guinea-pig ileum. **Planta Medica** 71(3): 231–236.

Jansen, K. L. R. & Prast, C. J. 1988. Ethnopharmacology of kratom and the *Mitragyna* alkaloids. **Journal of Ethnopharmacology** 23: 115–119.

Malaysian Herbal Monograph Committee. 2009. *Malaysian Herbal Monograph*. Vol. 2. FRIM, Kuala Lumpur.

Matsumoto, K., Mizowaki, M., Suchitra, T., Takayama, H., Sakai, S., Aimi, N. & Watanabe, H. 1996. Antinociceptive action of mitragynine in mice: evidence for the involvement of supraspinal opioid receptors. **Life Sciences** 59(14): 1149–1155.

Razak, H. L. & Adenan, J. 2000. **Siri Tumbuhan Beracun in Penawar Racun**. PRN Bulletin, Penang. Vol. 30.

Ridley, H. N. 1922. **The Flora of the Malay Peninsula**. Vol II. L. Reeve & Co. Ltd, London.

Tsuchiya, S., Miyashita, S., Yamamoto, M., Horie, S., Sakai, S., Aimi, N., Takayama, H. & Watanabe, K. 2002. Effect of mitragynine, derived from Thai folk medicine, on gastric acid secretion through opioid receptor in anesthetized rats. **European Journal of Pharmacology** 443(1-3): 185–188.

Zarembó, J. E., Douglas, B., Valenta, J. & Jerry, A. W. 1974. Metabolites of Mitragynine. **Journal of Pharmaceutical Sciences** 63: 1407–1415.



- 1.0 Scientific Name** : *Momordica charantia* L.
Family : Cucurbitaceae

- 2.0 Vernacular Names** : Bitter melon, balsam apple, peria katak (Malaysia)

3.0 Plant Description

Herbaceous, slender climber with tendrils, slightly pubescent, the tendril up to 20 cm long. Leaves 10–12 cm long, palmately 5–7 lobed; the lobes sinuate-dentate. Flowers yellow; peduncle with a reniform bracteole; corolla 1.5–2 cm long. Fruit obovoid or oblong-cylindrical, coarsely ridged and bumpy-tuberculate, up to 20 cm long, orange or dark yellow when ripe. Seeds black covered with a soft, fleshy red aril, 12–16 mm long.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

Native to tropical Africa and Asia, it grows wild or is planted in house gardens throughout Southeast Asia.

6.0 Chemical Constituents

5- α -stigmasta-7,25-dien-3- β -etanol, 5-hydroxytryptamine, alkaloids, α -elaeostearic-acid ascorbigen, b-sitosterol-d-glucoside, charantin, citrulline, cryptoxanthin, elasterol, flavochrome, fluoride, gaba, galacturonic-acid, lanosterol, Lutein, lycopene, momordicin, momordicoside-F-1, momordicoside-F-2, momordicoside-G, momordicoside-I, mutachrome, oxalate, oxalic-acid, pipercolic-acid, polypeptide-p, rubixanthin, stigmasta-5,25-dien-3- β -ol, sugars, zeaxanthin, speciophylline, stipulatine, uncarine

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

In vivo studies

- i. Blood sugar-lowering effect of this bitter fruit. The fruit has also shown the ability to enhance cells' uptake of glucose, to promote insulin release, and to potentiate the effect of insulin.
- ii. Bitter melon's fruit and/or seed have been shown to reduce total cholesterol. Elevated cholesterol and triglyceride levels in diabetic rats were returned to normal after 10 weeks of treatment.
- iii. Antitumour activity of the entire plant of bitter melon. Water extract blocked the growth of rat prostate carcinoma; another study reported that a hot water extract of the entire plant inhibited the development of mammary tumours in mice.
- iv. The leaf extract increased resistance to viral infections and had an immunostimulant effect in humans and animals, increasing interferon production and natural killer cell activity.

In vivo clinical studies

- i. The studies have demonstrated the relatively low toxicity of all parts of the bitter melon plant when ingested orally. However, toxicity and even death in laboratory animals have been reported when extracts were injected intravenously.
- ii. Other studies have shown extracts of the fruit and leaf (ingested orally) to be safe during pregnancy.
- iii. Other studies have shown extracts of the fruit and leaf (ingested orally) to be safe during pregnancy. The seeds, however, have demonstrated the ability to induce abortions in rats and mice, and the root has been documented as a uterine stimulant in animals.
- iv. The fruit and leaf of bitter melon have demonstrated an *in vivo* antifertility effect in female animals; and in male animals, to affect the production of sperm negatively.

In vitro studies

- i. Numerous *in vitro* studies have also demonstrated the anticancerous and anti-leukemia activity of bitter melon against numerous cell lines, including liver cancer, human leukemia, melanoma, and solid sarcomas.
- ii. Antiviral activity against numerous viruses, including Epstein-Barr, herpes, and HIV viruses.
- iii. The leaf extracts of bitter melon have demonstrated broad-spectrum antimicrobial activity. Various extracts of the leaves have demonstrated *in vitro* antibacterial activities against *Escherichia coli*, *Staphylococcus*, *Pseudomonas*, *Salmonella*, *Streptobacillus* and *Streptococcus*; an extract of the entire plant was shown to have antiprotozoal activity against *Entamoeba histolytica*. The fruit and fruit juice have demonstrated the same type of antibacterial properties and, in another study, a fruit extract demonstrated activity against the stomach ulcer-causing bacteria *Helicobacter pylori*.

7.2 Uses in traditional medicine:

The leaves or whole plant is abortifacient and carminative, and used to treat earache, headache, asthma, boil, burn, bilious problems, cancer, colic, dysmenorrhoea, colitis, coughs, catarrh, chilblain, dysentery, diabetes, eruption, fever, gout, halitosis, hepatitis, hyperglycemia,

itch, jaundice, leprosy, night-blindness, piles, poison, psoriasis, malaria, rheumatism, roundworms, sores, splenitis, stones, thrush, urethritis, and wounds. The plant is also used as astringent, lactagogue, refrigerant, soap, stomachic, tonic, depurative, emetic, laxative, purgative, styptic and vermifuge.

8.0 Contraindications

- Bitter melon traditionally has been used as an abortive and has been documented with weak uterine stimulant activity; therefore, it is contraindicated during pregnancy.
- This plant has been documented to reduce fertility in both males and females and should therefore not be used by those undergoing fertility treatment or seeking pregnancy.
- The active chemicals in bitter melon can be transferred through breast milk; therefore, it is contraindicated in women who are breast feeding.
- All parts of bitter melon (especially the fruit and seed) have demonstrated in numerous *in vivo* studies that they lower blood sugar levels. As such, it is contraindicated in persons with hypoglycemia. Diabetics should check with their physicians before using this plant and use with caution while monitoring their blood sugar levels regularly as the dosage of insulin medications may need adjusting.
- Although all parts of the plant have demonstrated active antibacterial activity, none have shown activity against fungi or yeast. Long-term use of this plant may result in the die-off of friendly bacteria with resulting opportunistic overgrowth of yeast (*Candida*). Cycling off the use of the plant (every 21–30 days for one week) may be warranted, and adding probiotics to the diet may be beneficial if this plant is used for longer than 30 days.

9.0 Bibliography

- Ahmad, N., Hassan, M. R., Halder, H. & Bennor, K. S. 1999. Effect of *Momordica charantia* (karolla) extracts on fasting and postprandial serum glucose levels in NIDDM patients. **Bangladesh Medical Research Council Bulletin** 25(1): 11–13.
- Ahmed, I., Edeghate, E., Sharma, A. K., Pallot, D. J. Singh, J. 1998. Effects of *Momordica charantia* fruit juice on islet morphology in the pancreas of the streptozotocin-diabetic rat. **Diabetes Research and Clinical Practice** 40(3): 145–151.
- Akhtar, M. S. 1982. Trial of *Momordica charantia* Linn (Karela) powder in patients with maturity-onset diabetes. **Journal of Pakistan Medical Association** 32(4): 106–107.
- Basaran, A. A., Yu, T. W., Plewa, M. J. & Anderson, D. 1996. An investigation of some Turkish herbal medicines in *Salmonella typhimurium* and in the COMET assay in human lymphocytes. **Teratogenesis Carcinogenesis and Mutagenesis** 16(2): 125–138.
- Bourinbaiar, A. S. & Lee-Huang, S. 1996. The activity of plant-derived antiretroviral proteins MAP30 and GAP31 against herpes simplex virus *in vitro*. **Biochemical and Biophysical Research Communications** 219(3): 923–929.
- Clafin, A. J., Taylor, B., Clafin, L., Rudikoff, S. & Hood, L. 1978. Inhibition of growth and guanylate cyclase activity of an undifferentiated prostate adenocarcinoma by an extract of the balsam pear (*Momordica charantia* abbreviata). **Proceedings of National Academy of Sciences of USA** 75(2): 989–993.

Gimlette, G. D. 1939. **A Dictionary of Malayan Medicine**. Oxford Univ. Press, Kuala Lumpur.

<http://www.rain-tree.com/bitmelon.htm>. Database file for Bitter melon (*Momordica charantia*). 7 August 2005.

Lee-Huang S, Huang, P. L., Chen, H. C., Huang, P. L., Bourinbaiar, A. S., Huang, H. I. & Kung, H. F. 1995. Anti-HIV and anti-tumor activities of recombinant MAP30 from bitter melon. **Gene** 161(2): 151–156.

Lee-Huang S, Huang, P. L., Nara, P. L., Chen, H. C., Kung, H. F. Huang, P., Huang, H. I. & Huang, P. L. 1990. MAP 30: a new inhibitor of HIV-1 infection and replication. **FEBS Lett.** 272(1-2): 12–18.

Lee-Huang, S., Huang, P. L., Huang, P. L., Bourinbaiar, A. S., Chen, H. C. & Kung, H. F. 1995. Inhibition of the integrase of human immunodeficiency virus (HIV) type 1 by anti-HIV plant proteins MAP30 and GAP31. **Proceedings of National Academy of Sciences of USA** 92(19): 8818–22.

Matsuda, H, Li, Y., Yamahara, J., Yoshikawa, M. 1999. Inhibition of gastric emptying by triterpene saponin, momordin Ic, in mice: roles of blood glucose, capsaicin-sensitive sensory nerves, and central nervous system. **Journal of Pharmacology and Experimental Therapeutics** 289(2): 729–734.

Matsuda, H., Li, Y., Murakami, T., Matsumura, N., Yamahara, J., Yoshikawa, M. 1998. Antidiabetic principles of natural medicines. III. Structure-related inhibitory activity and action mode of oleanolic acid glycosides on hypoglycemic activity. **Chemical and Pharmaceutical Bulletin** (Tokyo) 46(9): 1399–1403.

Matsuda, H., Murakami, T., Shimada, H., Matsumura, N., Yamahara, J., Yoshikawa, M. 1997. Inhibitory mechanisms of oleanolic acid 3-O-monodesmosides on glucose absorption in rats. **Biological and Pharmaceutical Bulletin** 20(6): 717–719.

Muhammed, M. & Prakash, L. 1997. Alternative medicine goes mainstream for better health care delivery. Paper presented at the 49th Indian Pharmaceutical Congress, Thiruvananthapuram, December 18–21, 1997.

Platel, K. & Srinivasan, K. 1997. Plant foods in the management of diabetes mellitus: vegetables as potential hypoglycaemic agents. **Nahrung** 41(2): 68–74.

Quisumbing, E. 1978. **Medicinal Plants of the Philippines**. Katha Publishing Co. Inc.

Raza, H., Ahmad, I., John, A. & Sharma, A. K. 2000. Modulation of xenobiotic metabolism and oxidative stress in chronic streptozotocin-induced diabetic rats fed with *Momordica charantia* fruit extract. **Journal of Biochemical and Molecular Toxicology** 14(3): 131–139.

Sarkar, S, Pranava, M. & Rosalind, M. A. 1996. Demonstration of the hypoglycemic action of *Momordica charantia* in a validated animal model of diabetes. **Pharmacology Research** 33(1): 1–4.

Takemoto, D. J., Jilka, C., Rockenbach, S. & Hughes, J. V. 1983. Purification and characterization of a cytostatic factor with anti-viral activity from the bitter melon. **Preparative Biochemistry and Biotechnology** 13(4): 371–393.

Takemoto, D. J., Jilka, C., Rockenbach, S. & Hughes, J. V. 1983. Purification and characterization of a cytostatic factor with anti-viral activity from the bitter melon. **Preparative Biochemistry and Biotechnology** 13(5): 397–421

Takemoto, D. J., Jilka, C. & Kresie, R. 1982. Purification and characterization of a cytostatic factor from the bitter melon *Momordica charantia*. **Preparative Biochemistry and Biotechnology** 12(4): 355–375.

Takemoto, D. J., Kresie, R. & Vaughn, D. 1980. Partial purification and characterization of a guanylate cyclase inhibitor with cytotoxic properties from the bitter melon (*Momordica charantia*). **Biochemical and Biophysical Research Communications** 94(1): 332–339.

Takemoto, D.J., Dunford, C., Vaughn, D., Kramer, K, Smith, A. & Powell. 1982. Guanylate cyclase activity in human leukemic and normal lymphocytes. Enzyme inhibition and cytotoxicity of plant extracts. **Enzyme** 27(3): 179–788.

Zhang, Q. C. 1992. Preliminary report on the use of *Momordica charantia* extract by HIV patients. **J. Naturopath. Med.** 3: 65–69.



- 1.0 Scientific Name** : *Ocimum basilicum* L.
Synonyms : *O. album* L., *O. americanum* Jacq., *O. barreleiri* Roth., *O. caryophyllatum* Roxb., *O. citriodorum* Blanco, *O. graveolens* R.Br., *O. hispidum* Lamk., *O. integerrimum* Willd., *O. menthaefolium* Benth., *O. petitianum* Rich. *O. pilosum* Willd.
Family : Lamiaceae

- 2.0 Vernacular Names** : Selasih (Malaysia); sweet basil (English); tulsi (India)

3.0 Plant Description

A bushy, much branched, aromatic herb or shrublet, up to 1.3 m height. Stem and inflorescence often purplish. Leaves small, oval, 2–3 cm long, 1.2 cm wide; margins with tiny teeth or none. Inflorescence 7.7–20.5 cm long. Flowers in whorls spaced, white or purplish. Seeds small, black.

- 4.0 Propagation** : Seeds

5.0 Geographical Distribution/Ecology

Native to Asia. It is cultivated in house gardens in open and semi-shaded areas.

6.0 Chemical Constituents

Chemical constituents with commercial potential: Anethole, apigenin, b-bisabolene, carvone, caryophyllene, esculetin, esculin, myrcene, p-coumaric acid, essential oil (anethole, cineole, eugenol, linalol, methyl chavicol, ocimene, pinene, terpene hydrate)

Other chemicals: Acetic acid, ascorbic acid, a-amorphene, cis-anethole, trans-anethole, benzylacetate, benzy alcohol, a-bergamotene, a-bisabolol, borneol, borneol acetate, b-bourbonene,

a-bulnesene, butyric acid, a-, b-, d-, g-cadinene, 5,10(15)-cadinen-4-ol, b-cadinol, T-cadinol, caffeic acid, caffeic acid-N-butylester, calamene, camphene, camphor, caproic acid, b-carotene, b-caryophyllene, caryophyllene oxide, a- and b-cedrene, chavicol, chavicolmethylether, cinnamic acid-methylester, cis-cinnamic acid methylester, trans-cinnamic acid, trans-cinnamic acid-methylester, 1,8-cineole, citral, citronellol, a-copaene, a- and b-cubebene, cyclosativene, b-cymene, p-cymene, a-p-dimethylstyrene, b- and g-clemene, elemol, epibicyclosesquiphellandrene, 1-epibicyclosesquiphellandrene, 2-epi-a-cedrene, eriodictyol, eriodictyol-7-O-glucoside, estragole, eugenol, eugenol-methyl ether, farnesol, a-farnesene, (E)-b-farnesene, (Z)-b-farnesene, fenchone, a-fenchene, fenchyl acetate, fenchyl alcohol, furfural, D-galacturonic acid, geranial, geraniol, geranyl acetate, germacrene D, a- and d-guaiene, g-gurjunene, cis-3-hexenol, humulene, a-humulene, humulene epoxide, hydroxy benzoic acid-4-b-D-glucoside, isocaryophyllene, isoeugenol, isoeugenolmethylether, isoquercitrin, juvocimene-I, juvocimene-II, kaempferol, kaempferol-3-O-b-D-rutinoside, ledene, limonene, cis-limonene, linalyl acetate, luteolin, D-mannuronic acid, menthol, menthone, p-methoxycinnamaldehyde, methylchavicol, methylcinnamate, methylthymol, methyleugenol, mucilage, a- and g-murolene, b-myrcene, neral, nerol, nerolidiol, nerolidol, niacin, b-ocimene, cisocimene, trans-ocimene, cis-allo-ocimene, trans-allo-ocimene, octanol, 1-octen-3-ol, 3-octanone, oleoic acid, orientin, phellandrene, phenylethyl alcohol, a- and b-pinene, planteose, propionic acid, quercetin, quercetin-3-O-diglucoside, riboflavin, rosmarinic acid, sabinene, cis-sabinenehydrate, trans-sabinene-hydrate, safrole, salicylic acid-2-b-D-glucoside, sambulene, a- and b-santalene, a- and b-selinene, sesquithujene, stigmasterol, b-sitosterol, succinic acid, syringic acid-4-b-D-glucoside, syringoyl-glucose, tannin, a- and g-terpinene, terpinen-4-ol, a-terpineol, terpinolene, a-terpinylacetate, thiamin, a- and b-thujone, thymol, tricyclone, undecylaldehyde, ursolic acid valerie acid, vanillic acid-4-b-D-glucoside, vicenin-2, xanthomicrol, xi-bulgarene; amino acids, fatty acids (linoleic acid, linolenic acid, oleic acid, palmitic acid, stearic acid); minerals, phytosterols, sugars (D-arabinose, D-galactose, D-glucose, D-mannose, L-rhamnose, xylose)

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

- i. Pharmacological effects – In traditional Ayurvedic system of medicine, several medicinal properties have been attributed to this plant. Recent pharmacological studies have established the anabolic, hypoglycemic, smooth muscle relaxant, cardiac depressant, antifertility, adaptogenic and immunomodulator properties of this plant.
- ii. Antimicrobial effects – Essential oil of tulsi has antibacterial, antifungal and antiviral properties. It inhibits the growth of *E. coli*, *B. anthracis*, *M. tuberculosis*, etc. Its antitubercular activity is one-tenth the potency of streptomycin and one-fourth that of isoniazid. Preparations containing tulsi extract significantly shorten the course of illness, clinical symptoms and the biochemical parameters in patients with viral hepatitis and viral encephalitis.
- iii. Antimalarial effects – Essential oil of tulsi has been reported to possess 100% larvicidal activity against the *Culex* mosquitoes. Trials have shown excellent antimalarial activity of tulsi. Its extracts have marked insecticidal activity against mosquitoes. Its repellent action lasts for about two hours.
- iv. Antiallergic and immunomodulator effects – Essential oil of tulsi was found to have antiallergic properties. When administered to laboratory animals, the compound was found to inhibit mast cell degranulation and histamine release in the presence of allergen. These studies reveal the potential role of *O. sanctum* extracts in the management of immunological disorders including allergies and asthma.

- v. Antistress/adaptogenic effects - Extracts from the plant have been found to reduce stress.
- vi. Antifertility effect – One of the major constituents of the leaves, ursolic acid, has been reported to possess antifertility activity in rats and mice. This effect has been attributed to its antiestrogenic effect which may be responsible for arrest of spermatogenesis in males and inhibitory affection implantation of ovum in females. This constituent may prove to be a promising antifertility agent devoid of side effects.
- vii. Antidiabetic effect – A randomized, placebo-controlled cross-over single blind trial on 40 human volunteers suffering from Type II diabetes was performed. During the four week trial, subjects alternately received a daily dose of 2.5 g of tulsi leaf powder or a placebo for two-week periods. The results showed 17.6 % reduction in fasting blood glucose and 7.3% decline in postprandial blood glucose on treatment with tulsi as compared with the blood glucose levels during treatment with placebo.
- viii. For Heart ailments – As tulsi (basil) has a positive effect over blood pressure and also is a detoxicant, its regular use prevents heart attacks. A tonic may be prepared by mixing 1 gm of dry leaves with a spoonful of butter and some candy sugar or honey. Take twice a day first thing in the morning and before going to bed at night.
- ix. Other effects – The leaves in the form of a paste are used in parasitical diseases of the skin and also applied to the finger and toe nails during fever when the limbs are cold. The juice of the leaves is given in catarrh and bronchitis in children. The plant is said to have carminative, diaphoretic and stimulant properties. A decoction of the plant is used for coughs and also as mouth wash for relieving toothache. It is good for headache, convulsions, cramps, fevers and cholera.

7.2 Uses in traditional medicine:

Uses described in pharmacopoeias and in traditional system of medicine:

Basil oil combined with other oil is used in:

- i. wound treatment, rheumatic discomfort, colds, bruises, painful joints, irrigation therapy;
- ii. maintenance and stimulation of sexual capacity, prevention of sexual fatigue in male and female, prevention of frigidity in male and female;
- iii. supportive treatment for infections of lower urinary tract, as well as inflammations of kidneys, bladder and urethra;
- iv. nasal catarrh, temporary shortness of breath, fatigue, cough, congestion, muscle pain, nerve pain, pain in the limbs (neuralgia), lumbago, sprains, dislocations, contusions, heartburn, flatulence, bad breath, travel fatigue, inflammation, oral hygiene, air quality improvement, foot bath, bath additives;
- v. supportive therapy for massages used as warm-up procedures of the muscles before sports activities and particularly exertions in order to prevent muscle sprains and muscle spasms and their consequences, and for massages of hardened muscle parts.

Uses described in folk medicine, not supported by experimental or clinical data:

The juice of the leaves is used to cure ringworm infections, as cough remedy and a nasal douche in myosis and irregular menstrual cycles. Leaves are a diuretic and a stimulant for weak digestion. The leaf is used in treating high fever and after childbirth, to possess narcotic effect which helps to ease itchiness in the throat, to relieve stomach-ache and stimulate bowel movement. The seed are mucilaginous and cooling, and used to treat

gonorrhoea, diarrhoea, and chronic dysentery. The jelly is used for treating intestinal troubles in children, kidney trouble and diarrhoea.

8.0 Contraindications

Not available

9.0 Bibliography

Adirukmini *et al.* 1995. Types of basil (*Ocimum sp.*) found in Malaysia. In **Proceedings of the International Conference on the use of Traditional Medicine & Other Natural Products in Health Care**.

Barghava, K.P and Singh, N. 1981. Anti-stress activity of *Ocimum sanctum* Linn. **Indian Journal of Medical Research** 73: 443–451.

Burkil I. H. 1966. **A Dictionary of the Economic Products of the Malay Peninsula**. Volume 2. Ministry of Agriculture and Cooperatives, Kuala Lumpur, Malaysia.

Rajasekaran, M. Sudhakaran, C., Pradhan, S. C., Bapna, J. S. & Nair, A. G. R. 1989. Mast cell protective activity of ursolic acid α -triterpene from the leaves of *Ocimum sanctum*. **Journal of Drug Development** 2(3): 179–182.

Banerjee, S., Prashar, R., Kumar, A. & Rao, A. R. 1996. Modulatory influence of alcoholic extract of *Ocimum* leaves on carcinogen-metabolizing enzymes activities and reduced glutation level in mouse. **Nutrition and Cancer** 25(2): 205–217.

Agarwal, P., Rai, V. & Singh, R. B. 1996. Randomised placebo – controlled, single blind trial of holy basil leaf in patients with noninsulin-dependent diabetes mellitus. **International Journal of Clinical Pharmacology, Therapy and Toxicology** 34(9): 406–409.

Betty, P. J & Derek, W. S. 1974. **Powdered Vegetable Drugs: An atlas of Microscopy for use in the Identification and Authentication of some Plant Materials Employed as Medicinal Agents**. Stanley Thornes Ltd, London, Great Britain.

Brown, D. 2002. **The Royal Horticultural Society New Encyclopedia of Herbs & Their Uses**. Dorling Kindersley Limited, Britain.

Chavan, S. R. & Nikam S. T. 1982. Mosquito larvicidal activity of *Ocimum basilicum* Linn. **Indian Journal of Medical Research** 75: 220–222.

Henderson, M.R. 1951. **Malayan Wild Flowers: Dicotyledons**. Malayan Nature Society, Kuala Lumpur.

Indu, B. I. & Ng, L.T. 2000. **Herbs: The Green Pharmacy of Malaysia**, Malaysian Agriculture Research and Development Institute, Kuala Lumpur, Malaysia.

Jayaweera, D. M. A. 1981. **Medicinal Plants Used in Ceylon**. Part 3., The National Science Council of Sri Lanka, Colombo.

Kusamran, W. R., Ratanavila, A. & Tepsuwan, A. 1998. Effect of neem flowers, Thai and Chinese bitter gourd fruits and sweet basil leaves on hepatic monooxygenases and glutathione s-transferase activities, and *in vitro* metabolic activation of chemical carcinogens in rats. **Food and Chemical Toxicology** 36(6): 475–484.

Lachowicz, K. J., Jones, G. P., Briggs, D. R., Bienvenu, F. E., Wan, J., Wilcock, A. & Coventry, M. I 1998. The synergistic preservative effect of the essential oil of sweet basil (*Ocimum basilicum* L.). **Letters in Applied Microbiology** 26(3): 209–214.

Ridley, H.N. 1922. **The Flora of the Malay Peninsula**. Vol II. L. Reeve & Co. Ltd, London.

Simon JE, Quinn I & Murray RG. 1990. Basil: A source of essential oil. In: Janick I & Simon JE (Eds.). **Advances in New Crops**. Timber press, Portland, USA. Pp. 484–489

The Complete German Commission E Monographs. 1998. **Therapeutic Guide to Herbal Medicines**. American Botanical Council, Austin, Texas, USA.



1.0 Scientific Name : *Phyllanthus amarus* Schumach. & Thonn.
Family : Euphorbiaceae

2.0 Vernacular Names : Meniran, rami buah, dukung anak (Malaysia); stone breaker, seed on the leaf, child pick-a-back (English)

3.0 Plant Description

Glabrous weedy herb 30 to 40 cm tall. Leaves distichous oblong or elliptic-obovate subsessile, 0.5 cm long, 0.2 cm wide; petiole minute or none. Stipule subulate, base broad. Male flowers solitary or in pair, very minute. Female flowers twice as large. Fruit globose, smooth, on underside of leaf rachis. Seeds pale brown with 6–7 straight longitudinal ribs.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

It is widely distributed in tropical countries and easily grows at wet and shaded places.

6.0 Chemical Constituents

3,5,7-trihydroxyflavonal-4'-O-a-1(-)-rhamnopyranoside, 4-methoxynorsecurinine, 4-methoxysecurinine, 5,3',4'-trihydroxyflavonone-7-O-a-1(-)-rhamnopyranoside, astragalol, brevifolin-carboxylic acid, cymene, hypophyllanthin, limonene, lintetralin, lupa-20(29)-ene-3-b-ol, lupa-20(29)-ene-3-b-ol-acetate, lupeol, methyl salicylate, niranthin, nirtetralin, niruretin, nirurin, nirurisode, phyllanthin, phyllochrysin, phyltetralin, quercetin, quercetin-heteroside, quercetol, quercitrin, rutin, saponins, triacontanol, tricoctanol, geraniin

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

- i. In 1990, the Paulista School of Medicine in São Paulo, Brazil, conducted studies with humans and rats with kidney stones. They were given a simple tea of *P. amarus* for 1–3 months and it was reported that the tea promoted the elimination of stones. They also reported a significant increase in urine output as well as sodium and creatine excretion.
- ii. In a 1999 *in vitro* clinical study, a *P. amarus* extract exhibited the ability to block the formation of calcium oxalate crystals (the building blocks of most kidney stones) which indicates that it might be a useful preventative aid for people with a history of kidney stones.
- iii. In a 2002 *in vivo* study, researchers seeded the bladders of rats with calcium oxalate crystals and treated them for 42 days with a water extract. The results indicated that *P. amarus* strongly inhibited the growth and number of stones formed over the control group. Several of the animals even passed the stones which did form. In 2003 scientists confirmed *in vitro* that *P. amarus* could help prevent the formation of kidney stones.
- iv. In the mid-1980s the antispasmodic and muscle relaxant properties activity of *P. amarus* was observed. In 1990, Nicole Maxwell reported that Dr. Wolfram Wiemann (of Nuremberg, Germany) treated over 100 kidney stone patients with *P. amarus* obtained in Peru and found it to be 94% successful in eliminating stones within a week or two.
- v. In a 2002 study, Indian researchers reported that *P. amarus* increased bile acid secretion in the gallbladder and significantly lowered blood cholesterol levels in rats. The beneficial effects of lowering cholesterol and triglyceride levels was also confirmed by another *in vivo* (rat) study in 1985.
- vi. The hypotensive effects were first reported in a dog study in 1952. The hypotensive effects were attributed to a specific phytochemical in *P. amarus* called geraniin in a 1988 study. In 1995 Indian researchers gave human subjects with high blood pressure *P. amarus* leaf powder in capsules and reported a significant reduction in systolic blood pressure, a significant increase in urine volume and sodium excretion.
- vii. In the above 1995 study, researchers also reported that blood sugar levels were reduced significantly in human subjects studied. Two other studies with rabbits and rats document the hypoglycemic effect of *P. amarus* in diabetic animals. Aldose reductases are substances that act on nerve endings exposed to high blood sugar concentration and can lead to diabetic neuropathy and macular degeneration. Substances which inhibit these substances can prevent some of the chemical imbalances that occur and thus protect the nerve.
- viii. Another area of research has focused on the pain-relieving effects of *P. amarus* and was performed at a Brazilian university. So far, they have published six studies on their findings. The first three studies reported strong and dose-dependent pain-relieving effects in mice given extracts of chanca piedra against six different laboratory-induced pain models. In 1996, they isolated and tested *P. amarus* hypotensive plant chemical geraniin and reported that it was seven times more potent as a pain-reliever than aspirin or acetaminophen. Their last two studies (published in 2000) continued to document chanca piedra's pain-relieving effects against normal pain models in mice, and, newly-tested nerve-related pain models. Again, they related this effect to the geraniin plant chemical and reported its ability

to inhibit several neurotransmitter processes that relay and receive pain signals in the brain.

- ix. The liver-protecting activity of *P. amarus* has been established with clinical research with animals and humans. These effects have been attributed to (at least) two novel plant chemicals in *P. amarus* named phyllanthin and hypophyllanthin. The researchers who reported the cholesterol-lowering effects also reported that *P. amarus* protected rats from liver damage induced by alcohol, and normalized a “fatty liver.” One *in vitro* study and four *in vivo* studies (with rats and mice) document that extracts of *P. amarus* effectively protect against liver damage from various chemical liver toxins. Two human studies reported *P. amarus* liver protective and detoxifying actions in children with hepatitis and jaundice. Indian researchers reported that *P. amarus* was an effective single drug in the treatment of jaundice in children, and British researchers reported that children treated with a *P. amarus* extract for acute hepatitis had liver function return to normal within five days. Researchers in China also reported liver protective actions when *P. amarus* was given to adults with chronic hepatitis.
- x. A 2000 study even documented that *P. amarus* increased the life-span of mice with liver cancer from thirty-three weeks (control group without treatment) to fifty-two weeks. Another research group tried to induce liver cancer in mice that had been pretreated with a water extract of *P. amarus*. Their results indicated the *P. amarus* extract dose-dependently lowered tumour incidence, levels of carcinogen-metabolizing enzymes, levels of liver cancer markers, and liver injury markers. Both studies indicate that the plant has a better ability to prevent and slow down the growth of tumours rather than a direct toxic effect or ability to kill cancer cells.

7.2 Uses in traditional medicine:

The whole plant is used as an antihepatotoxic, antihypertensive, antidysenteric, purgative, emmenagogue, febrifuge, stomachic and diuretic. It is used internally in treatment of jaundice, dropsy, genito-urinary infections, blennorrhagia, colic, diabetes, dysentery, fever, flu, tumours, jaundice, vaginitis and dyspepsia. It is used externally for cuts, bruises, ulcers, sores and swelling.

8.0 Contraindications

- *Phyllanthus amarus* has demonstrated hypotensive effects in animals and humans. People with a heart condition and/or taking prescription heart medications should consult their doctor before taking this plant. It may be contraindicated for some individuals with heart conditions and/or heart medications that may need monitoring and adjusting.
- *Phyllanthus amarus* has been considered in herbal medicine to be abortive (at high dosages) as well as a menstrual promoter. While not studied specifically in humans or animals, animal studies do indicate it has uterine relaxant effects. It should therefore be considered contraindicated during pregnancy.
- *Phyllanthus amarus* has been documented with female antifertility effects in one mouse study (the effect was reversed 45 days after cessation of dosing). While this effect has not been documented in humans, the use of the plant is probably contraindicated in women seeking pregnancy or taking fertility drugs. This effect has not been substantiated sufficiently to be used as a contraceptive, however, and should not be relied on for such.

- *Phyllanthus amarus* has demonstrated hypoglycemic effects in animals and humans. It is contraindicated for people with hypoglycemia. Diabetics should consult their doctor before taking this plant as insulin medications may need monitoring and adjusting.
- *Phyllanthus amarus* has been documented in human and animal studies with diuretic effects. Chronic and acute use of this plant may be contraindicated in various other medical conditions where diuretics are not advised. Chronic long-term use of any diuretic can cause electrolyte and mineral imbalance; however, human studies with *P. amarus* (for up to three months of chronic use) has not reported any side effects. Consult your doctor if you choose to use this plant chronically for longer than three months concerning possible side effects of long term diuretic use.

9.0 Bibliography

Agrawal, S. S., Garg, A. & Agrawal, S. 1986. Screening of *Phyllanthus niruri* Linn. and *Ricinus communis* Linn. on alcohol-induced liver cell damage in non-hepatectomized and partially hepatectomized rats. **Indian Journal of Pharmacology** 18(4): 211–214

Duke, J. & Vasque, R. 1994. **Amazonian Ethnobotanical Dictionary**. CRC Press Inc., Boca Raton, FL.

Goh, S. H., Chuah, C. H., Mok J. S. L. & Soepadmo, E. 1995. **Malaysian Medicinal Plants for the Treatment of Cardiovascular Diseases**. Pelandok Publication Sdn. Bhd. Kuala Lumpur.

<http://rain-tree.com/chanca.htm>. Database file on *Phyllanthus niruri*. 8 August 2005.

Indu B.J. & Ng, L. T. 2000. **Herbs: The Green Pharmacy of Malaysia**. Malaysian Agricultural Research and Development Institute (MARDI), Kuala Lumpur, Malaysia.

Materia Medika Indonesia Jilid II. 1978. Departemen Kesehatan Republik Indonesia, Jakarta, Indonesia.

Ridley, H.N. 1922. **The Flora of the Malay Peninsula**. Vol. III. L. Reeve & Co. Ltd, London.

Ueno H, Horie S, Nishi Y, Shogawa H, Kawasaki M, Suzuki S, Hayashi T, Arisawa M, Shimizu M, Yoshizaki M, *et al.* 1988. Chemical and pharmaceutical studies on medicinal plants in Paraguay, Geraniin, an angiotensin-converting enzyme inhibitor from “Paparai mi”, *Phyllanthus niruri*. **Journal of Natural Products** 51(2): Pp. 357–359.



1.0 Scientific Name : *Rafflesia hasseltii* Suringar
Family : Rafflesiaceae

2.0 Vernacular Name : Bunga pakma (Malaysia)

3.0 Plant Description

Parasitic herb growing on the roots or branches of other plants. The plant body is almost wholly within the host plant. The flower and fruit are the only parts of the plant outside the tissue of the host plant. The bud breaking through the bark of the host looks like a large brown cabbage. The flower is very large, very thick and fleshy, but not long lasting. The average size of the flower is 30–40 cm across, radially symmetrical, epigynous; the ovary inferior or partly so. Sepals very large, 4–16; petals none; stamens numerous, without stalk arranged round a fleshy column, the top of which forms the stigma. The pollen chamber opening by slits or apical pores; carpel 4–8; the ovary 1-chambered; placentae parietal; ovules numerous. Fruit is a berry.

4.0 Propagation : Not available

5.0 Geographical Distribution/Ecology

Found throughout Malaysia, Indonesia (Sumatra, Java and Kalimantan), Brunei Darussalam, Thailand (southern provinces) and the Philippines. It grows only on the roots and stems of two species of vines belonging to the grape family, *Terastigma leucostaphylum* and *T. diepenhostii*.

6.0 Chemical Constituents

No report found

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The flower is astringent and an aphrodisiac for women. It is reported to be used as after-birth medication for (purifies uterus), after menstruation and to expedite delivery.

8.0 Contraindications

Not available

9.0 Bibliography

Burkill I. H. 1966. **The Dictionary of the Economic Products of the Malay Peninsula.** Ministry of Agriculture, Malaysia, Kuala Lumpur. I & II: Pp. 1894–1895.

Burkill, I. H. & Haniff, M. 1930. Malay Village Medicine, **Garden Bulletin Straits Settlement.** 6: Pp. 240.

Dawn, J. 1994. Rafflesia in Temenggor. **Malayan Naturalist** 47: Pp. 26–27.

Meijer, W. & Wong, M. 1993. *Rafflesia cantleyi* and *R. hasseltii* compared. **Malayan Naturalist.** 47: Pp. 10–12.



- 1.0 Scientific Name** : *Smilax myosotiflora* A. DC.
Family : Smilacaceae

- 2.0 Vernacular Names** : Ubi jaga, ubi besi, keranting, itah besi, akar ding (Malaysia)

3.0 Plant Description

Herbaceous climber; stem slender but very tough and rigid; branching loosely, light green and very smooth. Presence of nodes and internodes about 2–15 cm long. Occasionally rooting occurs at the nodes and adheres to the ground. Leaves lanceolate or broadly elliptic. Base of leaf is broad and gradually cuneate or suddenly acuminate apex, 8–17 cm long, 2–15 cm broad, grass green on adaxial side while paler green on abaxial side of leaf; densely veined; marginal nerves slightly thickened; petiole 7–25 mm long. Tendrils 6–13 cm, long, slender, often becoming brownish. Inflorescence umbels and axillary together with tendrils; peduncles 1–4 cm long; pistillate umbels 8–14 flowered; staminate perianth yellow-green 3.5–4.2 mm long, 4–5 mm wide, connate, lobed to 2.5 from top; outer lobes oblong, 1.5 mm wide, inner lobes half as long as outer ones.

- 4.0 Propagation** : Not available

5.0 Geographical Distribution/Ecology

It is common in lowlands and in the hills forest.

6.0 Chemical Constituents

No report found

7.0 Reports on Medical Usage

7.1 Uses supported by clinical data:

Not available

7.2 Uses described in traditional medicine:

The tuber has an aphrodisiac property and it is used to treat syphilis.

8.0 Contraindications

Not available

9.0 Bibliography

Burkill, I. H. 1966. **A Dictionary of the Economic Products of the Malay Peninsula**, Ministry of Agriculture, Malaysia I & II: Pp. 2075.

Gimlette, J. D.& Burkill, I. H. 1930. **The Garden Bulletin Straits Settlement**. Pp. 470.



- 1.0 Scientific Name : *Stemonon tuberosa* Lour.
Family : Stemonaceae
- 2.0 Vernacular Names : Galak tua, janggut adam (Malaysia)

3.0 Plant Description

Herb with upright, twining slender stems. Leaves alternate, heart shaped in outline with an abrupt, narrow pointed end, dark green, usually about 10 x 7 cm, sometimes reaching twice this size; leaf stalk about 7 cm long; leaf has prominent longitudinal ribs and fine, close cross-veins; rib about 7–13. Flower arises from leaf axils; individual flower stalk is about 3 cm long, jointed in the middle, long narrow, deep purple to pink; lobes narrowly elliptical in outline.

- 4.0 Propagation : Root tuber

5.0 Geographical Distribution/Ecology

It is found throughout Peninsular Malaysia to South Thailand, Central China, Taiwan, India and Indo-China.

6.0 Chemical Constituents

Root tuber: Fluoride, stemonal, stemonone, stemonidine, stemotinine, iso-stemotinine, stemonine, stenine, tuberostemonine, tuberostemonone

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The root tubers are used as antiparasitic and antimicrobial towards *Streptococcus pneumoniae*, b-haemolytic *Streptococcus*, *Neisseria meningitidis* and *Staphylococcus*

aureus. Various preparations of the tubers also showed better than 85% effectiveness in treating pertussis. The tuber is useful for pulmonary tuberculosis, coughs, skin diseases and as a vermifuge.

7.2 Uses in traditional medicine:

Not available

8.0 Contraindications

Not available

9.0 Bibliography

Bensky, D. & Gamble, A. 1986. **Chinese Herbal Medicine: Materia Medica**. revised edition, Eastland Press Inc., USA. Pp. 202–203.

Chu, J. H. & Young, P. T. 1955. **Hua Hsueh Hsueh Pao** 21: Pp. 173–177.

Etude botanique, clinique et pharmacodynamique de la racine de 'Stemona tuberosa' (drogue vermifuge sinoannamite).

Journal of crystallographic and spectroscopic research. Pp. 26–34.

Keys, J. D. 1976. **Chinese Herbs: Their Botany, Chemistry and Pharmacodynamics**. Charles E. Tuttle Co., Japan. Pp. 71.

Lin, W. H., Xu, R. S., Wang, R. J., Mak, T. C. W. 1991. Crystal and molecular structure of tuberostemonone. **Journal Crystallogr. Spectrosc. Refs.** 21: Pp. 189–194.

Lobstein, J. E. & Grumbach, J. 1932. **Bulletin Science Pharmacology.** 39: 26.

Malaysian Monograph Committee. 1999. **Malaysian Herbal Monograph.** Pp. 71–73.

Perry, L. M. 1980. **Medicinal Plants of East and Southeast Asia**. MIT Press, Massachusetts. Pp. 397.

Roengsamran, S. 1973. Master thesis, Faculty of Science, Chulalongkorn University, Thailand. Pp. 43.

Sakai, T., Kobashi, K., Tsunozuka, M., Hattori, M. & Namba, T. 1985. Studies on dental caries prevention by traditional Chinese medicines (Part VI). On the fluoride contents in crude drugs. **Shoyakugaku Zasshi.** 39: Pp. 165–169.

Willaman, J. J. & Li, H. L. 1970. Alkaloid-bearing plants and their contained alkaloids. **Lloydia.** 33: 286.

Xu, R. S., Lu, Y. J., Chu, J. H., Iwashita, T., Naoki, H., Naya, Y. & Nakanishi, K. 1982. Studies on some new stemona alkaloids: A diagnostically useful ¹H-NMR line-broadening effect. **Tetrahedron.** 38: 2667–2670.



- 1.0 Scientific Name** : *Zingiber officinale* Rosc.
Family : Zingiberaceae
- 2.0 Vernacular Names** : Halia (Malaysia); kinkh, khing-daen (Thailand);
gung, sinh khuong (Viet Nam), luya (Philippines)

3.0 Plant Description

An upright herb; soft non-woody stem. Rhizome is light yellow in whorl, aromatic smell and slightly hot in taste; the stem grows from the rhizome and may reach up to 50 cm tall, covered with leaf-sheath. Leaf is linear-lanceolate, about 17 cm long, 1.8 cm wide, dark green, smooth on the upper surface and slightly rough on the underneath which is covered with very fine hairs; ligule light green in colour. Flower in the axil of each bract; the bracts are arranged in whorl; corolla tube is 2–2.5 cm long that is slightly longer than bractea and consists of 3 separated lobes, the dorsal lobe broader 12 mm by 10 mm, light purple with yellow spots. The other two lobes are 6 mm by 4 mm, yellowish green.

- 4.0 Propagation** : Rhizome

5.0 Geographical Distribution/Ecology

It is cultivated in all tropical countries.

6.0 Chemical Constituents

Acetaldehyde, acetone, n-butyraldehyde, diethyl sulfide, ethyl acetate, n-heptane, methyl acetate, n-nonane, n-nonanol, nonyl aldehyde, n-octane, propionaldehyde, ethyl isopropyl sulfide, methyl allyl sulfide, isovaleraldehyde, (+)-borneol, chavicol, benzaldehyde, 2-hydroxy-1,8-cineol, cis-geranic acid, trans-geranic acid, 6-methylhept-5-en-2-ol, hexanol, linalool oxide, p-mentha-1,5-dien-7-ol, p-mentha-2,8-dien-1-ol, p-mentha-1,5-dien-8-ol, p-metha-1,8-dien-7-ol, nerol oxide, 2,6-dimethylocta-2,6-diene-1,8-diol, 2,6-dimethylocta-3,7-diene-1,6-diol, octan-2-ol, n-octanol, cis-selinen-4-ol, 1,8-terpinen hydrate, 4-terpineol, a-ylangene, acetic acid,

aromadendrene, 3-phenylbenzaldehyde, 4-phenylbenzaldehyde, bornyl acetate, a-cadinol, calamenene, camphene hydrate, d-car-3-ene, cedrorol, citronellyl acetate, ethyl myristate, farnesol, geranyl acetate, guaiol, 6-methylhept-5-en-2-one, 2,2,4-trimethylheptane, *cis*-hexan-3-ol, hexanol, b-himachalene, b-ionone, juniper camphor, *trans*-linalool oxide, menthol acetate, methyl nonyl ketone, a-muurolene, g-muurolene, 9-oxonerolidol, *trans*-octen-2-ol, patchouli alcohol, pirellene, *n*-propanol, neoisopulegol, a-selinene, b-selinene, *cis*-sesquibinene hydrate, sesquiphellandrene, terpinen-4-ol, b-thujone, alloaromadendrene, d-cadinene, *p*-cymen-8-ol, b-elemene, g-eudesmol, isoeugenol methyl ether, farnesal, a-farnesene, *trans*-b-farnesene, fluoride, furfural, heptan-2-one, hexanal, *trans*-nerolidol, nonan-2-one, octanal, perillene, myrtenal, rosefuran, selina-3,7(11)-diene, tricyclene, undecan-2-ol, sabinene, heptan-2-ol, undecan-2-one, borneol, nonan-2-ol, 8-bisabolol, camphor, b-caryophyllene, *p*-cymen, lauric acid, a-phellandrene, g-terpinene, terpinolene, xanthorrhizol, asparagine, *trans-trans*-a-farnesene, b-sesquiphellandrene, a-zingiberene, b-bisabolene, curcumere, zingiberol, *n*-nonanone, b-phellandrene, csitronellal, methylheptenone, borneol acetate, elemol, g-eudesmol, isoborneol, b-sesquiphellandrol, myrcene, b-pinene, citronellol, cineol, a-cadinene, caffeic acid, *p*-coumaric acid, camphene, citral, caprylic acid, capsacin, car-3-ene, a-terpineol, a-terpinene, geraniol acetate, nerol, a-copaene, a-curcumene, 3,5-diacetoxy-1-(4-hydroxy-3,5-dimethoxy-phenyl)-7-(4-hydroxy-3-methoxy-phenyl)heptane, *meso*-3,5-diacetoxy-1,7-bis-(4-hydroxy-3-methoxyphenyl) heptane, hexahydrocurcumin, farnesene, furanogermenone, geranial, a-pinene, neral, limonene, linalool, geraniol, germanium, 10-gingediol, 6-gingediol, 6-gingediol diacetate, 6-gingediol diacetate methyl ether, 6-gingediol methyl ether, 8-gingediol, gingerol methyl ether, 10-methylgingerol, 12-methylgingerol, 6-methylgingerol, 8-methylgingerol, paradol, 4-gingerol, 10-gingerdione, 6-dihydrogingerdione, 6-dehydrogingerdione, gingerenone B, isogingerenone B, gingerenone C, gingerenone A, gingerol, 10-gingerol, shogaol, 12-gingerol, 14-gingerol, 16-gingerol, 7-gingerol, gingerol, 9-gingerol, 8-gingerol, glanolactone, 8b,17-epoxylabd-*trans*-12-ene-15,16-dial, 6-paradol, 6-gingerol, nerolidol, pentan-2-ol, pipercolic acid, *cis*-b-sesquiphellandrol, *trans*-b-sesquiphellandrol, *cis*-sesquisabinene hydrate, 10-shagaol, shagaol derivatives, starch, *n*-undecanone, zingerone, zingiberene, zingiberenol, zingiberone, *Zingiber officinale* var. *macrorhizomum* galanolactone, 6-gingerol, 8-gingerol, 10-gingerol, *trans*-8b,17-epoxylabd-12-ene-15, 16-dial, *Zingiber officinale* var. *rubens* galanolactone, 6-gingerol, 8-gingerol, 10-gingerol, *trans*-8-b-17-epoxylabd-12-ene-15, 16-dial, 8b, 17-epoxylabd-*trans*-12-ene-15, 16-dial

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The rhizome is carminative and stimulant. It is useful as after-birth medication and for menstrual pain, coughs, constipation, rheumatism, colic, body-ache, leucorrhea/puerperal infection, tonic/sexual debility, sea-food poisoning, nausea and cold stomach.

8.0 Contraindications

Not available

9.0 Bibliography

Malaysian Monograph Committee. 1999. **Malaysian Herbal Monograph**. Pp. 85–88.



Myanmar



- 1.0 Scientific Name** : *Barleria prionitis* L.
Family : Acanthaceae
- 2.0 Vernacular Name** : Leik-Su-Shwe (Myanmar)

3.0 Plant Description

A much-branched shrub, about 5 ft, usually prickly at the stem branches, leaves opposite, ovate-elliptic, tip acute, margin entire or slightly wavy, mid-vein distinct. Flowers bisexual, pentamerous, funnel shaped, yellow or purple.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

It is found in tropical regions.

6.0 Chemical Constituents

Scutellarein – 7 – rhammosyglucoside, barlerin and acety-balerin

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The leaves are applied for swellings, aches, skin diseases, as hair tonic and antiseptic (cleans, boils and abscesses). The discharge of blood in urine can be cured by giving their juice or the powder of the whole plant mixed with sugar. The decoction of the whole plant

is given for piles, melena diuretic action and edema. The dried powder is taken with honey to increase spermatogenesis, and is also used as antiseptic. The decoction of the leaf is famous for tuberculosis, used externally for swellings and inflammation.

8.0 Contraindications

Not available

9.0 Bibliography

Department of Traditional Medicine. 2001. **Medicinal Plants of Myanmar**. Department of Traditional Medicine, Yangon.

Rastogi, R.P. & Mehrotra, B.N. 1993. **Compendium of Indian Medicinal Plants**. Vol. 3. CDRI Lucknow & Publication and Information Directorate, New Delhi.

State Traditional Medical Council, **Myanmar Traditional Medicine Manual for Health Basic Training Course** (WHO/MMR/TRM/003).

Thidar Swe. *et al.* 2000. Ethnobotany of Yangon Division, Myanmar, Myanmar Health Research Congress. Program & Abstract.



- 1.0 Scientific Name** : *Dioscorea esculenta* (Lour.) Burkill
Family : Dioscoreaceae

- 2.0 Vernacular Names** : Wet-ka (Myanmar); ubi torak (Malaysia)

3.0 Plant Description

Annual herb with perennial underground large tuber. Spiny climber 3–5.5 m high. Base of the stem produces many white roots, log, woody with numerous sharp, pointed, whitish spines 1–2 cm arising from the surface, surrounding the tuber. Leaves broadly orbicular (or) cordate, acuminate, glabrous above, slightly hairy below, 8–11 nerved. Male flower in spike form and female is minute in raceme.

- 4.0 Propagation** : Tuber

5.0 Geographical Distribution/Ecology

It grows in lowland to hilly regions, preferring subtemperate areas (Myanmar). It is found wild in open areas in Malaysia.

6.0 Chemical Constituents

The tuber has the toxic principle, dioscorine.

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

It is used as tonic, and has antioxidant properties (prolongs longevity of life and youth) and a rich source of vitamin E. The tuber is applied to ulcers and swellings. In certain species of *Dioscorea*, the leaves are used for intermittent fevers.

8.0 Bibliography

Ashin-nagathein. **Encyclopedia of Medicinal Plants.**

Hooker, J. D. 1879. **The Flora of British India.** Vol. L. Reeve and Company, London.

Hyndley, H. G. 1987. **List of Trees, Shrub and Principal Climbers etc. Recorded with Vernacular Names.** Forest Department, Burma.

Kirtikar, K. R. & Basu, B. D. 1933. **India Medicinal Plants.** Vol. II, 12th edition. The Prabasi Press, Calcutta.



- 1.0 Scientific Name** : *Elettaria cardamomum* Maton
Family : Zingiberaceae
- 2.0 Vernacular Names** : Hpalar, phalar-thein, phalar-nge (Myanmar);
buah pelaga (Malaysia)

3.0 Plant Description

Perennial herb with a large and fleshy rhizome; the flowering stems spread horizontally near the ground. Leaves oblong-lanceolate. Fruit capsule, subglobose or oblong, marked with fine vertical striations.

- 4.0 Propagation** : Rhizomes

5.0 Geographical Distribution/Ecology

It grows wildly in rich moist soil and cultivated in tropical regions.

6.0 Chemical Constituents

The fruit contains fixed oil, volatile oil. The principal constituents of volatile oil are cineol, terpineol, limonene and sabinene, D-borneol, bornylacetate, d-camphor, nerolidol, linalool.

7.0 Report on Medicinal Usage:

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

It is antiseptic, antimicrobial, aphrodisiac, astringent, antispasmodic, digestive, diuretic, settles digestive discomfort, helps with flatulence, stimulates saliva and is used in tonic. The fruit is used mostly as spice and flavouring agent. It is used as carminative in traditional practice.

8.0 Contraindications

Not available

9.0 Bibliography

Ashin-nagathein. **Encyclopedia of Medicinal Plants.**

Hooker, J. D. 1879. **The Flora of British India.** Vol. L. Reeve and Company, London.

Hyndley, H. G. 1987. **List of Trees, Shrub and Principal Climbers etc. Recorded with Vernacular Names.** Forest Department, Burma.

Kirtikar, K. R. & Basu, B. D. 1933. **India Medicinal Plants.** Vol. II, 12th edition. The Prabasi Press, Calcutta.



- 1.0 Scientific Name** : *Gloriosa superba* L.
Family : Colchicaceae
- 2.0 Vernacular Name** : Si-mee-dauk (Myanmar)

3.0 Plant Description

Herbaceous, tall, stout climbing herb. Root-stock of arched, solid, fleshy-white cylindrical tubers. Leaves sessile. Ovate lanceolate, tip ending in a tendril-like spiral. Flowers large solitary, axillary, changing colours from greenish yellow, orange, scarlet to crimson from blooming to fading. Fruits capsule.

- 4.0 Propagation** : Stem cutting

5.0 Geographical Distribution/Ecology

It grows widely in tropical regions.

6.0 Chemical Constituents

Seed contains high level of colchicines. Cornigerine, 3-demethyl-N-formyl-N-deacetyl-b-lumicolchicine, 3-demethyl-g-lumicolchicine, 3-demethyl colchicines have been isolated from the plant. b-sitosterol, its glucoside, a long chain fatty acid, b and g-lumicolchicines from fresh tubers and luteolin, colchicines, N-formyldeacetylcolchicines and glucosides of 3-demethylcolchicine have been isolated from flowers.

7.0 Report on Medical Usage

- 7.1 Uses supported by experimental/clinical data:**
 Not available

7.2 Uses in traditional medicine:

It is indicated for asthma, tussis and amenorrhoea, and used as antiinflammatory agent, in arthritis. Dried flowers mixed with other ingredients are used to cure asthma. The powder of dried tubers mixed with roasted salt is also used to treat asthma and arthritis.

8.0 Contraindications

Not available

9.0 Bibliography

Rastogi, R. P. & Mehrotra, B. N. 1993. **Compendium of Indian Medicinal Plants**. Vol. 1–5. CDRI Lucknow & Publication and Information Directorate, New Delhi.



1.0 Scientific Name : *Millettia extensa* (Benth.) Baker
Family : Fabaceae

2.0 Vernacular Name : Wun-u

3.0 Plant Description

A large climbing shrub about 9 m. Stem finely downy. Leaves pinnate compound; leaflets 3–5 obovate-oblong, tip acute, long petioled, elongated, glabrous rachis. Flowers short-pedicelled, close axillary racemes; sepals bell-shaped; petals densely silky, red. Pod hard and woody.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

It occurs naturally in tropical areas.

6.0 Chemical Constituents

Nil

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The roots and stem are used to treat bone fractures and skin diseases, i.e itches and scabies.

8.0 Contraindications

Not available

9.0 Bibliography

Hooker, J. D. 1879. **The Flora of British India**. Vol.L. Reeve and Company, London.

Hundley, H. G. 1987. **List of Trees, Shrub and Principal**.

Kirtikar, K. R. & Basu, B. D. 1933. **India Medicinal Plants**. Vol II, 12th edition. The Prabasi Prees, Calcutta.

Watt, G. 1889. **A Dictionary of the Economic Products of India**. Vol.C. Government Printing Press, India.



1.0 Scientific Name : *Nervilia fordii* (Hance) Schltr
Family : Orchidaceae

2.0 Vernacular Name : Ta-bin-shwe-hti (Myanmar)

3.0 Plant Description

Perennial herb with fleshy tuber. Tuber globular, 5–20 mm in diameter, with fibrous roots and 1–2 blades. Leaf ovate-cordate, about 6–12 cm in length and width; with several obvious arched parallel veins; petiole long, tubular at the lower part, surrounded by the purple-red leaf sheath; flower rare. Inflorescence spike; flower white with pinkish-violet spots. Capsule rhomboid striate.

4.0 Propagation : Tuber

5.0 Geographical Distribution/Ecology

It is found in tropical and subtropical regions, growing mostly in hill regions of evergreen forests, often in rich soil under shade.

6.0 Chemical Constituents

Not available

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

It is used as depurative, especially in the case of mushroom intoxication. The leaves are used for alleviating coughs and relieving pain. It clears away heat and toxic material. It

is used for skin infection of intense heat type, sorethroat, summer-heat syndrome with fever and thirst, scrofula. It moisturizes the lungs to relieve coughs.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 2. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

<http://herb.damo-qigong.net/b024.htm> - 24 August 2003.



1.0 Scientific Name : *Piper betle* L.
Family : Piperaceae

2.0 Vernacular Names : Kun (Myanmar); sirih (Malaysia, Indonesia, Brunei Darussalam)

3.0 Plant Description

A perennial aromatic creeper. Stem long, slender, producing small roots at the nodes. Leaves alternate; long petiolate, coiled at the base; leaves shaped broadly ovate; tip acute; base cordate; margin entire; 5–7 nerved; palmately veined; upper surface bright green, lower pale; thick, long stalk. Inflorescence spikes; flowers minute. Fruit small berries, one-seeded.

4.0 Propagation : Seed and stem cutting

5.0 Geographical Distribution/Ecology

Tropical regions

6.0 Chemical Constituents

Leaf contains aromatic essential volatile oil of sharp burning taste, aromatic odour containing betel-phenols, starch, sugars and tannin. Essential oil: eugenol, methyleugenol, a-terpineol, terpinyl acetate and caryophyllene.

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The leaves are used for the treatment of low pressure and irregular movements of the heart. They have been used successfully for colds, loss of voice, coughs and asthma. They cure throat disorders, loss of appetite, indigestion, constipation and germ diseases. The decoction of leaves is taken orally for the treatment of fever. They are also widely used to treat asthma and inflammation. The fresh leaves are eaten together with jaggery for the treatment of hypertension. The decoction of leaves combined with sugar and jaggery is given for diarrhoea.

8.0 Contraindications

Not available

9.0 Bibliography

Nadkarni, K. M. 1993. *Indian Materia Medica*. Popular Prakashan Private Limited, Mumbai.

Rastogi, R. P. & Mehrotra, B. N. 1993. **Compendium of Indian Medicinal Plants**. Vol.3. CDRI Lucknow & Publication and Information Directorate, New Delhi.

State Traditional Medical Council, Myanmar Traditional Medicine Manual for Health Basic Training Course. (WHO/MMR/TRM/003).



1.0 Scientific Name : *Rauvolfia serpentina* Benth. ex Kurz.
Family : Apocynaceae

2.0 Vernacular Name : Bon-ma-ya-zar (Myanmar)

3.0 Plant Description

Roots up to 15 cm in length and 2 cm in diameter, stout, thick, tortuous. Surface is slightly wrinkled, rough with coarse longitudinal marking. External colour greyish yellow to brown, wood pale yellow. Fracture short, irregular. Odourless, taste very bitter.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Tropical regions

6.0 Chemical Constituents

Alkaloid-ajmaline, serpentine, serpentinine

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The root is used as anthelmintic and febrifuge. It is also used as a remedy for snakebites and stings of insects and in dysentery. Its powder is combined with other ingredients for treatment of hypertension, fevers, high blood pressure, hypochondria, insanity, insomnia, painful bowel disorders.

8.0 Contraindications

Not available

9.0 Bibliography

Chopra, R. N., Nayar, S. L. & Chopra, I. C. 1956. **Glossary of Indian Medicinal plants**. Council of Scientific & Industrial Research, New Dehli.

Department of Traditional Medicine. 2001. **Medicinal Plants of Myanmar**. Ministry of Health.

Rastogi, R. P. & Mehrotra, B. N. 1993. **Compendium of Indian Medicinal Plants**. Vol. 2 & 3. CDRI Lucknow & Publication and Information Directorate, New Delhi.

State Traditional Medical Council, **Myanmar Traditional Medicinal Manual for Health Basic Training Course** (WHO/MMR/TRM003). The Union of Myanmar.

Thidar Swe *et al.* 2000. **Ethnobotany of Yangon Division, Myanmar**. Myanmar Health Research Congress Programme & Abstract.

<http://www.pharm.kumamoto-u.ac.jp/yakusoen/rauorufia-e.html> - 24 August 2003.



- 1.0 Scientific Name** : *Vitex negundo* L.
Family : Lamiaceae

- 2.0 Vernacular Name** : Kyaung-pan-gyi

3.0 Plant Description

A large shrub or small tree, branches quadrangular. Leaves compound opposite; long petiolate; leaflets penta-foliolate, lanceolate, glabrous above, tomentose below. Inflorescence terminal thyrse. Flowers bisexual, bluish purple, tomentose outside, hairy inside. Fruits drupe, globose, black when ripe.

- 4.0 Propagation** : Stem cutting and seed

5.0 Geographical Distribution/Ecology

It grows in warmer place and is found mostly in waste places.

6.0 Chemical Constituents

Vanillic and p-hydroxybenzoic acids and luteolin isolated from bark. Roots contain hentriacontane, β -sitosterol, β -sitosterol acetate and stigmaterol. Leaves contain essential oil.

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The leaf juice is taken in treatment of swelling of joints, weakness of brain, paucity of menses and ailments connected with childbirth. It cures itches and ailments caused by

heat. The decoction of the plant is given in the treatment of fever as well as malaria. The decoction of the leaves is useful for dysentery and gastric ulcer.

8.0 Contraindications

Not available

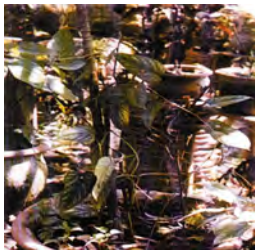
9.0 Bibliography

Rastogi, P. T. & Mehrotra, B. N. 1993. **Compendium of Indian Medicinal Plants**. Vol. 2 & 3. CDRI Lucknow & Publication and Information Directorate, New Delhi.

Chopra, R. N., Nayar, S. L. & Chopra, I. C. 1956. **Glossary of Indian Medicinal plants**. Council of Scientific & Industrial Research, New Dehli.

State Traditional Medical Council, **Myanmar Traditional Medicine Manual for Health Basic Training Course**. (WHO/MMR/TRM/003) Union of Mynmar.

Department of Traditional Medicine. 2001. **Medicinal Plants of Myanmar**. Ministry of Health.



1.0 Scientific Name : *Vitis repens* Lam. Wight & Arn.
Family : Vitaceae

2.0 Vernacular Name : Ta-bin-taing-mya-nan (Myanmar)

3.0 Plant Description

Tendrillar climber, slender, scandent. Stem 6-angled with ridges and furrows. Rhizome glaucous, fusiform to tuberculous. Leaves alternate, simple; margin serrulate; white patch in pale-green-coloured leaf blade. Cymose, small yellowish green flowers are borne on the peduncle. Fruits berries.

4.0 Propagation : Stem cutting

5.0 Geographical Distribution/Ecology

It is widely distributed in hill regions.

6.0 Chemical Constituents

Glycosides and flavonoids.

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The root is used for sores, ulcers and tumours. The whole plant is used for hepatitis, jaundice and hypertension. It is used mostly for sores, ulcers and tumours.

8.0 Contraindications

Not available

9.0 Bibliography

San, S. Y. 1989. **Taxonomical, Pharmacognostical and Antitubercular Studies of Two Species of Vitis**. M.Sc. thesis, Yangon University.

Department of Traditional Medicine. **Medicinal Plants of Myanmar**. A Selection of 60 commonly used species compiled by the Ministry of Health.



Philippines



- 1.0 Scientific Name** : *Aloe barbadensis* Mill.
Synonym : *Aloe vera* (L.) Burm. f.
Family : Liliaceae
- 2.0 Vernacular Names** : Aloe, curacao aloe (English); sabila, sabila-pinya (Tagalog); dilang-halo (Bisakol); dilang-boايا (Bikol); acibar (Spanish)

3.0 Plant Description

A short-stemmed herb cultivated both as ornamental and medicinal. The thick, sword-shaped leaves form a rosette immediately above the ground. They are 30 to 40 cm long, pale green with white spots and smooth except for weak marginal spines. The flower cluster (raceme), about 30 cm long, has a long stalk with distant acute scales. The yellow flowers without calyx are drooping, 2.5 cm long, tube shaped, tipped with short lobes which are curved outward. The capsule (fruit) bears angular seeds.

- 4.0 Propagation** : Commonly propagated by suckers

5.0 Geographical Distribution/Ecology

Aloe is commonly found in the Philippines as an ornamental.

6.0 Chemical Constituents

Histochemical findings are as follows: tannin in leaves (detectable); calcium oxalate in leaves (abundant); sulphur, fats, iron formic acid and glycoside in leaves (detectable).

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Leaf juice is used for treating burns, abrasions and skin irritations; also purgative, vermifuge; tonic and remedy for kidney pains; cathartic; juice of leaves applied to the scalp prevents falling hair, and is said to be good for the complexion. Crushed leaves as poultice for contusions. Juice mixed with water is a remedy for indigestion and peptic ulcers. It is usually combined with other antispasmodic drugs; vermifuge; emmenagogue.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L. S., Lugod, G. C. & Pancho, J. V. 1981. **Handbook on Philippine Medicinal Plants**. Vol. III. Technical Bulletin Vol. V, No.2. University Publication Office, Las Banos, Laguna, Philippines. Pp. 66.



- 1.0 Scientific Name** : *Anacardium occidentale* L.
Synonym : *Cassuvium reniforme* Blanco
Family : Anacardiaceae
- 2.0 Vernacular Names** : Balubad, kasoy, balugo (Philippines); Gajus, jambu bongkok (Malaysia)
- 3.0 Plant Description**

Small tree with gnarled trunk. Leaves simple, alternate, ovate or obovate, 10–20 cm long and 7–12 cm wide, with slightly rounded apex. Flowers small crowded at the tip of branches; petals yellowish to white sometimes with pink stripes. Fruit is a nut, ash-colored, kidney-shaped, about 2 cm long, with its receptacle or torus fleshy, juicy yellow and pear shaped, about 5–7 cm long.

- 4.0 Propagation** : Seed, stem cutting, marcotting, inarching, budding and grafting

5.0 Geographic Distribution/Ecology

The cashew is a native of northeastern Brazil in tropical America, where it occurs wild in extensive islands. From its native home, it became well dispersed throughout the tropics in the lowlands of Central and South America, Mexico and the West Indies where it was thoroughly naturalized and became abundant. In the 16th century, Portuguese traders introduced cashew into India where it was planted along the seashores to bind the soil and check erosion. Soon, the species spread throughout India, Sri Lanka, Malaysia and other Asian countries. The early Spanish missionaries are credited to have introduced cashew into the Philippines from tropical America and India. At present, the cashew is an important nut crop in India, Mozambique, Tanzania, Brazil, Madagascar, Kenya, Sri Lanka, Nigeria, Senegal, the Philippines and other tropical countries. The greater bulk of cashew kernel is consumed in the United States, Russia, United Kingdom, Canada, Australia, Federal Republic of Germany and Japan.

6.0 Chemical Constituents

Alkaloids, glycosides, saponin, tannin and calcium oxalate

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Decoction of the bark is used to treat diarrhea, diabetes, syphilitic swellings and ulcerations in the mouth. Infusion of the leaves and bark acts as astringent, relieves toothache, sore gums and for dysentery. Juice from the pericarp is diuretic and sudorific. The bruised nut is used in abortion. Oil from the nut is used for warts, blisters, corns and ulcers. Tincture of the pericarp is vermifuge.

8.0 Contraindications

Not available.

9.0 Bibliography

De Padua, L. S., Lugod, G. C. & Pancho, J. V. 1978. **Handbook on Philippine Medicinal Plants**. Vol. I. University Publication Office, Las Banos, Laguna, Philippines.

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Bureau of Printing, Manila.



- 1.0 Scientific Name** : *Annona reticulata* L.
Family : Annonaceae
- 2.0 Vernacular Names** : Anonas, nona (Malaysia)

3.0 Plant Description

A tree, 10 m high or less. Leaves oblong to oblong-lanceolate, acuminate, 20 cm long or less, glabrous; petioles 1–1.5 cm long. Flowers greenish-yellow, fragrant, 2–2.5 cm long, 2 or 3 together on lateral peduncles. Fruit subglobose or ovoid, large, fleshy edible, with pentagonal areolae on the outside.

- 4.0 Propagation** : Seed and stem cutting

5.0 Geographical Distribution/Ecology

Anonas is widely distributed after the discovery of the New World and is now found in all tropical and subtropical regions. It has been long established in India.

6.0 Chemical Constituents

Alkaloids, tannin, formic acid, peroxidases and calcium oxalate

7.0 Reports on Medicinal Usage

- 7.1 Uses supported by experimental/clinical data:**
Not available

7.2 Uses in traditional medicine:

Fresh leaves are applied onto the stomach of children suffering from indigestion. Fresh leaves and fruits are anthelmintic. Young fruits and bark act as astringent in dysentery and diarrhea.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L. S., Lugod, G. C. & Pancho, J. V. 1978. **Handbook on Philippine Medicinal Plants**. Vol. II. University Publication Office, Las Banos, Laguna, Philippines.

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Bureau of Printing, Manila.



- 1.0 Scientific Name** : *Areca catechu* L.
Synonym : *Areca alba* Bory.
Family : Arecaceae

- 2.0 Vernacular Names** : Areca nut, betel nut palm, boa, bunga, dapiau, hua, lugos, luyos, pasa, takobtov, vua, va

3.0 Plant Description

The trunk is erect and solitary, up to 25 m high, and marked with annular scars. The leaves are up to 4 m long; with numerous leaflets, 60 to 90 cm long, with the upper ones confluent. The spadix is much branched and compressed, with branched filiform bearing numerous, somewhat distichous male flowers which are yellow and about 5 mm long. The female flowers are at the base of the branches and in axils, about 1 cm long or more. The fruit is ovoid, smooth, orange or red (when ripe), 4 to 6 cm long, with the pericarp somewhat fleshy, and the mesocarp fibrous.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

The plant is often cultivated throughout the Philippines. Possibly it is native to the country, having been found once, spontaneous in primary forests in Palawan. It also occurs in the Old World Tropics generally, and has been introduced into the New World.

6.0 Chemical Constituents

The first chemical analysis of the seed was performed in 1886 and isolated a liquid volatile alkaloid called arecaine. Other alkaloids isolated from the seeds are in the following proportions - arecaine 0.1% and arecoline 0.07-0.1%; arecaine, guvacoline and choline occur only in traces. Arecolidine is another alkaloid obtained. The seed contains 15% of tannin and 14% of fat.

Tannin is located almost entirely in the kernel. However, the husk contains only traces. As the green nuts ripen, the amount of tannin in the kernels decreases. Analyses of full-grown betel nut (kernel) yielded 12.98–26.89% of tannin.

The kernel has gallic acid and gum. The most important of all the alkaloids and the one which has anthelmintic property is arecoline ($C_8H_{13}NO_2$). Arecoline is a colourless, oily liquid with a boiling point of 230° C, and forms crystalline salt with acids.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in the traditional medicine:

In the Philippines, as well as in the Indo-Malayan and Polynesian regions, the areca nut is extensively chewed with lime and the leaves of betel piper (*Piper betle*) which is locally known as *ikmo*. The *buyo*, is generally regarded as a tonic and a general stimulant, but its excessive use is certainly harmful. The fruit in decoction is considered an abortifacient and the nut as an emmenagogue. Excessive use of *buyo* causes loss of appetite, salivation, and general degeneration of the organism. The tender seeds are said to be purgative and grated ripe ones are vermifuge, and externally used as an astringent.

The fresh nut is somewhat intoxicating and produces giddiness in some persons. The dried nut is a stimulant, astringent and taenifuge. It increases the flow of saliva, sweetens the breath, strengthens the gum, and produces mild exhilaration. Arecoline is a highly toxic substance, and its pharmacological action resembles that of muscarine, pelletierine, and pilocarpine. It violently stimulates the peristaltic movements of the intestines and produces a marked constriction of the bronchial muscles which can, however, be overcome by adrenaline or atropine. It is a powerful sialogogue and stimulates the secretion of sweat in the same way as pilocarpine.

The young nut is useful in bowel complaints. The tincture forms an astringent gargle when diluted with water, which is useful for bleeding gums. It may also be injected to stop water discharges from the vagina. It is useful in checking the pyrosis during pregnancy.

The young green shoots act as an abortifacient in early pregnancy. Large doses of areca nut can cause vomiting and diarrhoea. The roots (shredded, steeped in water, pounded and the juice extracted) are used as poison.

The tannic and gallic acids in young nuts are responsible for the astringent properties. The burned and powdered nuts make an excellent dentifrice. The juice of young leaves mixed with oil is used externally for lumbago. It has been found to be useful to cure urinary disorders. It is also reported to possess aphrodisiac properties. The powdered nuts have long been known to be antihelmintic in man and animals and are useful in the expulsion of tapeworms from human, as well as in combating round worms. The nut is regarded as a nervine tonic.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L. S., Lugod, G. C. & Pancho, J. V. 1977. **Handbook on Philippine Medicinal Plants**. Vol. I. Technical Bulletin Vol. 11(3). University Publication Office, Las Banos, Laguna, Philippines. Pp. 63.

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Manila Blue Printing.



- 1.0 Scientific Name** : *Basella rubra* L.
Synonyms : *Basella alba* L., *Basella lucida* L., *Basella cordifolia* Lam.
Family : Basellaceae

- 2.0 Vernacular Names** : Alugbati, arogbati, dundula, grana; ilaibakir, libato, malabar nightshade, Lok'uei

3.0 Plant Description

The plant is a succulent, branched, smooth, twining, herbaceous vine reaching a length of several meters. The stems are green or purplish. The leaves are somewhat fleshy, ovate or heart-shaped, 5–12 cm in length stalked, tapering to a pointed tip, and cordate at the base. The spikes are axillary, solitary, and 5–29 cm in length. The flowers are pink, and about 4 mm long. The fruit is fleshy, stalkless, ovoid or nearly spherical, 5–6 mm in length, and purple when mature.

- 4.0 Propagation** : Seed and stem cutting

5.0 Geographical Distribution/Ecology

The plant is widely cultivated and found at low and midland elevations throughout the Philippines. It is certainly not a native of the archipelago but is a prehistoric introduction. It also occurs in tropical Asia, Africa and Malaysia.

6.0 Chemical Constituents

Histochemical test analysis indicates that calcium oxalate in leaves is abundant and in stems detectable. Starch in leaves is detectable and in stems abundant, while saponin in leaves is detectable.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The roots are employed as rubefacient, and as a poultice to reduce local swelling. The sap is used to anoint any part of the body affected by acne to reduce irritation. It is demulcent, diuretic and emollient. It makes wholesome and is most easily digested and acts as a mild laxative. The leaves are reduced to a pulp and applied to boils, ulcers and abscesses to hasten suppuration. The juice of the leaves together with sugar is useful in catarrhal infections in children. It is useful in treating gonorrhoea and balanitis. The juice from the leaves, thoroughly rubbed and mixed with butter, is a soothing and cooling application for burns and scalds. The mucilaginous liquid obtained from the leaves and tender stalks of this plant is a popular remedy for habitual headaches. The leaves are considered good maturation as cataplasm. A decoction of the leaves is a good laxative for pregnant women and children. The fruit is used as rouge for the cheeks and lips and also as a dye.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L. S., Lugod, G. C. & Pancho, J. V. 1981. **Handbook on Philippine Medicinal Plants**. Vol. I. Technical Bulletin Vol. 5(2). University Publication Office, Las Banos, Laguna, Philippines. Pp. 66.

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Manila Blue Printing.



- 1.0 Scientific Name** : *Bixa orellana* L.
Family : Bixaceae

- 2.0 Vernacular Names** : Achuete, asuite, achiti, atsuite, sotis (Philippines)

3.0 Plant Description

A tree, 4–6 m high. Leaves ovate, entire, 8–20 cm long, 5–12 cm wide; base broad, more or less cordate; apex acuminate. Flowers white to pinkish, 4–6 cm in diameter. Capsules ovoid or subglobose, green or reddish purple, about 4 cm long, covered with long, slender, rather soft spines and containing many small, dark red seeds.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

The plant is usually planted around towns throughout the Philippines. It is a native of tropical America and is now pantropic in cultivation.

6.0 Chemical Composition:

Tannin, saponin, fats and calcium oxalate

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Febrifuge, leaf infusion is used in treating dysentery. When pounded and macerated in water, the leaves are diuretic. Decoction of the bark is employed in febrile catarrhs, to relieve period pain and stomach-ache. Dye from this plant mixed with lime is applied externally in treating erysipelas. The seed is an efficient remedy for certain skin diseases. They are said to be an antidote to cassava and *Jatropha curcas* poisoning.

8.0 Contraindications

Not available.

9.0 Bibliography

De Padua, L. S., Lugod, G. C. & Pancho, J. V. 1978. **Handbook on Philippines Medicinal Plants**. Vol. 2. University Publication Office, Las Banos, Laguna, Philippines.

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Bureau of Printing, Manila.

<http://www.nativehabitat.com/Bixaorellana.asp> - 26 August 2003.



- 1.0 Scientific Name** : *Caesalpinia pulcherrima* (L.) Sw.
Synonym : *Poinciana pulcherrima* L.
Family : Caesalpinaceae

- 2.0 Vernacular Names** : Bulaklak ng paraiso (Philippines)

3.0 Plant Description

An erect, glabrous sparingly spiny shrub or small tree, 1.5–8 m high. Leaves bipinnate, pinnae 4–8 pairs, 6–12 cm long; leaflets sessile, 7–11 pairs, obtuse, elliptic, 1–2 cm long. Racemes terminal lax; pedicels long, slender. Flowers red yellow or yellow, about 4 cm in diameter; petals crisped, clawed; stamens long-exserted. Pods 5–9 cm long, 1.5 cm wide.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

It was introduced from tropical America. It is popular in other regions of the world. Introduced into the Philippines at an early date, it is now spontaneous in abandoned areas and vacant lots. Native of Madagascar.

6.0 Chemical Composition:

Alkaloids, saponin, tannin, glucosides and calcium oxalate.

7.0 Report on Medicinal Usage

- 7.1 Uses supported by experimental/clinical data:**
Not available

7.2 Uses in traditional medicine:

Plant decoction or infusion is used as purgative and emmenagogue. Decoction of the leaves is used to treat liver infections and ulcers of the mouth and throat. Infusion of the leaves, roots or bark is employed for colds and skin diseases and is even said to induce abortion. Root decoction is used to cure intermittent fever. The flower is a popular remedy for erysipelas and for inflammation of the eyes. It is also used as a tonic. The seeds are an effective abortifacient. The fruit is employed against diarrhea and dysentery.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L. S., Lugod, G. C. & Pancho, J. V. 1978. **Handbook on Philippine Medicinal Plants**. Vol. 2. University Publication Office, Las Banos, Laguna, Philippines.

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Bureau of Printing. Manila.



- 1.0 Scientific Name** : *Carmona retusa* (Vash.) Masam.
Synonyms : *Ehretia microphylla* Lam., *Ehretia buxifolia* Roxb.
Family : Boraginaceae
- 2.0 Vernacular Names** : Putputai, alangit, tsaang gubat (Philippines)
- 3.0 Plant Description**

A shrub or much-branched small tree, 1–4(–10) m tall; young branches hispid, with buds or short shoots producing clusters of leaves and inflorescences. Leaves simple, alternate obovate to spatulate, 1–6(–10) cm x 0.5–2.5(–4) cm, thick gradually narrowing towards base, toothed or crenate towards apex with short rigid hairs; lateral veins about 5 arching; petiole 0.1–0.5(–1) cm long, stipules absent. Inflorescence in fascicles of 2–6 or in a cyme. Flowers actinomorphic, bisexual, (4–) 5 merous, pedicelled; calyx 3–6 mm long, with (–) 5 linear lobes densely hairy inside; corolla sub-rotate, white 6–9 mm in diameter, tube about 2 mm long, widening, lobes spreading 2.5–4.5 mm long; stamens (4–) 5 with filaments 2.5–3.5 mm long and anthers oblong; ovary superior, globose about 1 mm in diameter style deeply bifid 4.5–6 mm long. Fruits drupaceous globose 5–6 mm in diameter, red or yellow, with 1–4 seeds not breaking up into pyrenes. Seeds with straight or slightly curved embryo, embedded in thin albumen. Seedling with epigeal germination; cotyledons leafy, green, hypocotyl elongated.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

Found from India eastward to southern China, Taiwan, Japan, and further south throughout Malaysia to New Guinea and to Solomon Island. The plant is often grown as ornamental.

6.0 Chemical Constituents

Boraginaceae commonly contain pyrrolizidine alkaloids, biosynthesized from the amino acid ornithine, and quinoid or phenolic compounds derived from C-prenylated, C-geranylated or C-farnesylated 4-hydroxybenzoic acid. The isomeric red pigments alkanin and shikonin are best known representatives of such hydroxybenzoic acid derivatives. Specifically *C. retusa* contains alkaloids, glycosides and tannin.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicines:

In the Philippines, the leaves are taken as a substitute for tea. It is considered as stomachic, antidiarrhea and as remedy for dysentery and coughs. Infusions of the leaves are taken as febrifuge. A decoction of the leaves is consumed to cure stomach-ache and coughs.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L.S. 1999. **Plant Resources of South-East Asia. Medicinal and Poisonous Plants 1.** Backhuys, Leiden, The Netherlands. Pp. 52.



- 1.0 Scientific Name** : *Cassia fistula* L.
Family : Leguminosae
- 2.0 Vernacular Names** : Golden shower, Indian laburnum, purging cassia, pudding pipe tree, (English); bitsula (C. Bis.); cana fistula (Spanish); kana-pestula (Ibn.); kana-pistula (Tagalog); fistula (C. Bis., Tagalog); ibabau (Bis.); lombayong (Bis.); lapad-lapad (Tagb.)

3.0 Plant Description

This is a moderate-sized, erect, deciduous tree. The leaves are pinnate smooth, and 30 to 40 cm long. The leaflets are 8 to 16, ovate, and average 10 cm in length. The flowers are borne in long, lax racemes (30 to 50 cm long), and are fragrant, bright yellow, on stalks, and 3 to 5 cm in length. The calyx is 6 to 8 mm long, smooth, and deciduous. The petals are veined, obovate, 18 to 25 mm long, bright yellow, and short-clawed at the base. The stamens are all furnished with anthers, the 2 or 3 lower ones being longer. The pod is cylindrical, 30 to 60 cm long, about 2.5 cm thick, pendulous, smooth, shining, and dark brown. The seeds are numerous, embedded in black, sweet pulp, completely separated by thin, transverse dissepiments, small, ovoid, slightly compressed, smooth, shining and yellowish brown.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

Golden shower is found from northern Luzon to Mindanao and Palawan. Most often cultivated as an ornamental flowering tree and is sometimes planted for its medicinal properties. A native of tropical Asia, it was introduced into the Philippines and is now pantropic in cultivation.

6.0 Chemical Constituents

Pulp analysis: 20 parts of the pulp consist of sugar, 12.00; gum, 1.35; astringent matter; gluten; colouring matter; and water, the latter amounting to about 3.80. The root-bark and root-wood analysis results:

	Root-bark	Root-wood
Water (%)	10.01	8.21
Ash (%)	8.92	2.29
Petroleum ether extract (%)	0.32	0.52
Ether extract (%)	2.17	0.45
Absolute alcohol extract (%)	17.62	4.56

Manganese was absent from the ash of both the root-bark and the root-wood; the former contained iron in a very marked amount. No alkaloidal principle was detected; resins were present. A bitter principle was also present to which the taste of the wood is probably due. As reported, oxymethyl-antraquinone was isolated from the entire fruit, 0.95%; from the fruit pulp, 1.05 %; and from the bark of the twigs, 1.20 %. In addition, saccharose (53-66 %), viscient sugar, citric acid, and pectin were present.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The roots are useful in fever, heart diseases, retained excretions, and biliousness; they are a strong purgative, tonic and laxative.

The leaves are purgative. Externally the leaves, ground into a paste, are applied to ringworm. The juice of the young leaves is used to cure ringworm. The tender leaves are employed in rheumatic fever as a mild purgative. The powdered leaves are also laxative. The bark and leaves, mixed with oil, are applied to pustules, ringworm, insect bites, facial paralysis, and rheumatism. The bark is used as dye material.

The flowers are purgative and are said to have demulcent properties. In decoction they are given in stomach affections. The pulp of the fruit is employed as a cathartic; extract of fruit-pulp proved to be good laxative.

8.0 Contraindications

Not available

9.0 Bibliography

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Manila Blue Printing.



- 1.0 Scientific Name** : *Ceiba pentandra* (L.)
Synonyms : *Bombax pentandrum* L., *Eriodendron anfractuosum* DC.
Family : Bombacaceae
- 2.0 Vernacular Names** : White silk cotton tree (English); basanglai (Iloko); boboi (Bikol, Tagalog); boi-boi (Bisakol); buboi (Tagalog); bulak (Tagalog, Pampango); bulak-dondol, gapas, dogdol (Bisakol); kasanglai, bulak-kastila (Pampango); bulak-kahoi, balios, bulak-sina (Tagalog); daldol (Bisakol); doldol (Bisakol); dondol (Iloko); gataoua (If.); kayo (Bikol, Bisakol); kapas-sanglai (Iloko); kapok (Bisakol, Sulawesi); kapas (Pang.); kapuk (Sulawesi); kulak (Iloko)

3.0 Plant Description

It is an erect, deciduous tree 15 m or less in height. The trunk is cylindrical, usually bearing scattered, large spines. The branches are in distant whorls, and spread horizontally. The leaves are compound, with 5 to 8 leaflets which are whitish and about 3 cm long. The capsules are pendulous, oblong, about 15 cm in length, and 5 cm thick. They contain numerous black seeds, which are compressed-globose, smooth, and embedded in fine, silky hairs.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

Kapok is widely distributed in the Philippines. It is possibly a native of tropical America and is now pantropic.

6.0 Chemical Constituents

Histochemical test indicates: tannin in leaves and stems (detectable-abundant); fats in stem (detectable); calcium oxalate in leaves and stems (detectable-abundant); peroxidase in leaves and stems (detectable).

The seeds have been reported with the following composition: oil – 24.20%; water – 11.85%; ash – 5.22%; crude fiber – 23.91%; albuminoids – 18.52%; carbohydrates – 15.90%. Kapok oil has the following constants: specific gravity at 15° C – 0.9235%; solidifying point – 29.6%; saponification value (Mgrms KOH) – 181 – 205%; Iodine value – 117.9%; maumene test – 95%; refractive index – 51.3%. The oil consists of a mixture of fatty acids about 70% of which is liquid, while 30% is palmitic acid, which is solid.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The bark is employed as vomitive and aphrodisiac. When brewed into decoction it is regarded as febrile catarrh. The root decoction is used for chronic dysentery, diarrhea, ascites and anasarca. The gum is sometimes given in bowel complaints. The leaves are used for coughs, hoarseness, intestinal catarrh and urethritis. Tender leaves are administered for gonorrhea. Flower decoction is used for constipation. The tender fruit is used as emollient. The unripe fruit is regarded as demulcent and astringent.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L. S., Lugod, G. C. & Pancho, J. V. 1978. **Handbook on Philippine Medicinal Plants**. Vol. 2. Technical Bulletin Vol. III, No.3. University Publication Office, Las Banos, Laguna, Philippines. Pp. 67.

Quisumbing, E. 1954. **Medicinal Plants of the Philippine**. Manila Blue Printing.



- 1.0 Scientific Name** : *Hibiscus rosa-sinensis* L.
Family : Malvaceae

- 2.0 Vernacular Names** : Shoeflower, hibiscus, china rose (English); gumamela (Tagalog); gumamela (Tagalog, Bisakol, Pampango); kayangan (Iloko, Bikol, Bisakol); aratongan (Pampango)

3.0 Plant Description

The plant is an erect, much branched, smooth shrub, 1 to 4 m in height. The leaves are ovate and 7 to 12 cm long, with coarsely toothed margins. The flowers are solitary, axillary, very large, about 10 cm long, and 12 cm in diameter. The calyx is green and about 2 cm long, with ovate lobes. The petals are red, orange, or rose-white, obovate, rounded, and imbricate. The staminal tube is slender and longer than the corolla. There are many hybrids of different coloured, simple flowers in addition to a few doubles.

- 4.0 Propagation** : Cutting

5.0 Geographical Distribution/Ecology

Gumamela is found in cultivation for ornamental purposes, but nowhere spontaneous, throughout the Philippines. It is a native of the Old World and is now pantropic in cultivation.

6.0 Chemical Constituents

Histochemical findings are as follows: calcium oxalate in leaves and stem (detectable to abundant); sulphur in stem (detectable); peroxidase in leaves and stem (detectable to abundant); fats in leaves and stem (detectable to abundant); protein in leaves and stem (detectable to abundant).

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The plant possesses antiinfection and antiinflammation properties. Decoction of dried plant is used for infection of urinary tract. Roots, bark, leaves and flowers in decoction are used as emollient. Fresh leaves are crushed and applied as poultice to abscesses and carbuncles. The bark is used as an emmenagogue. Flower buds, beaten into a paste, are applied as poultice to boils, cancerous swellings and mumps. The red flowers regulate menstruation; they are somewhat purgative and are sometimes said to cause abortion. Infusion of flowers used as an expectorant in bronchitis. Decoction of flowers is effective for coughs. The dark red petals are administered in the form of a mucilaginous infusion in irritable conditions of the genito-urinary tract; also a refrigerant drink in fevers. The seeds, pounded into a pulp and mixed with water, are given with much benefit in gonorrhoea. Decoction of roots is used for sore eyes.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L. S., Lugod, G. C. & Pancho, J. V. 1978. **Handbook on Philippine Medicinal Plants**. Vol. 2. Technical Bulletin Vol. III, No.3. University Publication Office, Las Banos, Laguna, Philippines. Pp. 67.

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Manila Blue Printing.



1.0 Scientific Name : *Jatropha curcas* L.
Family : Euphorbiaceae

2.0 Vernacular Names : Physic nut tree, purging nut tree, big-purge nut (English); tubang-bakod, kirisol, taba-taba (Tagalog); galumbang (Pampanga); kasla (Bisakol); tagumbau, tagumbau-na-purau, tauua (Iloko); tangan-tangan-tuba (Tagalog); taua-taua (Iloko); tuba (Bikol, Tagalog)

3.0 Plant Description

This is a smooth, erect, branched shrub 2 to 5 m in height. The leaves are entire, angular or somewhat three-to five-lobed, orbicular-ovate and 10 to 18 cm long; the apex is pointed and the base heart-shaped. The petioles are long. The flowers are greenish or greenish white, 7 to 8 mm in diameter, and borne on axillary cymes. The capsules are at first fleshy but later become dry, are rounded and are composed of two or three one-seeded divisions which are 3 to 4 cm long.

4.0 Propagation : Seed and stem cutting

5.0 Geographic Distribution/Ecology

Tubang-bakod is found throughout the Philippines. It was introduced at an early date in colonial history from Mexico, and is now pantropic in distribution.

6.0 Chemical Constituents

It contains 29 to 40 percent of a yellow fixed oil, known variously as hell oil, pinheon oil, oleum infernale, and oleum ricini majoris. The oil consists principally of glycerides of palmitic, oleic, and linolic acids. The bark contains a considerable amount of chlorophyll, reducing sugars or other reducing substances, saponin, a small amount of tannin, resin and a trace of volatile oil.

The bark yields wax which is a mixture of melissyl alcohol and its melissinic acid ester. It consists of the glyceride of a characteristic acid, belonging to the same group as ricinoleic and crotonoleic acids, but is not identical with either.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

A decoction of the leaves is a good antidiarrhetic. A decoction of the roots is also used as a cure for diarrhoea, while that of the leaves is employed as a cough remedy and to excite secretion of milk. The bark of this plant is pounded slightly and placed in the mouth as a cure for snake-bite. It is also used as a poultice for sprains and dislocations, and the sap is a cure for toothache. The fresh, viscid juice flowing from the stem is employed to arrest bleeding or haemorrhage from wounds, ulcers, cuts and abrasions; it is said to promote healing by coagulating the blood and forming an air-tight film when dry, like that produced by collodion. It is a successful local remedy for scabies, eczema and ringworm.

8.0 Contraindications

A dose of 1 to 4 seeds is a mild purgative; an overdose is a drastic purgative – causing vomiting, purging - and violent inflammation of the mucous membrane of the stomach and intestines.

9.0 Bibliography

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Manila Blue Printing.



- 1.0 Scientific Name** : *Mimosa pudica* L.
Synonym : *Mimosa asperanta* Blanco
Family : Leguminosae

- 2.0 Vernacular Names** : Bashful mimosa, humble plant, sensitive plant (English); babain (Iloko); damohia (Tagalog); dilgansusu (Iloko); harupai (Bisakol); huya-huya (Bisakol); kiromkirom (Bisakol); makahia (Pang., Tagalog); tuyag-huyag (Bisakol); torog-torog (Bikol)

3.0 Plant Description

The species is a diffusely spreading, half-woody herb, with branched stems up to 1 meter in length, sparingly prickly with numerous deflexed, bristly hairs. The leaves are very sensitive, both the pinnae and the leaflets closing when touched. The pinnate are usually 4, digitately arranged at the end of each petiole, 4–9 cm long. The leaflets are narrowly oblong, inequilateral, 1–1.5 cm long, sessile, sparingly bristly, with pointed tip. The heads are long-peduncled, solitary or 2 or 3 in each axil, nearly 1 cm in diameter. The flowers are pink and very numerous. The pods are flat, slightly recurve, numerous, 1–2 cm long made up of 3–5 one-seeded joints that at maturity fall away.

4.0 Propagation

Propagation is by seed and produced in dense population once mature pods opened up.

5.0 Geographical Distribution/Ecology

Makahiya is abundant throughout the Philippines in open, waste places at low and medium altitudes in settled areas. It was introduced from tropical America and is now a pantropic weed.

6.0 Chemical Constituents

The roots contain tannin 10% and ash 5.5%.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

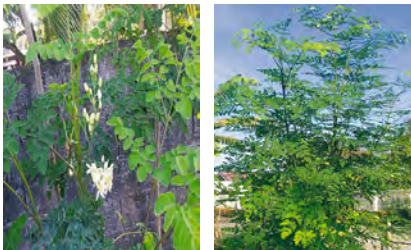
The root is administered as a diuretic, and is used against dysentery and dismenorrhoea. The entire plant is considered as an adulterant and antiasthmatic. The root decoction is aphrodisiac and for urinary complaints; useful in diseases arising from corrupt blood and bile. The leaves and root in powdered form with milk is given in cases of piles and fistula. The leaves rubbed into a paste are applied to hydrocel and glandular swellings. The juice of the leaves is used to impregnate cotton wool for dressing in any form of sinus difficulty. The leaves are employed as a bath for pains of the hips and kidneys. The infusion of the leaves is considered tonic, given for dysentery and as bitter tonic. The seeds constitute a good emetic and for sore throat and hoarseness.

8.0 Contraindications

Not available

9.0 Bibliography

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Manila Blue Printing.



- 1.0 Scientific Name** : *Moringa oleifera* Lam.
Synonyms : *Guilandina moringa* L. *Moringa pterygosperma* Gaertn.,
Moringa nux-ben Perr.
Family : Moringaceae

- 2.0 Vernacular Names** : Horse-radish tree, arunggai, balungai, dool, kalamungai, kamalongan, kalungai, kamalungai, kompomplan, malomgai, malungai, malungit, marongoi, marungai

3.0 Plant Description

The plant is a small tree, 8 m or less in height, with corky bark and soft, white wood. The leaves are alternate; usually thrice pinnate and 25–50 cm long; 3–9 leaflets on the ultimate pinnules, thin, ovate to elliptic and 1–2 cm long. The flowers are white and 1.5–2 cm long, on spreading panicles. The pod is 15–30 cm long, pendulous, 3-angled and 9-ribbed. The seeds are 3-angled and winged on the angles.

- 4.0 Propagation** : Seed and stem cutting

5.0 Geographical Distribution/Ecology

The plant is planted throughout the Philippines in settlement areas at low and medium altitudes. It was introduced from tropical Asia in the prehistoric period, and is now pantropic in cultivation. It is drought resistant and grows in practically all kinds of well-drained soils. The plant conserves water by shedding its leaves during dry season.

6.0 Chemical Constituents

Histochemical test indicates the following: tannin in stem (abundant); sulphur in stem (detectable); calcium oxalate in leaves and stem (detectable-abundant); pectin substances in leaves and stem (detectable).

The bark contains white crystalline alkaloid (occurring in the spirituous extract), 2 resins (one soluble and the other insoluble in ammonia), and inorganic acid, mucilage and ash 8%. The root yields an essential oil which is very pungent and has offensive odor. The seed contains traces of an acrid and pungent alkaloid ben or behen, and is said to contain the glycerides of margaric, oleic and behenic acid. Ben oil consists largely of the glycerides of oleic, palmitic and stearic acids. It also contains a solid acid of high melting point. The husked seeds yield a fixed oil, 30.20%. The gum contains bassorin, dextrin, enzymes myrosin and emulsin. The astringent property of the gum is due to the presence of moringo-tannic acid. This substance differs from bassorin and contains some arabin.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The flowers, tender leaves, and young pods are eaten as vegetables and contain abundance of calcium and iron. The bark, flowers and the oil from the seeds are of medicinal value. The oil, known as ben oil, is used as an ointment base and an absorbent in the enflourage process of extracting volatile oils from flowers. The oil is particularly valuable for ointments since it can be kept for almost any length of time without undergoing oxidation. The oil is used externally in treating rheumatism. Essential oil from the root is used externally as a rubefacient. The root juice has been used as a dog poison.

The young leaves are used as a galactagogue. Decoction of the roots is used to cleanse sores and ulcers, also considered antiscorbutic and is given to delirious patients. The bark is used as a rubefacient remedy. It is said that the roots of the tree, if chewed and applied to snake-bite can prevent the poison from spreading.

The leaves as a poultice are useful in reducing glandular swelling. They are said to have purgative property. Eating the leaves is also recommended in the treatment of gonorrhea on account of their diuretic action.

The roots have a taste somewhat like that of horse-radish, and in India are eaten by Europeans as a substitute for the latter. The fresh root is regarded as an acrid, pungent remedy, which is stimulant and diuretic.

The roots are regarded as antiscorbutic and when pounded are considered an effective poultice for inflammatory swelling. The roots are rubefacient applied externally in the form of a plaster as a counter-irritant. The juice of the roots mixed with milk is also useful as a decoction to treat hiccough, asthma, gout, lumbago, rheumatism, enlarged spleen or liver, internal and deep-seated inflammations, and calculous affections. Decoction or infusion of the root is an effective gargle and can cause abortion. A decoction of the bark of the roots is used as a fomentation to relieve spasm. The gum is also good for intestinal complaints. The gum mixed with sesame oil is recommended for the relief of otalgia.

The flowers are useful for catarrh, with or in lieu of young leaves or young pods. The pods have anthelmintic property and are administered to treat infections of the liver and spleen, articular pains, etc.

8.0 Contraindications

Not available

9.0 Bibliography

1971. *Plants of the Philippines*. **UP Science Education Center**. Pp. 96.

De Padua, L.S. *et. al.* 1978. **Handbook on Philippines Medicinal Plants**. *Volume 2* Technical Bulletin Vol. III, No. 3., UPLB, College, Laguna. Pp. 34.

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Manila Blue Printing.



- 1.0 Scientific Name** : *Premna odorata* Blanco
Synonyms : *Premna curranii* H.J.Lam, *Premna benthamiana* Domin, *Premna inaequilateralis* E. Beer & H.J.Lam
Family : Lamiaceae
- 2.0 Vernacular Names** : Alagao, anobran (Philippines)
- 3.0 Plant Description**
- A shrub or small tree up to 10(–12) m tall, with up to 25(–30) cm in diameter, bark finely flaky fissured; leaves ovate to ovate rotundate, sometimes ovate lanceolate (–)6.5 – 16(–20) cm x 4–10(13.5) cm, mostly entire, sometimes serrate-denticulate in upper half, pubescent all over especially beneath petiole; flowers with pedicel 0.5–1.5 mm long; corolla greenish white or pinkish white; fruit obovoid, 3.5 mm long, green turning black.
- 4.0 Propagation** : Stem cutting and seedling
- 5.0 Geographic Distribution/Ecology**
- Asia, Southeast Asia, China, Taiwan, Japan and Australia
- 6.0 Chemical Constituents**
- Alkaloids and glucosides in leaves and stem
- 7.0 Report on Medicinal Usage**
- 7.1 Uses supported by experimental/clinical data:**
 Not available

7.2 Uses in traditional medicines:

The leaves are used as diuretic; decoction with sugar and little 'calamansi' (*Citrofortunella microcarpa*) juice is consumed to treat coughs. An infusion is considered carminative and useful to treat beri-beri. A decoction of leaves or flowers is considered to be a febrifuge and is also used to cure abdominal pains and dysentery. Masticated roots are prescribed against cardiac problem.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L.S. 1999. **Plant Resources of South-East Asia. Medicinal and Poisonous Plants 1**. Backhuys, Leiden, The Netherlands. Pp. 52.

De Padua *et al.* 1978. **Handbook on Philippine Medicinal Plants, Volume 1**. Published by Documentation and Information Section, Office of the Director of Research. University of the Philippines Los Banos.



- 1.0 Scientific Name** : *Streblus asper* Lour.
Synonyms : *Calius lactescens* Blanco, *Streblus lactescens* Blume
Family : Moraceae
- 2.0 Vernacular Names** : Kalios (Tagalog); ampas (Pampango); buntatai, bagtak (Bisakol); kakadli (Tagalog); aludig (Iloko); lampataki (Tagalog)

3.0 Plant Description

Kalios is a rigid and densely branched tree growing from 4 to 15 m in height. The leaves are oblong-ovate to subrhomboid, 4 to 12 cm long, very rough on both sides, with finely toothed margin, the tip blunt or tapering to a point, base narrowed. The male flowers are in rounded heads, 4 to 7 mm in diameter, short-peduncled, greenish yellow, or nearly white. The female flowers are peduncled, usually in pairs, green; the sepals accrescent and nearly enclosing the fruit. The fruit is ovoid, 8 to 10 mm long, pale yellow; the pericarp soft and fleshy. The seed is ovoid, 5 to 6 mm long.

- 4.0 Propagation** : Kalios is propagated by seed, cutting and air layering.

5.0 Geographical Distribution/Ecology

Kalios is found in thickets at low and medium altitudes, common in regions with long dry season, from Northern Luzon to Palawan and Mindanao. It also occurs in India to southern China and Malaysia.

6.0 Chemical Constituents

Histochemical test indicate the following findings: glucosides in stem (detectable); calcium oxalate in leaves and stem (detectable–abundant); sulphur in leaves and stem (abundant); peroxidase in leaves and stem (detectable); hydrocellulose in leaves and stem (detectable–abundant).

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Bark decoction is used for disinfecting wound, internally used for skin diseases called "culebra", for fever, dysentery and diarrhea. Bark is chewed as an antidote in snake poisoning. Roots are used in epilepsy and inflammatory swellings and applied to boils; juice is astringent and antiseptic. The latex is applied to sore heels and chapped hands, on glandular swellings.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L. S. *et al.* 1981. **Handbook on Philippine Medicinal Plants**. Vol. II. Technical Bulletin Vol. II, No.3. 6. UPLB, College, Laguna. Pp. 67.

Quisumbing, E. 1954. **Medicinal Plants of the Philippines**. Manila Blue Printing.



- 1.0 Scientific Name** : *Tinospora crisa* (L.) Hook f. & Thomson
Synonyms : *Tinospora rumphii* Boerl., *Tinospora tuberculata* (Lamk) Beumee ex K. Heyne
Family : Menispermaceae
- 2.0 Vernacular Names** : Makabuhay (Philippines); patawali, putawali, akar seruntum (Malaysia)

3.0 Plant Description

A woody climber up to 15 m long; older stems very prominently tuberculate and producing very long filiform aerial roots; leaves broadly ovate to orbicular, 7–14(–25) cm x 6–12(–24) cm, without domatia; inflorescences appear when plant is leafless; flowers usually with 3 petals; fruit ellipsoidal, about 2 cm long, orange. The plant occurs primarily in rain forest and mixed deciduous forest but can be very common in secondary vegetation after logging and in hedges, up to 1,000 m altitude.

- 4.0 Propagation** : Stem cutting

5.0 Geographical Distribution/Ecology

India, Myanmar, Cambodia, Lao PDR, Viet Nam, Southern China (Yunnan), Thailand, Peninsular Malaysia, Singapore, Indonesia (Java, Sumbawa) and the Philippines (Luzon, Mindoro, Mindanao). A commonly backyard plant.

6.0 Chemical Constituents

Alkaloid, saponin, tannin and glycosides in leaves and stems

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicines:

An infusion of the stem is served as vermifuge and the whole plant is used to treat cholera and diabetes mellitus. Externally applied to cure scabies and to heal wounds. Powdered stems are used to fatten horses and cattle by stimulating their appetite. The plant is a very commonly used medicinal plant in the Philippines, Thailand, Sri Lanka and India.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua *et al.* 1978. **Handbook on Philippine Medicinal Plants**, Volume 1. Published by the Documentation and Information Section, Office of the Director of Research University of the Philippines Los Banos.

De Padua, L.S. 1999. **Plant Resources of South-East Asia. Medicinal and Poisonous Plants 1**. Backhuys, Leiden, The Netherlands.



- 1.0 Scientific Name** : *Vitex negundo* L.
Family : Lamiaceae
- 2.0 Vernacular Names** : Lagundi (Philippines); legundi (Malaysia); kyaung-pan-gyi (Thailand)

3.0 Plant Description

Evergreen or deciduous shrub or small to medium-sized tree, sometimes large, up to 45 m tall; bole crooked to straight, up to 125(–200) cm in diameter, usually without buttress but sometimes with distinct buttress, often deeply fluted; bark surface rather smooth to shallowly fissured or flaky, pale gray to pale yellowish brown, inner bark pale yellow to bright orange; crown often spreading. Leaves opposite or in whorls of 3; palmately compound with 3–7(–9) leaflets, rarely reduced to one leaflet without stipules, leaflet entire dentate or lobed. Inflorescence terminal or axillary, cymose; the cymes sessile or pedunculate, solitary or arranged in racemes, thyrses or panicles. Flowers bisexual; calyx campanulate to tubular; 5-lobed to truncate corolla usually with a short tube, 2-lipped, upper lip 2-fid, lower 3-fid often pubescent outside, white to blue or violet or rarely yellowish; stamens 4 didynamous, inserted on the corolla tube, exserted; ovary superior usually first to locular and later 4 locular with a single ovule in each cell; style 1 filiform; stigma vivid. Fruit, a juicy or dry drupe, seated on the often enlarged calyx, generally with 4-seeded pyrene. Seeds obovoid or oblong without endosperm. Seedling with epigeal germination; cotyledons emergent, leafy; hypocotyls elongated; leaves opposite conduplicate, first ones simple and with toothed margins.

- 4.0 Propagation** : Stem cuttings and seeds

5.0 Geographical Distribution/Ecology

It grows well in tropical regions, commonly in thickets and wastelands.

6.0 Chemical Constituents

The active constituents are probably the flavonoids casticin, chresoplenol D, luteolin and isooreintin, and p-hydroxybenzoic acid.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Lagundi is the only extensively studied cough remedy and antiasthma herbal preparation in the Philippines today. The National Integrated Research Program on Medicinal Plants (NIRPROMP) has established in both animal and human studies the wide margin of safety and efficacy of lagundi as a cough remedy and antiasthma medicine. Phase III-double blind placebo controlled trial has shown bronchodilator effect and antitussive effect.

7.2 Uses in traditional medicine:

The bark, leaves, flowers, fruits or roots of various *Vitex* species are used as general tonic, antihelmintic and in the treatment of gastro-intestinal disorders. General applications are as anodyne, febrifuge, expectorant and diuretic. A poultice of the leaves is applied to relieve rheumatic pains, inflammations and sprains. An infusions of the leaves is used in the treatment of dermatitis and eczema. The leaves are traditionally placed between pages of books and clothes as well as in rice stores to ward off insects. In the Philippines the plant is applied in veterinary medicine to treat internal parasite.

8.0 Contraindications

Not available

9.0 Bibliography

De Padua, L.S. 1999. **Plant Resources of South-East Asia. Medicinal and Poisonous Plants 1.** Backhuys, Leiden, The Netherlands.



Thailand



1.0 Scientific Name : *Artocarpus lakoocha* Roxb.
Family : Moraceae

2.0 Vernacular Names : Ma haat, kaa-yae, taa-pae, taa-paeng, mahaat baiyai, haat, puag-haad (Thailand)

3.0 Plant Description

The plant is a large-sized tree, 15–20 m tall; crown is dense, rounded; bark is brownish grey or dark brown and scaly. Young shoots covered with a tawny or rusty dense, villous tomentum. Leaves simple, alternate, 10–30 cm long, 5–20 cm wide, surface rough beneath; petiole 2–4 cm long, hairy or glabrous; blade oblong, elliptic or ovate; base rounded or cordate, unequal; apex acute or acuminate; mature leaf margin entire but young leaves serrulate. Flowers are monoecious, the males and females crowded on separate receptacles. The male inflorescences are irregularly oblong, yellow, solitary in the axils of the leaves; consisting of short peduncles; perianth 2-3-4 parted; stamen 1 only, exerted; filament complanate. The female inflorescences usually irregularly globular; consisting of peduncle slightly longer than the male one; perianth tubular, entire; ovary free, 1-very rarely 2- or 3-celled, the cells with solitary pendulous ovule. Fruit, compound fleshy syncarp, irregularly rounded, about 5–8 cm in diameter, velvety puberulous, when fully ripe yellow, edible. Seeds oblong, lodged within the fleshy enlarged perianth parts.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Not common in evergreen forests in peninsular, southeastern and southwestern parts of Thailand. It is cultivated for medicinal uses.

6.0 Chemical Constituents

The whole plant contains 2,3,4,5-tetrahydroxystilbene. The stem contains 5-hydroxy-2,4,7-trimethoxyflavone, 2,3,4,5-tetrahydroxystilbene, while the bark contains amyirin acetate, lupeol acetate, tannin. Root bark contains 5,7-dihydroxyflavone-3-O-a-L-rhamnoside, galangin-3-O-a-b-D-galactosyl-(1-4)-a-L-rhamnoside, kaempferol-3-O-b-L-xylopyranoside, lupeol, quercetin-3-O-a-L-rhamnopyranoside, b-sitosterol. The plant is also known to contain 2,4,3,5-tetrahydroxystilbene.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The aerial parts showed hypotensive activity when administered intravenously at 50% alcohol extract to dogs at a dose of 50.0 mg/kg. The heartwood (powdered) showed an anthelmintic activity against *Taenia saginata*. The 2,4,3,5-tetrahydroxystilbene, found in the stem bark, is responsible for the anthelmintic activity. A formula is being developed at the National Institute of Hygienic Sciences, Bangkok. The plant is also effective against pig ascaris. It managed to decrease helminth-eggs in faeces of both dogs and humans. The plant showed an antibacterial activity where a 95% alcohol extract of dried stemwood (91.0 mg/disc) exhibited the antibacterial activity against *Bacillus subtilis*. Antituberculosis activity was observed when 95% alcohol extract (1.0 mg/disc) was effective against *Mycobacterium smegmatis*.

The bark showed an antiviral activity when an aqueous extract inhibited the growth of potato virus X when grown on *Nicotiana tobacum* leaves at 1:1 dilution.

7.2 Uses in traditional medicine:

The root is antipyretic and anthelmintic. It is also used for alleviation of toxic symptoms and treatment of urinary stones. The wood is antifatulent, and used as carminative and laxative. It is used in the treatment of skin rash, chronic gastrointestinal ailments of children characterized by marked malnutrition and usually associated with intestinal parasitism and round worm infestation, and also in the treatment of menstrual disorders, fainting, tapeworm, any disorders or diseases which cause cachexia, disorders of flatulence and tendomyopathy. The bark is known to be antipyretic. The pith is used in the treatment of menstrual disorders, any disorders or diseases which cause cachexia, nephropathy, distension of abdomen due to peritonitis or paralytic ileus, and also in treating insomnia; malnutrition syndrome in children due to intestinal parasitism; splenomegaly; eye irritation; dissipate hematoma; oropharyngeal symptom from gastroenteric disease; dyspepsia caused by wind element; cramp; clouded mind; incontinent urination. It is also known to be anti-diarrheal, anthelmintic, febrifuge, antituberculosis and analgesic, and for increasing appetite.

In the treatment of right-sided thoraco-abdominal spasm and cholestyopathy and taenifuge, the powdered plant is suspended in lemon juice or water and taken orally.

8.0 Contraindications

Not available

9.0 Bibliography

- Buathong, M., Suwithayawat, V., Pavaro, C. & Huntrakul, T. 1976. **Chemical Study of the Active Compound from the Wood of *Artocarpus lakoocha***. B.Sc. (Pharm.). Faculty of Pharmacy, Mahidol University.
- Bhakuni, D. S., Dhar, M. L., Dhar, M. M., Chawan, B. N., Gupta, B. & Srimali, R. C. 1971. Screening of Indian plants for biological activity. Part III. **Indian Journal Experimental Biology**. 9: Pp. 91.
- Chauhan, J. S. & Kumari, G. 1979. A new glycoflavanol from the root bark of *Artocarpus lakoocha*. **Planta Medica**. 37: Pp. 85–88.
- Chauhan, J. S., Kumari, G. & Saraswat, M. 1980. A new flavanol glycoside from the root bark of *Artocarpus lakoocha*. **Indian Journal Chemistry Ser B**. 18: Pp. 473–475.
- Chauhan, J. S., Kumari, G., Kumar, S. & Chaturvedi, R. 1982. Chemical examination of the root bark of *Artocarpus lakoocha*. **Product Natural Academy Science India Sect A**. 52(2):217–218.
- Charoenlarp, P., Radomyos, P. & Bunnag, D. 1989. The optimum dose of puag-haad in the treatment of taeniasia. **Ibid**. 72(2):71–73.
- Choroenlarp, P., Shaipanich, C., Subhanka, S., Lakkantinaporn, P. & Tanunkat. 1991. A pharmacokinetics of the active constituent of puag-haad in man. Symposium on Mahidol University Research and Development. ASEAN Institute Health Development, Salaya, Nakhon Pathom, Thailand, February 25–29, 1991.
- Kapel, R. S. & Joshi, S. S. 1960. Chemical constituents of *Artocarpus lakoocha*. **Journal Science Indian Research** 19B: Pp. 498.
- Khalique, M. A. & Mofizerd, D. A. 1955. Indigenous tanning materials of E. Pakistan. I. Leaching of goran, sonail, and dahua barks. **Pakistan Journal Science Research** 7(2): Pp. 51–53.
- Manmontri, M. 1949. Report on the anthelmintic activity of puak-haad against tape-worm. **Journal Medical Association Thailand**. 32(6): Pp. 1–9.
- Mongkolsuk, S., Alexander, R. & Towers, R. 1956. 2,3,4,5 Tetrahydroxy- stilbene from *Artocarpus lakoocha*. **Journal Chemistry Society**. Pp. 2231–2233.
- Mahati, S. B., Banerjee, S. K. & Chakravarti, R. N. 1966. Triterpenes of *Artocarpus lakoocha* Roxb. **Bulletin Calcutta School of Tropical Medicine** 14(1): Pp. 16.
- Nilvises, N., Panyathanya, R. & Wamnutchinda, W. 1985. Toxicity test of Puag Haad (*Artocarpus lakoocha*). **Bulletin Department of Medical Science** 27(1): Pp. 49.
- Pavaro, C. & Reutrakul, V. 1976. A study of a new flavanol in puak-haad. **Mahidol University Journal of Pharmaceutical Sciences**. 3: Pp. 161–164.
- Pongpan, A., Chumsri, P. & Taworasate, T. 1982. The antimicrobial activity of some Thai medicinal plants. **Mahidol University Journal of Pharmaceutical Sciences** 9(4): Pp. 82–91.

Sambhandharaksa, C., Thantivatana, P. & Ratanachai, T. 1965. Pharmacognostical and phytochemical studies of *Artocarpus lakoocha* Roxb. **Journal Natural Resource Council Thailand**. 3: Pp. 68-78.

Singh, R. 1981. Inactivation of potato virus x by plant extracts. **Phytopathology Mediterranean** 10(2): Pp. 211-212.

Tiptssiankarn, L. I. 1967. **The antioxidant action of 2,4,3,5 Tetrahydroxystilbene and some of its Derivatives**. M.Sc. thesis (Pharmacology), Mahidol University.

Wisutsonthorn, J., Sukprasert, A. & Aarekul, S. et al. 1985. **Formulation of Some Thai Folkloric Anthelmintic Preparations**. Seminar on Medicinal Plants Development, Bangkok, Thailand. July 17-19, 1985.

Yodhabandu, C. 1960. **A Pharmacopoeial Study on "Puag Haad" (2,4,3,5-tetrahydroxystilbene)**. B.Sc. (Pharm), Chulalongkorn University.



- 1.0 Scientific Name** : *Boesenbergia rotunda* (L.) Mansf.
Family : Zingiberaceae
- 2.0 Vernacular Names** : Kra chaai, ka aen, ra aen, chee-puu, see-phuu, poh-so-roh, poh-see, waan phra aa thit (Thailand); temu kunci (Malaysia)

3.0 Plant Description

The plant is a rhizomatous herb; having roots cylindrical, fascicled, 6–10 cm long; tip acute, outside light brown, inside yellow, scented. Shoot leafy and very short, consisting of 3–4 leaves; petioles 12–25 cm long, 5–10 cm wide; apex acute; base cuneate or obtuse; margin entire. Inflorescence terminal, subsessile, enclosed by leaf-sheaths bearing 2-ranked bracts each subtending a single flower; bracts are linear-lanceolate up to 5 cm long; bracteoles are as long as the bracts but narrower. The uppermost flower opens first; calyx about 2 cm, bifid; corolla pink, tube exceeding the bracts; lobes about 1.5 cm, oblong; labellum bag-shaped about 2.5 cm long, 2 cm wide; lateral staminodes slightly shorter than corolla lobes and mottled purple. Fruits are ellipsoid.

- 4.0 Propagation** : Rhizome

5.0 Geographic Distribution/Ecology

It is grown in almost all soil types but it grows best in sandy soil. It is widely cultivated throughout the country.

6.0 Chemical Constituents

Boesenbergin A, boesenbergin B, cardamonin, chavicinic acid, 2, 6-dihydroxy-4-methoxychalcone, 2, 4-dihydroxy-6-methoxychalcone, 5, 7-dimethoxy-flavone, essential oil, 2-hydroxy-4, 4, 6-trimethoxychalcone, 2-ydroxy-4, 6'-dimethoxy-chalcone, 5-hydroxy 7, 4-dimethoxyflavanone,

panduratin A, panduratin B1, panduratin B2, 3, 5, 7, 3, 4-pentamethoxyflavone, dl-pinocembrin(2, 3-dihydroxychrysin) (1), dl-pinostrobin(5-hydroxy-7-methoxyflavanone) 4-tetramethoxyflavone

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The rhizome has antibacterial, antifungal, mutagenic, antiinflammatory, antipyretic, antispasmodic and insecticidal activities.

8.0 Contraindications

Not available

9.0 Bibliography

Achararit, C., Panyayong, W. & Ruchatakumut, E. 1983. **Inhibitory Action of Some Thai Herbian (Medicinal Plants) to Fungi**. Special project for the degree of B.Sc. (Pharm.). Faculty of Pharmacy, Mahidol University, Thailand.

Apisariyakul, A. & Anantasarn, V. 1984. A Pharmacological Study of the Thai Medicinal Plants Used As Cathartics and Antispasmodics. 10th Symposium on Science and Technology of Thailand, Chiang Mai, Thailand. 25–27 October 1984.

Apisariyakul, A., Puddhasukh, D. & Niyomka, P. 1987. **Pharmacological Screening of Thai Natural Products**. The First Princess Chulabhorn Science Congress I, Bangkok, Thailand.

Areekul, S., Sinchaisri, P. & Tigvatananon, S. 1987. Effect of Thai plant extract on the Oriental fruitfly I. Toxicity test. **Kasetsart Journal (Natural Science)**, 21(4): Pp. 395–407.

Hirunsalee, A., Pancharoen, O. & Tantiwachwuttikul, P. 1987. Further Studies of Flavonoids of the Black Rhizome of *Boesenbergia pandurata*. **Journal Science Society Thailand**. 13(2): Pp. 119–122.

Iamthammachard, S. 1982. **Study on the Effects of Some Medicinal Plants in the Family Zingiberaceae on the Growth of Some Bacteria**. M.Sc. (Teaching Biology) thesis, Chiang Mai University, Thailand.

Jaipetch, T., Kanghae, S., Pancharoen, O. et al. 1982. Constituents of *Boesenbergia pandurata* (Syn. *Kaempferia pandurata*): Isolation, Crystal Structure and Synthesis of (DL) — boesenbergin A. **Australia Journal Chemistry**. 35: Pp. 351–361.

Laorpaksa, A., Amnuoyopol, S. & Jongbunprasert, V. 1988. Preliminary Study on Antibacterial Action of Thai Medicinal Plants for Respiratory Tract Infection (I). **Thai Journal Pharm Science**. 13(1): Pp. 23–36.

Mahidol, C., Tuntiwachwuttikul, P., Pakawatchai, C. et al. 1988. Constituents of the Zingiberaceae. Crystal Structure of (+) — E-1 [5-hydroxy-7'-methoxy-2-methyl-2-(4-methylpent-3-enyl)-2'H-1-benzopyran-6'—YL]-3-Phenylprop-en-1-one. **Journal Science Society Thailand**. 14: Pp. 301–311.

Pancharoen, A., Kelvin, P., Reutrakul, V., Taylor, W. C. & Tantiwachwuttikul, P. 1987. Constituents of the Zingiberaceae. X. Diastereomers of [17-hydroxy-5-methoxy-2-methylbut-2(4-methylpent-3-enyl)-2H-chromen-8-yl] [3-methylbut-2-enyl]-6-phenylcyclohex-3-enyl] methanone (panduratin B) a Constituent of the Red Rhizomes of a Variety of *Boesenbergia pandurata*. **Australia Journal Chemistry**. 40(3): Pp. 455–459.

Suphat, P. 1964. **Active Principle in *Boesenbergia pandurata***. M.Sc. thesis, Chulalongkorn University, Thailand.

Tasneeyakul, W. A. 1984. **Study on Anti-inflammatory Activity of 5,7-Dimethoxyflavone Isolated from *Boesenbergia pandurata* Extract in Albino Rats**. M.Sc. thesis, Chiangmai University, Thailand.

Thamaree, S., Pachotilarn, C., Tankeyoon, M. & Itthipanichpong, C. 1985. Effects on intestinal motility of thirty herbal medicines used in the treatment of diarrhea and dysentery. **Chula Medical Journal**. 29(1): Pp. 39–51.

Tuntiwachwuttikul, P., Kanghae, S., Jaipetch, T. & Reutrakul, V. 1980. Chemical Constituents of *Boesenbergia pandurata*. Abstract 4th Asian Symposium Medicinal Plants Spices, Bangkok, Thailand, 15–19 September 1980. pg 77.

Ultee, A. J. 1928. The Essential Oil from *Gastrochilus panduratum*. *Ridl. Proceedings Academy Science Amsterdam*. 31: Pp. 62–64.

Ultee, A. J. 1957. The Ethereal Oil of *Gastrochilus panduratum*. *Ridl. Verslag Academy Wetenschappen Amsterdam*. 36: Pp. 1262–1264.

Ungsurngsie, M., Suthienkul, D. & Paovalo, C. 1982. Mutagenicity screening of popular Thai spices. **Food Cosmet Toxicology** 120: Pp. 527–530.



1.0 Scientific Name : *Cassia fistula* L.
Family : Leguminosae

2.0 Vernacular Name : Khuun (Thailand)

3.0 Plant Description

Small to medium-sized, upright tree, about 10–15 m tall. Trunk short, and branches slender, upright and spreading. Bark smooth, ash-coloured when young, becomes dark brown when mature. Stipules small and caducous. Leaves compound pinnate, rachis about 15–25 cm long, bears 3–8 pairs of leaflets about 7–12 cm long and 4–8 cm broad, smooth above and covered with fine veins, more distinct on the under-surface; petiolule about 5–10 mm long. Flowers racemes about 20–40 cm long, 1–3 racemes drooping from the axil; stalk about 15–35 mm long, slender, slightly hairy or quite smooth; 5 tender green sepals; 5 yellow petals, egg-shaped and distinctly veined; 10 stamens with thread-like filaments, the 3 longest stamens about 3 cm long, much curled and bear about 5 mm oblong anthers, the 4 smaller ones are quite straight, the 3 remaining stamens are quite short and erect; ovary and style are hairy. Fruit is a straight cylindrical pod, 20–60 cm long and about 1.5–2 cm in diameter, quite smooth and dark green when young, turning dark brown and then black with age; seeds numerous, oval, shining, yellowish brown, embedded in a dark-coloured, sweetish pulp.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

The plant is found in mixed deciduous forests and cultivated for ornamental purpose throughout the country.

6.0 Chemical Constituents

The sapwood contains 1-8-dihydroxy-3-methyl anthraquinone, (+)-catechin, dihydrokaempferol, (-)-epiafzelchin, kaempferol, procyanidin CF-1.

The leaves contain anthraquinones, carbohydrates, carotene, cellulose, chitorin, chlorophyll A, chlorophyll B, chrysophanic acid, hemicelluloses, inorganic elements kaempferol-3-O-b-D-glucoside, kaempferol-3-O-b-D-neohesperidoside, kaempferol-3-glucoside, kaempferol-3-rhamnosid, kaempferol-3-robinobioside-7-rhamnoside, lignins, myricetin, 3-neohesperidoside, phenolic ester and ethers, alcohol, pigments, protein, quercetin, quercetin-3-rutinoside, quercetin-3-xyloside, rhein, rhein glucoside, sennoside, sennoside A, sennoside B, steroids, tannins, vicein(6, 8-di-C-glucosylapigenin, xylose D.

The flower contains 28-isofucosterol, gibberellin A-3, b-sitosterol, stigmasterol.

The pod contains anthraquinones, arginine, aspartic acid, n-butyric acid, carbohydrates, citric acid, fistulic acid, formic acid, glutamic acid, hydroxymethylanthraquinone, leucine, lignoceric acid, d-(+)-malic acid, methionine, pectins, phenylalanine, protein, rhein, sucrose, tannins, terpenoids, triacontan-1-ol, n-triacetyl lignocerate, tryptophan, waxes.

The seed contains amino acid. The plant is also known to contain alcohol, phenolic ester and ethers, steroids, triterpenes.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The fruit has antiviral, antitumour, antifertility, hypoglycemic, antiinflammatory, antibacterial and antifungal activities.

8.0 Contraindications

Not available

9.0 Bibliography

Agarwal, C. D., Rizvi, S. A. I., Gupta, P. C. & Tewari, J. D. 1970. Chemical examination of *Cassia fistula* pods. Proceedings Natural Academy Science, India, Sect. A. 40(3):338–340.

Agarwal, C. D., Rizvi, S. A. I., Gupta, P. C. & Tewari, J. D. 1972. Structure of fistulic acid, a new coloring matter from the pods of *Cassia fistula*. **Planta Medica**. 21(2):150–155.

Babbar, J. P., Joshi, M. N. & Madan, A. R. 1982. Evaluation of plants for antiviral activity. **Indian Journal of Medical Research (Suppl)**. 76:54–65.

Babbar, O. P. 1982. Protective patterns of different interferons: Possible efficacy of chick embryo and plant interferons against microbial infections and malignancies of animals. *Ibid*. 20(8): Pp. 451–454.

- Babber, O. P., Bajpai, S. K., Chowdhury, B. L. & Khan, S. K. 1979. Occurrence of interferon-like antiviral and antitumor factor(s) in extract of some indigenous plants. **Indian Journal Experimental Biology**. 17(5): Pp. 451–454.
- Bhardwaj, S., Mathur, R. & Agarwal, O. P. 1980. Estrogenicity of fruit of *Cassia fistula* Linn. and its effect on implantation in female albino rats. **Bulletin Medical Ethnobotany Res.** 1: Pp. 281–286.
- Bhardwal, S. & Mathur, R. 1979. Anti-fertility screening of fruit of *Cassia fistula* in female albino rats. **Comp Physiol. Ecology**. 4(4): Pp. 277–279.
- Billore, S. K, Mehta, S. C. & Mall, L. P. 1976. Changes in chlorophyll A, B and carotenoid in summer leaves of tree species in a dry deciduous forest. **Journal Indian Botany Society**. 55(1): Pp. 56–59.
- Chutiyasantyanon, C., Sirikul, S., Buntaweekul, S. & Temrattansirikul, A. A. 1984. **Study of Medicinal Plants Used for Skin Diseases**. Special Project for B.Sc. (Pharm.), Faculty of Pharmacy, Mahidol University.
- Dhar, M. L., Dhar, M. M., Dhawan, B. N., Mehrotra, B. N. & Ray, C. 1968. Screening of Indian plants for biological activity: Part I. **Indian Journal Experimental Biology**. 6: Pp. 232-247.
- Estevez, A., Marquina, G., Polanco, N., Contreras, D., Vergara, A., Perez, I. & Kekoura, K. 1976. Antitumor substances from twenty two Cuban plants. **Revision Cubana Farm**. 10: Pp. 223–227.
- Ghosh, P., Thankur, S., Itoh, T. & Matsumoto, T. 1982. Sterols from flowers of *Cassia siamea*, *Cassia sophera* and *Cassia fistula*. **Indian Journal Chemistry Series B**. 21: Pp. 796–797.
- Gritsanapan, W. & Chulasiri, M. 1988. A Preliminary study of anti-diarrheal plants: I Antibacterial activity. **Mahidol University Journal Pharmacology Science**. 10(4): Pp. 119–123.
- Gupta, P. C., Singh, H., Sangwan, D. C. & Pradhan, K. 1975. Chemical composition and *in vitro* nutrient digestibility of some of the Tree Leaves. **Indian Forest** 101(11): Pp. 674–680.
- Kaji, N. N., Khorana, M. L. & Sanghavi, M. L. 1968. Studies on *Cassia fistula* Linn. **Indian Journal Pharmacology** 30(1): Pp. 8–11.
- Kamboj, V. P., Setty, S. S., & Khanna, V. M. 1977. Semen coagulation a potential approach to contraception. **Contraception**. 15: Pp. 601–610.
- Karim, M. A. & Guha Sircar, S. S. 1964. The fruit-pulp of *Cassia fistula*. **Science Culture**. 12(4): Pp. 194.
- Katiyar, S. K. & Niranjana, G. S. 1981. Studies on carbohydrates and amino acids of some non-cultivated leguminous seeds. **Journal Indian Chemistry Society**. 85: Pp. 98–100.
- Khan, M. R., Ndaalio, S., Nkunya, M. H., Wevers, H. & Sawhney, A. N. 1980. Studies on African medicinal plants. Part I. Preliminary screening of African medicinal plants. Part I. Preliminary screening of medicinal plants for antibacterial activity. **Planta Medica Supplement**. 40: Pp. 91–97.

Menon, T. V., Pillai, N. G. K., Pillai, K. G. B., Kurup, P. B. & Nair, C. P. R. 1980. A detailed study on Pama (Scabies) with Aragwatha Kwatham and Pamari Ointment. *Journal of Science Research on Plants Medicine* 1(3): Pp. 29–31.

Mitscher, L. A., Leu, R. P., Bathala, M. S., WU, W. & Beal, J. L. 1972. Antimicrobial agent from higher plants. I. Introduction, Rationale, and Methodology. *Lloydia*. 35: Pp. 157–166.

Naokata, M., Arisawa, M., Nagaes, M., Hsu, H. & Chen, Y. 1977. Studies on the constituents of Formosan leguminosae: III. On the flavonoids from *Leucaena glauca* (I). Benth, *Cassia fistula* L. and 8 other varieties. *Syoyakugaku Zasshi* 31(2): Pp. 172–174.

Nayudamma, Y., Rajadurai, S., Bhanu, K.U., Xeddy, K. K. & Banerji, S. 1962. Some Recent Studies in the Chemistry of Indigenous Condensed Tannins. Seminar on Vegetable Tannins, Madras. Pp. 55–61.

Patil, A. & Deshapande, V. H. 1982. A new dimeric proanthocyanidin from *Cassia fistula* sapwood. *Indian Journal Chemistry Series B*. 21:626–628.

Plengvidhya, P. & Savagondha, C. 1957. A study of diagnostic constants of leaves of some members in genus *Cassia*. *Journal Pharmacology Association of Siam*, Third Series. 10(1): 10–12.

Pongpan, A., Chumsri, P. & Taworasate, T. 1982. The antimicrobial activity of some Thai medicinal plants. *Mahidol University Journal Pharmacology Science*. 9(4):88–91.

Prasav, V. & Gupta, S. C. 1967. Inhibitory effect of bark and leaf decoctions on the activity of pectic enzymes of *Alternaria tenuis*. *Indian Journal Experimental Biology*. 5(3):192–193.

Pumsaard, U. 1979. **The Isolation of Steroids in *Cassia fistula* L.** M.Sc. thesis, Chiang Mai University, Thailand.

Quryamaty, P. 1980. **Isolation of Rhein from Pudding Pipetree (*Cassia fistula* Linn.).** M.Sc. thesis, Chiang Mai University, Thailand.

Rai, A. & Seti, M. S. 1972. Screening of some plants for their activity against Vassinia and Fowl-pox viruses. *Indian Journal Animal Science*. 41(12): Pp. 1066–1070.

Reauchianchai, S., Wacharothayangkul, W. & Chumsri, P. 1980. **Quantitative Determination of Anthraquinones in *Cassia* spp.** Special project for the degree of B.Sc. (Pharm.), Faculty of Pharmacy, Mahidol University.

Richter, G. & Hauenstein, H. 1967. Chemical quantitative determination of Senna drugs, extracts, and preparations by separate quantitative analysis of anthraquinone glycosides and aglycones. *Deut Apoth-Ztg*. 107(48): Pp. 1751–1756.

Ros, S. A., Megalla, S. E., Bishay, D. W. & Awad, A. H. 1980. Studies for determining antibiotic substances in some Egyptian plants. Part I. Screening for antimicrobial activity. *Fitoterapia* 51: Pp. 303–308.

Sacco, T. 1958. Researches on *Cassia fistula* of Somaliland. *Rev. Agriculture Subtrop Tropical*. 52: Pp. 119–126.

- Sburlati, A. 1940. The Heteroxides of Senna. **Arch Ital. Science Farmcology** 9: Pp. 143–150.
- Schmidt, H. J. & Dittrich, C. 1960. Senna Extracts. Ger. (East) Patent. 23:397.
- Shah, R. R., Subbaiah, K.V. & Mehta, A. H. 1978. Carbohydrate influence on polyphenol accumulation in *Cassia* and *Datura* tissues cultured *In-vitro*. **Biol Plant** (Prague). 1978. 20(1): Pp. 5–13.
- Singh, K. P. & Singh, R. P. 1977. The chlorophyll content of sun and shade leaves of common trees growing at Varanasi, India. **Indian Journal Ecology** 4(1):46–54.
- Sircar, P. K., Dey, S., Sanyal, T., Ganguly, S. N. & Sircar, S. N. 1970. Gibberellic acid in the floral parts of *Cassia fistula*. **Phytochemistry**. 735–736.
- Vasi, I.G. & Kaalintha, V. P. 1980. Chemical examination of the fruit pulp of *Cassia fistula* Linn. **Journal Institute Chemistry** (India). 52(2): Pp. 85–86.



- 1.0 Scientific Name** : *Cassia tora* L.
Family : Leguminosae
- 2.0 Vernacular Names** : Chumhet thai, ki-kia, no-panaa-noe, chumhet khwaai, chumhet naa, chumhet lek, phrom daan, lapmuen noi, yaa luek luen (Thailand)

3.0 Plant Description

The plant is a herb or undershrub up to 1 m high, nearly glabrous. Leaves paripinnate, with 3 pairs of leaflets; petiole about 1–4 cm long; rachis is 2–3 cm long with a subulate, 2 mm long gland between the 2 lower pairs of leaflets; stipules setaceous, 10–15 mm long, more or less cucuducous; leaflets 2–5 x 1.5–2 cm obovate, membranous, with a short petiolule, broadly rounded apex and cuneate-rounded base. Flowers axillary, short; 1–3 flowered racemes; bracts linear-acute, 2–3 mm long; pedicels 4–10 mm long; 5 sepals, ovate, subequal, 5 x 2–4 mm; 5 petals, yellow, unequal, obovate, short-clawed with rounded apex, up to 10x6 mm; 7 stamens, nearly equal; filaments 1.5–2 mm; anthers 1.5–2.5 mm long, opening by apical pores; ovary densely pubescent having glabrous style and truncate stigma. Fruit is a terete linear, more or less falcate pod, 10–15 x 0.5 cm, having 20–30 seeds which are glossy, rhomboidal, 5 mm in diameter.

- 4.0 Propagation** : Stem cutting

5.0 Geographical Distribution/Ecology

The plant grows around villages, frequently on lower altitudes. It is a common weed throughout Thailand.

6.0 Chemical Constituents

The whole plant contains D-mannitol, myricyl alcohol, b-sitosterol. The leaves contain chlorophyll, chrysophanic acid, inorganic elements, emodin, protein, and 1,6,8 trihydroxy-3-methyl

anthraquinone. The seeds contain alcohols, aloe emodin, aloe emodin glucoside, amino acid, anthraquinones, D-arabinose, aurantioobtusin, carbohydrates, chrysoobtusin, chrysophanic acid, chrysophanic acid-9-anthrone, chrysophanol diglucoside, chrysophanol triglucoside, chrysophanol-1-O-g-D-gentiobioside, emodin, D-galactose, D-glucose, gum, inorganic element, D-mannose, 1-methionine, 2-naphtho-g-pyrones, norrubrofusarin, obtusin, oligosaccharides, physcion, physcion diglucoside, polysaccharides, protein, D-rhamnose, rhein, rubrofusarin, rubrofusarin-6-O-b-D-gentiobioside, b-sitosterol, sitosterols, toralactone, 1-tryptophan, D-xylose. Oil from seeds contains linoleic, oleic, palmitic and stearic acids. The plant is also known to contain anthraquinones, carotene, chlorophyll A, chlorophyll B, and Vitamin C.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The entire plant is known to have an antiviral activity, phygoctytosis stimulation, antispasmodic activity, cytotoxic and toxic activities. The leaves have antimalarial, antibacterial and antifungal activities. The leaves and stems have an anthelmintic activity. The seeds have an antibacterial, antifungal, hypotensive activity, a smooth muscle stimulation and relaxation, diuretic and toxicity activities.

7.2 Uses in traditional medicine:

The whole plant is used to treat skin diseases, fever, yaws, acute gastrointestinal ailments in children characterized by marked malnutrition, usually associated with intestinal parasitism. It is also used as a laxative, diuretic and expectorant. The stem is used to treat coughs. The leaves are used as a laxative, diuretic for neurotonic, and in the treatment of skin diseases and detoxication. The seeds are used in the treatment of disorders in urination, fever, asthma, yaws, skin diseases, constipation, as a diuretic, anthelmintic, kidney tonic, cardiotoxic and demulcent.

8.0 Contraindications

Not available

9.0 Bibliography

Acharya, T. K. & Chatterjee, I. B. 1974. Isolation of chrysophanic acid-9-anthrone, a fungicidal compound from *Cassia tora*. **Science Cultivation** 40(7):316.

Acharya, T. K. & Chatterjee, I. B. 1975. Isolation of Chrysophanic Acid-9-anthrone, the major antifungal principle of *Cassia tora*. **Lloydia** 38(3): Pp. 218–220.

Bhakuni, O. S., Dhar, M. L., Dhar, M. M., Dhawan, B. N. & Mehrotra, B. N. 1969. *Screening of Indian Plants for Biological Activity. Part II*. **Indian Journal of Experimental Biology** 7: Pp. 250–262.

Bhatia, R.K. & Clawan, D.D. 1976. Occurrence of phenolic substances in seed coat of *Cassia* species and their effect on early seedling growth. **Geobios (Jodhpur)** (6): Pp. 214.

Broker, R. & Rhat, J. V. 1952. Phagocytic coefficient as a measure for evaluating plant antibiotics. **Indian Journal of Medical Research** 40(3):361.

Broker, R. & Bhatt, J. V. 1953. Symposium on Antibacterial Substances From Soil, Plants and Chan, S. H., Koo, A. & Li, K.M. 1976. The involvement of medullary reticular formation in the hypotensive effect from seed of *Cassia tora*. **American Journal of Chinese Medicine** 1:383.

Desai, H. B. & Shukla, P. C. 1978. Note on chrysophanic acid in *Cassia tora* seeds and its removal by different treatments. **Gujarat Agriculture University Research Journal** 4(1):60.

Dhar, M. L., Dhar, M. M., Dhawan, B. N., Mehrotra, B. N. & Ray, C. 1968. Screening of Indian plants for biological activity: Part I. **Indian Journal Experimental Biology** 6: Pp. 232–247.

Ito, K. & Ota, N. 1951. Effects of vegetable drugs on pathogenic fungi, Effect of Anthraquinone-glycoside Containing Crude Drugs Upon the Growth of Pathogenic Fungi. **Bulletin of Pharmacology Research Institute Japan** 2: Pp.23.

Joshi, S. B. & Varma, K. C. 1964. Panevar (*Cassia tora*) gum as a suspending and emulsifying agent. **Indian Journal of Pharmacology** 26:175–177.

Joshi, S. S. & Nigam, S. S. 1976. Amino acid composition of wild legumes. **Curr. Science** 45(12): Pp. 450–451.

Julkarat, P. 1972. Pharmacological Study of *Cassia tora*. **Siriraj Hospital Gazette** 24(10): Pp. 1559.

Katiyar, S.K. & Niranjana, G.S. 1982. Studies on carbohydrates and amino acids of some non-cultivated leguminous seeds. **Journal of Indian Chemistry Society** 58: Pp. 98.

Kawazu, K., Nishii, Y., Ishii, K. & Tada, M. 1980. A convenient screening method for nematocidal activity. **Agriculture Biology Chemistry** 44: Pp. 631.

Kehar, N. D. & Murty, V. N. 1950. Investigation on famine rations: Panevar (*Cassia tora*) seed, a protein-rich feed for livestock. **Journal of Science Indian Research** 9(3): Pp. 77.

Ketsingh, U. 1950. Clinical Trial on the Antimalarial Effect of Some Plants. Proceedings of Siriraj Symposium, Thailand. Pp. 275–281.

Kimura, Y., Takido, M. & Takahashi, S. 1964. On the constituents of the seed of *Cassia tora*. **Soyakugaku Zasshi** 18(1): Pp. 28–29.

Kolatat, T. & Julkarat, P. 1973. Effect of *Cassia tora* on kidney blood circulation. **Siriraj Hospital Gazette** 25(3): Pp. 434.

Koo, A., Chan, W. S. & Li, K. M. 1976. A possible reflex mechanism of hypotensive action of extract from *Cassia tora* seeds. *Ibid* 4: Pp. 249.

Koo, A., Wang, J. C. C. & Li, K. M. 1976. Extraction of hypotensive principles from seeds of *Cassia tora*. *Ibid* 4: Pp. 245.

Koshioka, M., Hotta, N., Ishii, Y. & Takino, Y. 1978. Studies on the evaluation of crude drug. III. Quantitative estimation of fatty acids in *Cassia* seeds. *Ibid* 32: Pp. 173.

Koshioka, M., Ikemoto, C., Nishimura, M., Ishii, Y. & Takino, Y. 1978. Studies on the evaluation of crude drug. VII. Separation and quantitative estimation of anthraquinones in *Cassia* seeds on column of Sephadex LH-20. **Shoyakugaku Zasshi** 32(4): Pp. 267.

Koshioka, M. & Takino, Y. 1978. Studies on the evaluation of crude drug: 1. Quantitative estimation of anthraquinones in *Cassia* seeds. **Chemistry Pharmacology Bulletin** 26(5): Pp. 1343.

Lohakajornpun, P. 1978. **The Study on Antibacterial and Antifungal Activity of Some Medicinal Plants**. M.Sc. thesis, Chulalongkorn University.

Mall, L. P., Singh, V. P. & Ramarao, S. V. 1977. Influence of industrial pollutants on pigment concentration of some Angiosperm flora. **Indian Journal of Environmental Health** 19(4): Pp. 365.

Manjursree, P. A.L., Roy, D. K. & Pal, P. R. 1977. Emodin from the leaves of *Cassia tora* Linn. **Indian Journal of Pharmacology** 39(5): Pp. 116–117.

Morimoto, I., Watanabe, F., Osawa, T., Okitsu, T. & Kada, T. 1982. Mutagenicity screening of crude drugs with *Bacillus subtilis* Rec-assay and Salmonella/Microsome Reversion Assay. **Mutat. Research** 97: Pp. 81.

Murty, V. N. 1962. *Cassia tora* Leaf Meal as a Component in Poultry Rations. **Poultry Science** 41: Pp. 1026–1028.

Nazir, B. N., Tej, S. & Rao P. R. 1962. Chlorophyll from the leaves of *Cassia tora*. **Bulletin Regional Research Laboratory Jammu, India** 1: Pp. 57.

Nath, Y., Chopra, I. C. & Rao, P. R. 1962. Oxytocic principle from the seeds of *Cassia tora*. **Curr. Science** 31(7): Pp. 285–286.

Negi, S.S. 1962. Studies on the whole plant and the seeds of *Cassia tora*. **Agricultural Research (India)** 2(4): Pp. 301.

Niranjan, G. S. & Katiyar, S. K. 1981. Chemical examination and biological evaluation of proteins isolated from some wild legumes. **Journal of Indian Chemistry Society** 58: Pp. 70.

Other Sources. XV. Phagocytic coefficient as a measure for evaluating plant antibiotics. **Indian Journal of Pharmacology** 15: Pp. 309.

Pandey, D. K., Tripathi, N. N., Tripathi, R. D. & Dixit, S. N. 1983. Antifungal activity of some seed extracts with special reference to that of *Pimpinella diversifolia* DC. **International Journal of Crude Drug Research** 21(4): Pp. 177.

Patel, B. M. & Patel, C. A. 1972. Partial replacement of concentrate mixture by products mixture in the ration of bullocks. **Indian Journal of Nutrient Diet** 9(3): Pp. 157–160.

Patel, B. M., Thakore, V. R., Patel, C. A. & Shukla, P. C. 1971. Molybdenum and Zinc contents of some common fodders and concentrates. **Indian Journal of Agricultural Science** 41(12): Pp. 1084–1087.

- Patel, R. P. & Patel, K. C. 1957. Antibacterial activity of *Cassia tora* and *Cassia obovata*. **Indian Journal of Pharmacology** 19: Pp. 70–73.
- Plengvidhya, P. & Suvagondha, C. 1957. A study of diagnostic constants of leaves of some members in genus *Cassia*. **Journal of Pharmaceutical Association Siam** 10(1): Pp. 10.
- Poethke, W., Rao, D.N. & Loescher, K.D. 1968. Chromatographic characterization of the contents of *Cassia tora* L. seeds. **Pharmacology Zentr** 107(8): Pp. 571.
- Raewthianchai, S., Watcharothayanggoon, W. & Chumsri, P. 1980. **Determination of Anthraquinones in *Cassia* spp.** Special Project for the Degree of B.Sc. (Pharm.), Faculty of Pharmacy, Mahidol University.
- Raghunathan, K., Hariharan, V. & Rangaswami, S. 1974. Chrysophanol-1 b-gentiobioside, a new anthraquinone glycoside from *Cassia tora*. **Indian Journal of Chemistry** 12(12): Pp. 1251–1253.
- Rangaswami, S. 1963. Crystalline chemical components of the seeds of *Cassia tora*. Identity of tora substance C with rubrofusarin and tora substance B with norrubrofusarin. Proceedings of the Indian Academy Science Section A 57(2):88.
- Rizvi, S. J. H., Mukerji, D. & Mathur, S. N. 1980. A new report of possible source of natural herbicide. **Indian Journal of Experimental Biology** 18: Pp. 777–781.
- Sastry, M. A. 1965. Chemical Investigations on *Cassia tora*. **Curr. Science** 34 (16): Pp. 481.
- Shah, C. S. & Shinde, M. V. 1960. Phytochemical studies of seeds of *Cassia tora* and *Cassia occidentalis*. **Indian Journal of Pharmacology** 31(1): Pp. 27–8.
- Shibata, S. 1972. Some Chemical Studies on Chinese Drugs. Ranqaswani. **Some Recent Developments in the Chemistry of Natural Products**, S, Rav NVS, Eds. Prentice Hall, New Delhi.
- Singh, N. 1964. Leaf protein extraction from some plants of Northern India. **Journal of Food Science Technology** (Mysore) 1(3): Pp. 37–39.
- Tabata, M.T., Hiroka, N., Ikenque, M., Samno, Y. & Konoshima, M. 1975. The production of anthraquinones in callus cultures of *Cassia tora*. **Lloydia** 38:131.
- Takahashi, S. & Takido, M. 1973. Purgative Crude Drugs. VII. Constituents of the Seeds of *Cassia tora*. II. Structure of the New Naphtho-a-pyrone derivative, toralactone. **Yakugaku Zasshi** 93(9):261.
- Varshney, S. C., Rizvi, S. A. I. & Gupts, P. C. 1973. Structure of a polysaccharide from *Cassia tora* seeds. **Food Chemistry** 21(2): Pp. 222–226.
- Varshney, S. C., Rizvi, S. A. I. & Gupts, P. C. 1976. Structure of a polysaccharide from the seeds of *Cassia tora*. Part II. Partial Acidic Hydrolysis. **Journal of Chemistry Society**, 1 (15): Pp. 161–168.
- Yun, H. S. & Chang, I. M. 1977. Plants with liver protective activities(1). **Korean Journal Pharmacognocoy** 8: Pp. 125.



- 1.0 Scientific Name** : *Clinacanth nutans* (Burm. f.) Lindau
Family : Acanthaceae

- 2.0 Vernacular Names** : Phayaa yo, Phak man kai, Phak lin khiat, Phayaa plong thong, Phayaa plong kham, Pho-so-chaang (Thailand)

3.0 Plant Description

The plant is a shrub 1–3 m high with pubescent branches. Leaves are simple, opposite, narrowly elliptic oblong or lanceolate, 2.5–13 cm long, 0.5–1.5 cm wide. The leaves have apex acute or acuminate; margin exsculptate-dentate or subentire; base cuneate, obtuse, rounded or truncate often oblique; pubescence on the nerves; petiole 3–15 mm long. Flowers are in dense cymes at the top of the branches and their branchlets; cymes 5–8 flowered, often terminating with drooping horizontal branches but themselves erect, subsecund, combined into a large lax, leafy panicle. Each flower has calyx densely patently glandular-pubescent, about 1 cm long; corolla glandular-pubescent, about 3.5 cm, dull red with green base; lower lip (turned upwards) with yellow streaks, apically sordidly yellow or greenish yellow; stamens 2, inserted in the throat, more or less appressed against the upper lip. Ovary is compressed, 2-celled, 2 ovules in each cell; having style filiform, shortly bidentate. Capsule is oblong, basally contracted into a short, solid stalk, 4-seeded (B2, B38).

- 4.0 Propagation** : Stem cutting

5.0 Geographical Distribution/Ecology

It is cultivated and found in deciduous forests.

6.0 Chemical Constituents

Roots contain betulin, lupeol, b-sitosterol, stigmasterol. The leaves contain lupeol, b-sitosterol, stigmasterol, and flavonoid compound.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The leaves are effective against snake venom. It is effective against aphthous ulcers and herpes simplex. The extract accelerated wound healing and lowered the inflammation activity.

7.2 Uses in traditional medicine:

The leaves are antipyretic (E80) and antiinflammatory. Fresh leaves are pounded with arrack and used as poultice over burns.

8.0 Contraindications

Not available

9.0 Bibliography

Cherdchu, C., Poopyruchpong, N., Adchariya, R., Patanabanangkoon, S. & Patanabanangkoon, K. 1977. The absence of antagonism between extracts of *Clinacanthus nutans* Burm. and *Naja Naja siamensis* venom. **Journal of Tropical Medicine Public Health** 8 (2): Pp. 249–254.

Chotikieat, U. & Pitiporn, S. 1989. *Clinical Trials on the Treatment of Herpes simplex, Herpes zoster and Aphthous Ulcer with Clinacanthus nutans. Workshop "Pharmacist and Development of Medicinal Plants"*, 23–25 May 1989.

Chuakul, W. 1986. **Chemical Study of the Antiinflammatory Agents from the Leaves of Phayaa Plong Thong (*Clinacanthus nutans* Lindau)**. M.Sc. thesis, Faculty of Pharmacy, Mahidol University.

Dampawan, P. 1976. **Studies of the Chemical Constituents of *Clinacanthus nutans* (Acanthaceae) and *Zingiber cassumunar* Roxb. (Zingiberaceae)**. M.Sc. thesis, Faculty of Science, Mahidol University.

Kittisiripornlul, S. 1984. **The Antiinflammatory Action and Toxicological Studies of Extract From *Clinacanthus nutans***. M.Sc. thesis, Faculty of Science, Mahidol University.

Lin, J., Li, H. & Yu, J. 1983. Studies on the chemical constituents of Niu Xu Hua (*Clinacanthus nutans*). **Zhongcaoyao** 14 (8): Pp. 337–338,340.

Tanasomwang, W. 1986. **The Screening of Antiinflammatory Action of *Clinacanthus nutans* Lindau: A Critical Evaluation of Carrageenan Induced Hind Paw Edema Model**. M.Sc. thesis, Faculty of Science, Mahidol University.

Thongharb, C. & Teijasen, P. 1977. The effect of slaed pang porn (*Clinacanthus nutans*) on Thailand cobra venom (*Naja Naja siamensis*). **Thai Journal of Pharmacology Science** 2(6): Pp. 1057.



- 1.0 **Scientific Name** : *Curcuma longa* L.
Family : Zingiberaceae

- 2.0 **Vernacular Names** : Khamin (Thailand); kunyit (Malaysia); temu kuning (Indonesia)

3.0 **Plant Description**

The plant is a stemless rhizomatous herb; rhizome fleshy, much branched, bright orange or yellow within and scented. Leaves emerge directly from the underground stem; with overlapping petioles 8–15 cm long or more, light green, 30–40 by 8–10 cm; having thin ellipse-shaped or elongate lance-shaped blades. A cylindrical inflorescence about 10–15 by 5–7 cm appears with the leaves; develops from the centre, pale green, pouchlike, curved bracts, each with two or more pale yellow flowers except in the upper part, the bracts are white and green or pink and without flowers; the tube-shaped calyx is split on one side to unequal teeth; the corolla tube is more or less funnel-shaped, not exerted beyond the bract, with 3-lobed limb and white; the lateral staminode petaloid is rather long and folded under the dorsal petal; there is a central yellow band at the labellum. A fertile stamen with short filament, broad and constricted at the apex is found in the floret; the anther is versatile and usually spurred at the base, sometimes with a small crest at the connective. The ovary consists of 3-locules; each locule contains 2 ovules; the capsules are ellipsoid; seeds are rare.

- 4.0 **Propagation** : Rhizome

5.0 **Geographical Distribution/Ecology**

The plant is cultivated throughout the tropics. It grows very well in rather hot climate with high humidity at night. It grows well on well-drained loam but clay or sandy soil is unsuitable. Heavy rain may cause damage to rhizomes.

6.0 Chemical Constituents

Arabinose, atlantone, bisdesmethoxycurcumin, b-bisabolene, borneol, campesterol, camphene, camphor, caryophyllene, cineole, curcumin, L-b-curcumens, curdione, curone, curzerenone, cycloisoprenemycene, cymene, desmethoxycurcumin, 2, 5-dihydroxybisabola-3, 10-diene, dihydrocurcumin, dihydroxycurcumin, essential oil, eugenol, fatty acids, fructose, germacron-13-al, glucose, glutamic acid, 4-hydroxybisabola-2, 10-dien-9-one, isborneol, limonene, linalool, 4-methoxy-5-hydroxy-bisabola-2, 10-dien-9-one, D-g-phellandrene, a-pinene, b-pinene, procurcumadiol, D-sabinene, b-sesquiphellandrene, tocopherol, p-tolylmethycarbinol, ar-turmerone, turmerone, terpinene, zingiberene, zingerene.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The rhizome is an antipeptic for ulcer, antiinflammatory, cholagogue, antibacterial, antifungal, antiyeast, antispasmodic, antiparasitic, and has hypocholesterolemic, immunological, mutagenic, insecticidal and insect repellent activities. It also has effect on the cardiovascular system.

7.2 Uses in traditional medicine:

Not available

8.0 Contraindications

Not available

9.0 Bibliography

Bainiam, N. 1985. **Effect of Potassium and Phosphorus on the Contents of Anti-Microbial Constituents, Volatile Oil, Total Curcuminoid and Curcuminoid Ratio of *Curcuma longa***. M.Sc. thesis (Pharmacognosy), Chiang Mai University, Thailand.

Chavalittumrong, P. & Dechatiwongse, T. 1988. Quality evaluation of turmeric. **Thailand Journal Pharmacological Science**. 13(3): Pp. 317–327.

Choiu, J. W. & Chang, W. H. 1983. Preliminary study on the antioxidative components of some spices grown in Taiwan. **Chung-kuo Nung Yeh Hua Hsueh Hui Chih** 21(1–2): Pp. 97–103.

Dixit, R. S. & Perti, S. L. 1963. Indigenous insecticides. III. Insecticidal properties of some medicinal and aromatic plants. **Bulletin Regional Reserach Laboratory Jammu, India**. 1: Pp. 169–172.

Franquelo, E. 1933. Active constituents of curcuma (Temoelavac). **Münch Med. Wochchr**. 80: Pp. 524–526.

Gonda, R., Tomoda, M., Shimizu, N. & Kanari, M. 1990. Characterization of polysaccharides having activity on the reticuloendothelial system from the rhizome of *Curcuma longa*. **Chemistry Pharmaco. Bulletin**. 38(2): Pp. 482–486.

Huhtanen, C. N. 1980. Inhibition of *Clostridium botulinum* by spice extracts and aliphatic alcohols. **Journal Food Protein** 43(3): Pp. 195–196.

- Kelkar, N. C. & Rao, B. S. 1933. Indian essential oils. V. Essential oil from the rhizomes of *Curcuma longa* L. (turmeric). **Journal Indian Institute Science** 17A: Pp. 7–24.
- Keshavar, K. 1971. The influence of turmeric and curcumin on cholesterol concentration of eggs and tissues. **Poultry Science** 9(2): Pp. 167–169.
- Khalique, A. & Amin, M. N. 1967. *Curcuma longa*. I. Constituents of the rhizome. **Science Research (Dacca, Pakistan)** 4(4): 193–197.
- Khurana, A. & Ho, C. T. 1988. High Performance Liquid Chromatographic analysis of curcuminoids and their photooxidative decomposition compounds in *Curcuma longa* L. **Journal Liquid Chromatography** 11(11): Pp. 2295–2304.
- Krishnamoorthy, M. & Rahiman, M. A. 1987. Cytogenetic effects of curcumin salt on the meiotic chromosomes of *Poecilocera picta*. **Journal Environmental Biology** 8(1): Pp. 11–24.
- Mondon, J. M., Guerere, M. & Rajamaye, A. 1986. Comparison of *Curcuma longa* from Reunion Island with imported curcuma. **Annal Falsif. Expert Chim. Toxicology**. 79(847): Pp. 153–165.
- Rouseff, R. L. 1988. High Performance Liquid Chromatographic separation and spectral characterization of the pigments in turmeric and annatto. **Z Food Science** 53(6): Pp. 1823–1826.
- Rupe, H., Clar, G., St. Pfau, A. & Plattner, P. I. 1934. Volatile plant constituents. II. Tumerone, the aromatic principle of turmeric oil. **Helv Chim Acta** 17: Pp. 372–389.
- Saarbrucken, F. K. 1975. *Schnelle Kennzeichnung von Curcuma-Rhizomen mit Dem TAS-Verfahren*. **Deutsche Apotheker-Zeitung** 115(10): Pp. 325–327.
- Sinha, M., Mukherjee, B. P., Sikdar, S., Mukherjee, B. & Dasgupta, S. R. 1972. Further studies on the pharmacological properties of curcumin. **Indian Journal Pharmacology** 4: Pp. 135.
- Srinivasan, K. R. 1952. The coloring matter in turmeric. **Current Science (India)** 21: Pp. 311–312.
- Srinivasan, K. R. 1953. Chromatographic study of the curcuminoids in *Curcuma longa*. **Journal Pharmacology** 5: Pp. 448–457.
- Toda, S., Miyase, T., Arichi, H., Tanizawa, H. & Takino, Y. 1985. Natural antioxidants. III. Antioxidative components isolated from rhizome of *Curcuma longa* L. **Chemistry Pharmacology Bulletin** 33(4): Pp. 1725–1728.
- Toennesen, H. H., Karlsen, J., Adhikary, S. R. & Pandey, R. 1989. Studies on curcumin and curcuminoids. Part 17. Variation in the content of curcuminoids in *Curcuma longa* from Nepal during one season. **Z. Lebensm-Unters Forsch.** 189(2): Pp. 116–118.
- Yang, M., Dong, X. & Tang, Y. 1984. Studies on the chemical constituents of common turmeric (*Curcuma longa*). **Zhongcaoyao**. 15(5): Pp. 197–198.
- Zhao, D. & Yang, M. 1986. Separation and determination of curcuminoids in *Curcuma longa* L. and its preparation by HPLC. **Yaoxue Xuebao** 21(5): Pp. 382–385.



- 1.0 Scientific Name** : *Eurycoma longifolia* Jack
Family : Simaroubaceae
- 2.0 Vernacular Names** : Plaa lai phueak, krung badaan (Surat Thani), kha-hnaang, cha-naang, trueng badaan, tu-wu-boh-ming, tuu-wu-wo-ming, tung so, haae phan chan, phiak, yik bo thong, yik mai thueng, ian don, lai phueak

3.0 Plant Description

Eurycoma longifolia is a small tree up to 10 m high with blackish stem and without stipule. Leaves are imparipinnate, up to 1 m long and numerous crowded at the tips of rather thick, pithy branches leaving large scars; leaflets are opposite or subopposite, lanceolate to abovate-lanceolate, rarely ovate-oblong sometimes slightly acuminate with a bluntish or acute apex; slightly oblique at the base: 0.5–20 by 1.5–6 cm. Flowers are reddish; branches of inflorescence, pedicels, sepals, and calyx are puberulous and with capitate - glandular hairs; bracts are triangular, very small, up to 1 mm long, caduceous; pedicels are rather thick, up to 7 mm long. Calyces are small, consisting of lobes 1 mm long. Petals are puberulous on both surfaces, lanceolate to ovate- or obovate-oblong, 4.5–5.5 by 2–3 mm; stamens usually are longer than the calyces, 1.5–2.5 mm long consisting of anthers 0.25 mm long; staminodes are 0.5 mm in female flowers to 2 mm in male flowers. Styles are rather long, with a peltate 5(6) - lobed stigma, elevated 1 mm above the ovaries. Fruits are ellipsoid or ovoid, 10–17 by 5–12 mm.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

The plant is found in primary and secondary, evergreen and mixed deciduous forests as understorey trees, typically growing on sandy soil, up to 700 m above sea level, but more frequently at lower altitude. It is found all over the country.

6.0 Chemical Constituents

Root

Campesterol, campesterol acetate, 13, 18-dihydroxy-13,18-dihydroeurycomanone, eurycomalactone, eurycomanol, eurycomanol-12-O- β -D-glycopyranoside, eurycomanone, 10-hydroxycanthin-6-one, 15-hydroxykluaineanone, longilactone, palmitic acid, scopoletin, β -sitosterol, stigmasterol, stigmasterol acetate, unidentified saponins

Root bark

Eurycomalactone

Whole plant

Eurycomalactone, laurycolactone A, laurycolactone B

Stem bark

Campesterol, eurycomalactone, dihydroeurycomalactone, 2,6-dimethoxybenzoquinone, oil, resin, β -sitosterol

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Root

Parasympathomimetic activity

Strong activity was shown when the 50% alcoholic extract was tested *in vitro* using guinea pig ileums (0.01 g/ml).

Antimalarial activity

Extracts of the roots of *E. longifolia* were tested for antimalarial activity against a multi-drug resistant Thailand strain (12-1) of *Plasmodium falciparum*, *in vitro*. The highest activities were shown in the chloroform extract (IC₅₀ 0.5–5 mg/ml) and 1-butanol extracts (IC₅₀ 0.5–5 mg/ml). Subsequent fractionation of the chloroform and the 1-butanol extracts yielded eurycomanone from one of the 1-butanol fractions, which was more active than chloroquin (relative potency of 1.52 compared to chloroquin); eurycomalactone (from the chloroform extract) and eurycomanol (from the same fraction that contained eurycomanone) were 60–70% as active as chloroquin (relative potencies of 0.68 and 0.60 respectively).

The stem and root extracts of *E. longifolia* also showed antimalarial activity against *P. falciparum*, *in vitro* with an IC₅₀ of 4.5×10^{-7} g/ml. It was shown in another study that an ethanol fraction of *E. longifolia* exhibited better inhibition of the growth of *P. berghei*, *in vitro*, than the chloroform or the hexane fraction. Both ethanol fraction and eurycomalactone were less active than chloroquin

Antifungal activity

An alcohol extract of roots was effective against *Microsporium gypseum*.

Toxicity assessment

An alcohol extract was administered by gastric incubation or s.c. in mice at a dose of 10 g/kg. Toxic symptoms were as follows: always in lying position, deep breathing and chronic convulsions. In another study, a 34% ethanol extract given either i.p. or p.o. to mice, produced higher toxicity than a water extract. The LD₅₀ of the 34% ethanol extract have been reported to be 15–20 mg/kg i.p. and 1,500–2,000 mg/kg p.o. An ethanol fraction containing eurycomalactone was found to be the most toxic fraction.

In order to study the acute toxicity of *E. longifolia*, male mice were given a suspension of dried ethanol extract by gavage. Mice showed the following symptoms: sedation, faint breathing, convulsions and death. The LD₅₀ was 2.6 g/kg. A subchronic toxicity was carried out in both mice and rats by giving the suspension of the extract every two days for three months. It was reported that at a dose of 0.43 g/kg p.o., the extract caused 85% mortality in mice with weight gained in liver, kidneys, spleen and testis. But in rats receiving the extract at 0.35–0.5 g/kg p.o., no toxicity was observed.

Root bark

Antimalarial activity

Both the 50% alcohol and water extracts of dried root bark were shown to be active against the growth of *P. falciparum* in broth cultures. Bioactive compound: eurycomalactone.

No antibacterial activity of the glucoside, eurycomalactone, from *E. longifolia*, was detected at a dose as high as 1,000 mg/disk against the following bacteria: *Staphylococcus aureus*, *Streptococcus faecalis*, *Escherichia coli* and *Salmonella typhosa*.

In conclusion, studies on the pharmacological actions of *E. longifolia* are still incomplete. Antipyretic activity testing showed negative results. A remark should be made that a 50% alcoholic extract had been used in the experimental study while a water extract was used in traditional Thai recipes for the same activity. Therefore, more studies on antipyretic activity should be carried out. Since toxicity has been shown at high dose, special caution should be emphasized.

7.2 Uses described in traditional medicine:

Root

Treatment of sore throat and tonsillitis; as antipyretic, expectorant, antituberculosis, anthelmintic, diaphoretic, antimalarial and for detoxication.

Bark

As antipyretic and antimalarial.

8.0 Contraindications

Not available

9.0 Bibliography

- Awiruthnunt, W. & Wuthiudomlert, M. 1983. Antifungal activity of some medicinal plants. **Mahidol Univ J Pharm Sci, Thailand** 10(3):87–89.
- Brockelman, C., Thanomsapaya, B., Somnabhandhu, A. & Tanaree, P. 1989. *In vitro* study of antimalarial activity of some Thai medicinal plant extracts. *Symposium on Antimalarial from Plants*, Government Pharmaceutical Organization, Nov, 1989.
- Chan, K. L., Lee, S. P., Sam, T. W. & Han, B. H. 1989. A quassinoid glycoside from the roots of *Eurycoma longifolia*. **Phytochemistry** 28(10): 2857–2859.
- Chan, K. L., O'Neill, M. J., Philipson, J. D. & Warhurst, D. C. 1986. Plants as sources of antimalarial drugs. Part 3. *Eurycoma longifolia*. **Planta Medica** 52: 105–107.
- Darise, M., Kohda, H., Mizutani, K. & Tanaka O. 1982. Eurycomanone and eurycomanol, quassinoids from the roots of *Eurycoma longifolia*. **Phytochemistry** 21: 2091–2093.

Dhammaupakorn P, Somnabhandhu A, Ruengransee N. & Suppakun N. 1989. Toxicity of *Eurycoma longifolia* root extract. *Symposium on Antimalarial from Plants*, Government Pharmaceutical Organization, Nov. 1989.

Gilling, C. 1908. The constituents of *Simaruba* bark. **Res Lab, Pharm Soc, Gt Brit A Pharm J.** 80: 510–513.

Mokkhasmit, M., Ngarmwathana, W., Sawasdimongkol, K. & Permpiphat, U. 1971. Pharmacological evaluation of Thai medicinal plants.(Continued). **J Med Assoc Thailand** 54(7): 490–504.

Mokkhasmit, M., Sawasdimongkol, K. & Sartravaha, P. 1971. Toxicity study of some Thai medicinal plants. **Bull Dep Med Sci Thailand** 12(2): 36–65.

Morita, H., Kishi, E., Takeya, K., Itokawa, H. & Tanaka, O. 1990. New quassinoids from the roots of *Eurycoma longifolia*. **Planta Medica** 56:551.

Oei-Kock, A. & Kraus, L. 1978. Constituents of *Eurycoma longifolia*. I Sterols and saponins. **Planta Medica** 34: 339.

Oei-Koch, A. & Kraus, L. 1979. Components of *Eurycoma longifolia* Jack. II. Lipophilic constituents (sterolester, fatty acids). **Science Pharm.** 47(3): 243–245.

Oei-Koch, A. & Kraus, L. 1980. Contents of *Eurycoma longifolia* Jack.III Bitter principle (Eurycomalactone). **Science Pharm** 48: 110–117.

Suong, N. N., Bhatnagar, S., Polonsky, J., Vuilhorgne, M., Prange, T. & Pascard, C. 1982. Structure of laurycolactone A and B, new C18-quassinoids from *Eurycoma longifolia* and revised structure of eurycomalactone(X-Ray analysis). **Tetrahedron Lett.** 23: 5159–5162.

Suppakun, N., Somanabandhu, A., Theptaranonth, Y. & Pavanon, K. 1982. An antimalarial principle from *Eurycoma longifolia* jack. NRCT-JSPS Rattanakosin bicentennial joint seminar on chemistry of natural products, Bangkok, Thailand, Aug 2–6,1982 , p 48.

Suppakun, N., Satayawiwat, J., Theptranont, Y. & Somnabhandhu, A. 1989. Antimalarial and toxicity studies of *Eurycoma longifolia* roots. *Conference of Division of Malarial Control, 3rd*, Ministry of Public Health, Chiangmai, Oct 18–20 Oct 1989.

Temcharoen, P., Glinsukon, T., Suksamram, A. & Bunyapraphatsaan .1988. Lack of antibacterial activity of four glucosides, eurycomalactone and hispidulin from *Barleria lupulina*, *Eurycoma longifolia* and hispidulin from *Barleria Illupulina*, *Eurycoma longifolia* and *Milingtonia hortensis* . **Thai J Toxicol.** 4: 43–46.

Thoi, L. V. & Suong, N. N. 1963. Chemical constituents from the bark of *Eurycoma longifolia*, II. Isolation of β -sitosterol, campeserol, and 2, 6–dimethoxybenzoquinone. **Ann Fac Sci, Univ Saigon** 1: 43–51.

Thoi, L. V. & Suong, N. N. 1970. Constituents of *Eurycoma longifolia*. **J Drg Chem.** 35: 1104.

Thoi, L.V., Suong, N. N. & Thu Van, L. T. 1986. Structure of laurycolactone A and B–two C 18 quassinoids from *Eurycoma longifolia*. **Tap Chi Huo Hoc** 24(2):7–10.



- 1.0 Scientific Name** : *Hibiscus sabdariffa* L.
Family : Malvaceae
- 2.0 Vernacular Name** : Krachiap (Thailand); roselle (English)

3.0 Plant Description

The plant is an erect annual herb with reddish, cylindrical stem, nearly or quite glabrous. Leaves are simple, having petiole, blade 3–5 lobed or parted, the lobes serrate or obtusely toothed. Flowers are solitary, axillary, nearly sessile, 5–7 cm in diameter; consisting of epicalyx-segments 8–12, distinct, lanceolate to linear, adnate at base of the calyx; calyx thick, red, and fleshy, cup-like, deeply parted, prominently 10-nerved; petals 5, yellow, twice as long as calyx; stamens numerous, the filaments united into a staminal column; style single, 5-branched near summit; stigma capitate. Fruit is capsule, ovoid, pointed, 1–2 cm long, shorter than calyx, having densely sharp and stiff hairs, dehiscent.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

It is native to the Old World tropics. It is extensively cultivated for its succulent, fleshy, edible calyx and the stem yields a fairly strong fibre.

6.0 Chemical Constituents

The leaf contain amino acids, anthocyanin, caprylic acid, a-carotene, B-carotene, formic acid, galactose, D-(+)-malic acid, oleic, pelargonic and propionic acids, protein, b-sitosterol, b-sitosterol-1-3-b-D-galactoside, stearic acid, steroidal glycoside, sucrose, tetrahydrosteroid, vitamin A, vitamin C.

The flower contains alkaloid, anthoxanthin, lascarbic acid, aspartic acid, chrysanthemin, citric acid, cyanidin-3(2(G)-glycosyl)-rutinoside, cyanidin-3, 5-diglucoside, cynidin-3-b-D-glucoside, cyanidin-3-sambubioside, cyanin, delphinidin, delphindin-3-O-b-D-glucoside, delphinidin-3-monoglucoside, delphinidin-3-sambubioside, galactose, galacturonic acid, glycolic acid, gossypetin, gossypetin-3-O-b-D-glucoside, gossypin, gossypitrin, gossytrin, heterosides, hibiscetin, hibiscic acid, hibiscin, hibiscitrin, hibiscus acid, malic acid, malvin, myrtilin oxalic acid, pectin, protocatechuic acid, quercetin, resin, sabdaretin, sabdaretrin, B-sitosterol, tartaric acid, waxes.

The fruit contains acetic acid, anthocyanin, L-arabinose, calcium oxalate, caprylic acid, cellulose, citric and formic acids, D-galactose, gossypetin, malic, oleic, oxalic and pelargonic acids, protein, L-rhamnose, B-sitosterol, vitamin C, D-xylose.

The seed contains calcium, cellulose, cis-12, 13-epoxy-cis-9-octadecenoic acid, epoxyoleic acid, gossypol, hibiscetin, hibiscic acid, hibiscin, inorganic elements, isoleucine, leucine, malvalic and myristic acids, oil, oleic, palmitic and palmitoleic acids, pentosans, phenylalanine, potassium, protein, B-sitosterol, sodium, starch, stearic and sterculic acids, threonine, tryptophan, valine.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The calyx showed antibacterial, antifungal, hypotensive, cytotoxic, diuretic, choleric activities. It also has urinary acidifying, uterine relaxation, and laxative effects. It is known to have effects on urinary uric acid and citrate excretion.

7.2 Uses in traditional medicine:

Not available

8.0 Contraindications

Not available

9.0 Bibliography

Buogo, G. & Picchinenna, D. 1937. Chemical characteristics of roselle hemp. **Ann Chim Applicata**. 27: Pp. 557–582.

Busson, F., Garnier, P. & Deniel, P. 1957. Amino-acid content of the calyces of *Hibiscus sabdariffa*. **Journal Agriculture Tropical Etno Botany Applied**. 4: Pp. 265–266.

Castiigliani, A. 1934. Chemical composition of *Hibiscus sadariffa* L. and its cultivation in Eritrea. **Atti Acad Science Torino, Classe Science Fis, Mat Nat**. 69:97–105.

Copertini, S. 1936. Chemical and technological researches on karkade. **Agriculture Colonial eI**. 30:182–184.

Du, C. T. & Francis, F. J. 1974. Anthocyanins of roselle (*Hibiscus sabdariffa*). **Journal Food Science**. 38: Pp. 810.

El-Hadidy, Z. A., El-Ghobashy, R. & Haridi, S. M. 1980. Biochemical changes of anthocyanins, protein and amino acids in roselle (*Hibiscus sabdariffa*) plants. **Ain Shams University Faculty Agriculture Res Bulletin**. 0(1420): Pp. 1–21.

- Indovina, R. & Capotummino, G. 1938. Chemical investigation of some products which can be obtained from *Hibiscus sabdariffa* L. **Boll Studi informaz Palermo**. 15:24.
- Kerharo, J. 1971. Senegal bisap (*Hibiscus sabdariffa*) of Guinia sorrel or red sorrel. **Plant Medica Phytotherapy**. 5(4):277-281.
- Khafaga, E. P. & Koch, H. 1980. Stage of maturity and quality of roselle (*Hibiscus sabdariffa* L. var. *savdariffa*). I. Organic acids. **Angew Botany**. 54(5-6): Pp. 287-293.
- La Gaetano, B. & Bruno, E. 1960. Presence of vitamin C (ascorbic acid) in *Hibiscus sabdariffa*. **Ann Chim (Rome)**. 50: Pp. 1357-1362.
- Leupin, K. 1935. Karkade. **Pharm Acta Helv**. 10: Pp. 138-142.
- Lorenxini, G. 1937. Vitamin C content of Karkaddde' (*Hibiscus sabdariffa*). **Arch Ist Biochim Italy**. 9: Pp. 123-130.
- Minuto, N. 1937. Specificity of vitamin C determination; its determination in karkadé. **Arch Ist Biochim Italy**. 9: Pp. 383-388.
- Osman Am, Younes Me & Mokhtar, A. 1975. Chemical examination of local plants. VIII. Comparative studies between constituents of different parts of Egyptian *Hibiscus sabdariffa*. **Indian Journal Chemistry** 13(2): Pp. 198-199.
- Osman, A. M., Younes Me, Mokhtar, A. 1975. Sitosterol b-D- galactoside from *Hibiscus sabdariffa*. XIII. **Phytochemistry**. 14(3): Pp. 829-830.
- Pankajamani, K. S. & Seshadri, T.R. 1955. Anthoxanthins. VIII. **Journal Science India Res (India)**. 14B: Pp. 93-98.
- Penteado, M. de V. C., Minazzi, R. S. & Bicudo de Almeida, L. 1986. Carotenoids and provitamin A activity of vegetable leaves consumed in northern Brazil. **Revision Farm Bioquim University Sao Paulo**. 22(2): Pp. 97-102.
- Pratt, Ds. 1913. Roselle. **Philip Journal Science**. (A)7: Pp. 201-205.
- Sharaf, A. 1962. The pharmacological characteristics of *Hibiscus sabdariffa*. **Planta Medica** 10: Pp. 48-52.
- Shibata, M. & Furukara, M. 1969. Reexamination of the structure of so-called hivoscin. **Shokubutsugaku Zasshi**. 82(974-975): Pp. 341-347.
- Tung, C. S. 1966. The determination of L-ascorbic acid in *Hibiscus sabdariffa*. **Chung Kuo Nung Yeh Hua Hsueh Hui Chih** 4 (1-2): Pp. 22-24.
- Tung, J. 1963. The non-nitrogenous organic acids of roselle by paper chromatography. **Journal Chinese Agriculture Chemistry Society (Taiwan)**. 1(1-2): Pp. 1-3.



- 1.0 Scientific Name** : *Impatiens balsamina* L.
Family : Balsaminaceae

- 2.0 Vernacular Names** : Thian dok (Thailand); kaembong (Malaysia)

3.0 Plant Description

The plant is an erect, annual herb up to 60 cm high, pubescent or nearly glabrous. Leaves are alternate, narrowly or broadly lanceolate, 8–10 by 2–3 cm, tapering at the tip and base, consisting of deeply serrate margin; the petiole glandular. Flowers are large, short peduncled, borne in the axils of the leaves along the main stem below the leafy tip, in many colours from white to dark red or spotted, with a long spur curving up. The fruit is a long woolly capsule, opens when ripe, with many seeds.

- 4.0 Propagation** : Seed

5.0 Geographic Distribution/Ecology

The plant is distributed throughout the tropics and subtropics. It is widely cultivated and especially grown ornamentally in shaded parts of gardens.

6.0 Chemical constituents

The whole plant contains lawsone. The roots contain cyanidin monoglycoside. The stem contains cyanidin monoglycoside. The leaves contain cinnamic acid esters, galactolipids, kaempferol, kaempferol-3-arabinoside, phospholipids, proteins. The flower contains anthocyanins, p-coumaric acid, cyanidin, delphinidin, ferulic acid, flavonols, glucosidase, galactosidase, 3b-D-glucosidase, hydroxycinnamic acid, kaempferol, leucoanthocyanins, myricetin, pelargonidin, pelargonidin monoglucoside, pelargonidin-3-O-a-L-rhamno-glucosyl-5-O-b-D-rhamnoside, pelargonidin-3-O-a-L-rhamnosyl glucoside, pelargonidin-3-O-b-D-feruloyl glucoside, pelargonidin-3-O-b-D-p-coumaroyl 1-5-O-b-D-glucoside, pelargonidin-3-O-b-D-p-coumaroyl glucoside, pelargonidin-3,

5-O-b-D-diglucoiside, peargonidin-3-O-b-D-glucoside, pelargonidin-5-O-b-D-glucoside, pelargonins, peonidin, pigments, quercetin. The seeds contain lobids, b-sitosterol, and the seed oil contains parinaric acid.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Antifungal and antibacterial activities.

7.2 Uses in traditional medicine:

Not available

8.0 Contraindications

Not available

9.0 Bibliography

Alston, R. E. & Hagen, C. W. 1955. Relation of leuco-anthocyanins to anthocyanin synthesis. **Nature** 175: Pp. 990.

Beth, S. C. 1958. Flavonols of *Impatiens balsamina*. **Arch Biochemistry Biophysics** 76: Pp. 131–138.

Boyle, C. W., Hagen, C. W. & Mansell, R. L. 1969. Differentiation of pigmentation of flower. V. Partial purification and characterization of a flavonoid 3-B-D-glucosidase from petals of *Impatiens balsamina*. **Phytochemistry** 8(12): Pp. 2311–2315.

Grotzinger, E. W. 1974. Metabolism of lawsone in *Impatiens balsamina*. **Diss Abstract Int B**. 35:1542.

Hayashi, K., Ade, Y., Noguchi, T. & SuZushino, K. 1953. Anthocyanins. XXII. Analyses by paper chromatography of natural anthocyanins and its application to the investigation of dyes of the red *impatiens* application to the blood-red peach fruit. **Pharmacology Bulletin** (Japan): Pp. 130–134.

Mansell, R. L. & Kemerer, V. L. 1970. Differentiation of pigmentation in flower parts. VI. Qualitative and quantitative comparisons of hydroxycinnamic acid derivatives in petals of the (LLHHP'P'), white (llhpp) and purple (LLhhP'P') genotypes of *Impatiens balsamina*. **Phytochemistry** 9(8): 1751–1755.

Miles, C. D. & Hagen, C. W. 1968. The differentiation of pigmentation in flower parts. IV. Flavonoid elaborating enzymes from petals of *Impatiens balsamina*. **Plant Physiology**. 43(9): Pp. 1347–1354.

Muller Wu & Leistner, E. 1976. 1,4-Naphtoquinone, an intermediate in juglone (5-hydroxy-1,4-naphthoquinone) biosynthesis. **Phytochemistry** 15: Pp. 407.

Pepkin, A. G. & Shulman, I. 1914. Coloring matters contained as glucosides in flowers of some Indian plants. **Proceedings Chemistry Society** 30: Pp. 200–201.

Pothiyanonth, P., Prasertwityakarn, S. & Suwakool, W. et al. 1989. Formulation of Dermatological Preparations from Extract of *Impatiens balsamina* Leaves. Eighth Conference of the Faculty of Pharmaceutical Science, Chulalongkorn University, Bangkok, Thailand.

Sawhney, S., Sawhney, N. & Nanda, K. K. 1976. Gel electrophoretic studies of proteins in photo-induced and vegetative plants of *Impatiens balsamina*. **Plant Cell Physiology**. 17(4): 751–755.

Sharma, J. N. & Seshadri, T.R. 1955. Survey of anthocyanins from Indian sources. II. **Journal Science India Reserach** (India) 14B: Pp. 211–214.

Tevini, M. 1976. Changes of glyco- and phospholipid contents during leaf senescence. **Planta Med.** 128(2): Pp. 167–171.

Thungsuwan, S., Wiroonphol, S., Yingyong, O., Lipiphant, W., Phothiyanont, P. & Saipha, A. 1985. Report on the Preparation of Dermatological Ointment From *Impatiens balsamina* Leaves. Faculty of Pharmacy, Chulalongkorn University.

Weissenboeck, G., Tevini, M. & Reznik, H. 1971. Occurrence of flavonoids in chloroplasts of *Impatiens balsamina*. **Z Pflanzenphysiol.** 64(3) 274.



- 1.0 Scientific Name** : *Solanum violaceum* Ortega
Family : Solanaceae

- 2.0 Vernacular Names** : Ma waeng ton, ma khwaeng, ma khwaeng khom, ma khwaeng dam, ma waeng, waeng khom, sa-kang-khae, maak-haeng-khong (Thailand)

3.0 Plant Description

The plant is a much-branched shrub, up to 1 m high; stem and branches are covered with stellate hairs and stout, recurved prickles. Leaves are simple, alternate or subopposite, usually crowned at the top of the branch; the blade is ovate, unlobed or shallowly 2 or 3-lobed on each side, 3–10 x 2–6 cm, subcoriaceous, having densely stellate hairs on both surfaces and prickly along the nerves. Inflorescences are lateral; flowers wheel-shaped, showy, 5-parted, violet; yellow stamens in the middle, about 2 cm in diameter; calyx campanulate with lanceolate acute lobes, tomentose, prickly; corolla short, tubular, 5-lobed, densely pubescent outside; stamens 5; filament very short; anther oblong; style straight longer than the stamen. Fruit is globose, subtended by the spreading calyx lobes, about 1 cm in diameter, glabrous, red when ripe, having numerous seeds inside.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

It is widely spread in tropical and subtropical Asia and commonly found along wastelands and roadsides.

6.0 Chemical Constituents

The roots contain solanine, while the stem contains solasodine. The leaves contain diosgenin, b-sitosterol, solanine, solasodine and the fruits contain carbohydrates, diosgenin, a-glucosidase, maltase, pseudoglucosidase, b-sitosterol, solanine and solasodine.

7.0 Report on Medicinal Usages:

7.1 Uses supported by experimental/clinical data:

The plant showed hypotensive, antitumour, anticonvulsant, CNS depressant activities. On toxicity assessment, an LD₅₀ of the 50% ethanol extract of entire plant was 900.0 mg/kg, i.p. in mice. The roots have antimicrobial and anticonvulsant activities, and are used in the treatment of anal haemorrhage, fever due to abnormality of combination of three of the following origins (*Semha, Pitta, Wata, Kamdao, Lohita*), as expectorant and anticough. The leaves showed an antimicrobial activity, used in the treatment of coughs, as tonic and antituberculosis. The fruits showed anticonvulsant, antimicrobial, and hypoglycemic activities, used in the treatment of anal haemorrhage, dry throat and coughs, as cholagogue, antidiabetes, expectorant, and diuretic. The seeds have an anticancer activity against sarcoma 180 (ASC) cells. Little information about its toxicity and no information is available to support its claimed antitussive effect.

7.2 Uses in traditional medicine:

It is taken as an anticough by chewing the fruits and taking only the juice, or by pounding the fruits to obtain the juice, and mixing the juice with salt.

8.0 Contraindications

Not available

9.0 Bibliography

Hong Vareewatana, U. 1975. **Study on the Alleged Hypoglycemic Activity of *Solanum sanitwongsei* Craib and *Solanum trilobatum* L.** M.Sc. thesis, Faculty of Pharmaceutical Science, Chulalongkorn University, Bangkok, Thailand.

Karunyavanich, P. & Suvagondha, C. 1949. Primary investigation for the insulin-like constituent of Mawaeang's Berries. **Journal of Pharmacology Association Siam** 11(4): Pp. 151–158.

Laorpaksa, A., Amnuoyphol, S. & Jongbunprasert, V. 1988. Preliminary study on antibacterial action of Thai medicinal plants for respiratory tract infection (I). **Thai Journal of Pharmaceutical Science** 13(1): Pp. 23–36.

Mokkhasmit, M., Ngarmwathana, W., Sawasdimongkol, K. & Permpiphat, U. 1954. Pharmacological evaluation of Thai medicinal plants. **Journal of Medical Association, Thailand** 54(7): Pp. 490–504.

Purushothaman, K. K. & Narayanaswami, V. 1976. Isolation of tomatid-3-bata-ol from the leaves of *Solanum trilobatum*. Indian Patent 140: 381.

Tasnawijitwongs, S. 1979. **Chemical and Biochemical Studies of Antidiabetic Drugs in Some Plants.** M.Sc. thesis (Chemistry) Chiangmai, University, Chiangmai, Thailand.



Viet Nam



1.0 Scientific Name : *Abrus precatorius* L.
Family : Fabaceae

2.0 Vernacular Names : Cam thao day, chi chi

3.0 Plant Description

Evergreen perennial twine, young twigs slender, covered with sparse. Leaves paripinnate, alternate, 5–10 cm long; leaflets 8–15 pairs, opposite, increasing slightly in size from the base, oblong-linear, base rounded, apex apiculate, dark green above, pale glaucous beneath, thin silky on both sides. Inflorescence in axillary and terminal pedunculate raceme, 3–6 long; flowers pink closely clustered; calyx campanulate villous outside; corolla glabrous, standard broad, unguiculate wings linear; stamens 9–10 monodelphous; anthers oblong; ovary villous. Pod turgid, thinly pubescent, with a sharp deflected beak; seeds 3–7, polished bright scarlet with black patch.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Abrus precatorius occurs at lowland to medium altitude (hill), especially in the coastal areas from Quang Binh to Ninh Thuan provinces, Phu Quoc and Con Dao islands. It can not tolerate droughts to some extent when growing in poor coastal soil together with other shrubs. In the north, it is winter deciduous, but behaves as an evergreen in the south, where it grows vigorously in the rainy season from June to October. Owing to good regenerative capacity after being cut, it can be collected twice or three times a year.

6.0 Chemical Constituents

The roots and leaves have been reported to contain glycyrrhizin at a percentage of 1.25 and 10% respectively. The whole plant contains the triterpenoids: abruslactone A, me-abrusgenate and abrusgenic acid.

The seeds contain a toxalbumin: abrin, an alkaloid: 1-abrin, trigonelline, precatorin, N, N-dimethyl tryptophan methyl ester, hypaphorine, the sterols: stigmaterol, brassicasterol, cycloartenol, squalene and β -cholanis acid. The seeds also yield carbohydrates (9.91%), haemoglutinin, urease, abralin (a glucoside) and fatty oil (6%). The seed coat contains a coloured compound, abarmin (lanthocyan monoglucoside).

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The whole plant and leaves are employed for the cure of coughs and cold and to counteract intoxication, modulate other drugs and relieve jaundice derived from viral hepatitis. The daily oral dose is 8–16 g in the form of a decoction. The seeds are also used in veterinary medicine as purgative, vomitory, aphrodisiac and to cure nervous troubles in animals.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.



1.0 Scientific Name : *Abutilon indicum* (L) Sweet
Family : Malvaceae

2.0 Vernacular Names : Coi xay, co to ep

3.0 Plant Description

Perennial shrub, 1–1.5 m high; stems cylindrical and hairy. Leaves alternate; long-petioled; base cordate; apex acute; margins toothed; pubescent on both sides, glaucous beneath; main nerves 5–7, stipules filiform. Flower yellow, solitary in the axils of the leaves; pedicel long, jointed near the top; calyx tomentose outside, villous inside; sepals triangular, grayish; petals cuneiform; stamens numerous clustered on a column hairy at the base; carpels usually 20. Fruit consists of many capsules separately radiated as a rice-hulling mill; capsules hairy, dark brown, with a small acute point; seed reniform, glabrous, dull black.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

Abutilon indicum occurs wild from lowlands to mountains. The plant is hygrophilous and can be slightly shade-enduring. It is frequently mixed with other shrubs around villages and on hillsides. In the mountains, it is deciduous and grows vigorously in summer, sheds its leaves in winter or in dry season.

6.0 Chemical Constituents

The leaves contain mucilaginous substances. The plant yields essential oil consisting of β -pinene, caryophyllene, caryophyllene oxide, cineole, geraniol, geranyl acetate, elemene, eudesmol, farnesol and borneol. The seed contains the glycerides of palmitic, stearic, oleic, linoleic and linolenic acids. The roots contain fatty oil, β -sitosterol, β -amyrin and an unidentified alkaloid.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The alcohol extract of *A. indicum* exhibits a pronounced effect on the central nervous system. It induces hypothermia in treated animals. It also exhibits a marked inflammation inhibitory effect in kaolin-induced rat paw oedema.

7.2 Uses in traditional medicine:

In Vietnamese traditional medicine, *A. indicum* is used to treat influenza, coryza, headache and dysuria. It is used on its own or in combination with other drugs. The juice extracted from pounded fresh leaves and seed is taken orally on furunculosis and snake-bites and the residue is used as poultice. A decoction of dried leaves of *A. indicum*, *Adenosma cacruleum* and *Prenna integrifolia* L. is used for postpartum jaundice. The preparation is taken daily in dose of 5–10 g of dry or 10–40 g of fresh materials.

8.0 Contraindication:

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.



1.0 Scientific Name : *Acanthopanax gracilistylus* W.W. Smith
Family : Araliaceae

2.0 Vernacular Name : Ngu gia bi huong

3.0 Plant Description

Rigid shrub, a few meters high. Bark grayish, sparsely spiny. Leaves alternate or 2–3 clustered, palmifoliate; leaflets 5 obovate or oblong; 2–6 cm long, 1–3 cm wide, the middle large; margins toothed and coarsely hairy; glabrous on both sides, shining dark above; petiole 2–6 cm long, glabrous. Inflorescence solitary in axillary umbels; peduncle 2–2.5 cm long, flowers greenish to yellow. Fruit globose compressed, black when ripe, 2 seeded.

4.0 Propagation : Stem cutting

5.0 Geographical Distribution/Ecology

Acanthopanax gracilistylus is an evergreen, heliophilous and hygrophilous shrub. It is adaptable to humid to cool climatic conditions in high mountainous areas, at an altitude of 1,500–1,600 m. It often grows in clusters on rocky forest edges, and is also cultivated in gardens for medicinal purposes. It is winter deciduous. *Acanthopanax gracilistylus* is listed in the Red Data Book of Viet Nam for conservation.

6.0 Chemical Constituents

The root bark contains syringin, kauronic acid and 16a.17 – dihydroxykauran – 19 oic acid and saponins.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

It is reported to be antibacterial against *Staphylococcus aureus* and *Bacillus pyocyaneus*.

7.2 Uses in traditional medicine:

It is commonly used as tonic to strengthen the tendons. It is administered orally in the form of an elixir, taken daily in doses of 6–12 g dried bark.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

1.0 Scientific Name : *Acanthopanax trifoliatum* (L.) Merrill
Family : Araliaceae

2.0 Vernacular Name : Ngu gia bi gai

3.0 Plant Description

Rigid shrub, diffuse 17 m high. Stems ascending, spiny. Leaves alternate, 3–5 palmifoliate, almost 3; leaflets oblong - oval; 5–8 cm long, 2–4 cm wide; base rounded; apex acuminate; margins toothed; and nerves spiny, the middle larger; glabrous on both side, shining dark above; petiole 4–5 cm long, spiny. Inflorescence in terminal panicle of 3–10 umbels; peduncle 3–4 cm long; flowers small, greenish white. Petals triangular; stamens 5; filaments filiform; ovary inferior, 2-celled. Fruit globose compressed, 2–5 mm in diameter, black when ripe, 2 seeded. Flowering period: September to November.

4.0 Propagation : Stem cutting

5.0 Geographical Distribution/Ecology

The plant has only been found in Northern Viet Nam. It is hygrophilous and heliophilous, and often grows in clusters in forest edges or near watersides in limestone mountains areas (500–1,500 m). It is a valuable medicinal species in Viet Nam. It is listed in the Red Data Book of Viet Nam for conservation.

6.0 Chemical Constituents

The root and stem bark contains 3á-, 11á-dihydroxy – 23 – oxolup – 20 (29)- ene – 28 oic acid, 24-nor – 3á, 11á-dihydroxylup – 20 (29) ene- 28 oic acid; 24-nor-3á. 11á-hydroxylup – 20(29) – en 25oic acid.

The leaf contains 3á-, 11á-dihydroxy – 20 (29)- ene – 28 oic acid and 3á, 11á-23- trihydroxylup – 20-(29) ene- 28 oic acid. In addition other components viz-nevadensin, taraxerol and taraxerol acetic ester are also present.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Acanthopanax trifoliatum is used as tonic and effective in the treatment of rheumatism, back and knee pains, male impotence and vulvas of women. It is good for children in early stage of walking. It is administered in the form of a decoction or elixir. The herbal preparation is taken daily in doses of 6–12 g of dried material.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

1.0 Scientific Name : *Achyranthes aspera* L.
Family : Amaranthaceae

2.0 Vernacular Names : Co xuoc, co nha lin ngu

3.0 Plant Description

Herbaceous plant, about 1 m high. Stems and branches quadrangular, striate, pubescent, swollen at the nodes. Leaves opposite, elliptic or obovate; margins entire, waxy with pubescent on both sides. Inflorescence in elongate terminal spike, 20–30 cm long; flowers numerous, greenish-white, deflected against the pubescent rachis; perianth glabrous; lobes subequal; stamens 5. Achence, utricle oblong-cylindrical, enclosed in the hardened perianth, brown, seeds oblong-ovoid.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

In Viet Nam this plant is widespread up to 1500 m. It often grows together with other herbs in gardens and abandoned grounds. During summer, it produces a lot of flowers and fruits.

6.0 Chemical Constituents

The root contains saponin, the aglycone of which is characterized as oleanolic acid. It also contains pentatriacontane, β - pentatriacontanone, hexatriacontane and triacontane. The seeds contain hentriacontane, 10-octacosanone, 10-triacosanone and 4-tritriacontanone.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The roots produce antiinflammatory and thymolytic effects in rats. They stimulate uterine contractions and exhibit mild oetrogenic action. They have also antibacterial and hypoglycaemic properties.

7.2 Uses in traditional medicine:

Achyranthes aspera is used to treat cold, fever, rheumatism, lumbago, osteodynia, arthritis, menstrual disorders, haematometra, rheumatoid poly-arthritis, limbs curling-up, oliguria, micturition and urodynia. It is also used to expel dead foetus and treat chronic malarial. The daily oral dose is 12–40 g of root, in the form of a decoction. It is effective against impetigo when used externally, kept in the mouth to treat stomatitis. The leaf juice is effective against dysentery.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

1.0 Scientific Name : *Aconitum fortunei* Hemsl.
Family : Ranunculaceae

2.0 Vernacular Names : Au tau, o dau

3.0 Plant Description

Perennial herba, 0.6–1 m high. Roots paired, tuberous, conical, including mother-tuber and daughter-tuber, glabrous outside and blackish. Stems erect, cylindrical less-branched. Leaves alternate of two kinds: the lower cordate-rotundate, coarsely crenate, the upper 3-palmatipartite, sharply denticulate; blade glabrous or pubescent; shining green above and pale below. Inflorescence in terminal loose raceme; flowers blue; perianth of 5 sepals, the upper broad helmet-shaped, the lateral somewhat obliquely obovate; corolla reduced; stamens numerous; ovary 3-celled with numerous carpels. Follicles, 5, sessile, oblong and divergent, seed winged.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

In Viet Nam, *A. fortunei* has been recorded to grow wild in Sa Pa. However, according to IMM specialists, it is cultivated.

6.0 Chemical Constituents

All parts of *A. fortunei* growing in Viet Nam contain alkaloids. The percentage of total alkaloids is highest in rootlets, the main alkaloid being aconitine. The percentage of aconitine is 0.28% in the mother root and 0.12% in the flower. The highest aconitine content is obtained at flowering.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The decoction of prepared daughter-tubers of *A. fortunei* has blood pressure lowering effect.

7.2 Uses in traditional medicine:

In modern medicine, *A. fortunei* is recommended as antitussive analgesic and diaphoretic. It is effective for sore throat, but caution is needed because of its high toxicity. It is used in the form of tincture. For adults the dose at a time is 5–10 drops, and the dose for 24 hours is 40 drops. For children over 30 months old, the daily dose ranges 5–10 drops.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.



1.0 Scientific Name : *Acorus gramineus* Soland
Family : Acoraceae

2.0 Vernacular Names : Thach xương bo, bo hoang

3.0 Plant Description

Perennial, semi-aquatic marsh herb, about 0.5 m high. Rhizome aromatic, creeping, 5–30 cm long. Leaves linear, sheathed amplexicaul in fascicles, 10–50 cm long, 0.4–0.8 cm wide; basal short and narrow; upper apex attenuate acute; glabrous on both sides; main nerves parallel. Inflorescence terminal spadix on a compressed scape, surrounded by a broad and long leaf-like spathe; spadix cylindrical, attenuate and slightly curved, 5–10 cm long; flowers numerous, small, bisexual, yellowish green; perianth in 6 lobes; sepals 3; petals 3; stamens 6; filaments short; ovary oblong, ovate. Seed berry elongated, bright red when ripe.

4.0 Propagation : Rhizome

5.0 Geographical Distribution/Ecology

Acorus gramineus is widely distributed in the tropical and subtropical regions of ASEAN including Viet Nam. It is scattered in mountain areas, mainly along the streams or climbing on rocks by a fibrous root system. Seeds are usually dispersed by water and often observed between the rocks along streams. The plant has been continuously overexploited.

6.0 Chemical Constituents

In Viet Nam, the rhizome of *A. gramineus* yields 0.34–0.41% essential oil including myrcene, camphor, cis-methyl isoeugenol, β -asarone, α -asarone and shyobunone.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The rhizome exhibits sedative, antispasmodic and hypotensive actions, and aids sleep. It improves the memory in alcohol amnesia. The active trans-4-propenyl veratrol exerts inhibitive effect on the central nervous system.

7.2 Uses in traditional medicine:

Acorus gramineus is employed as a tonic; it warms the stomach benefitting the digestion, relieves pain, improves eyesight and hearing, and counteracts rheumatism and osteodynia. It is taken daily in doses of 3–8 g, in the form of a decoction, pills or powder. *Acorus gramineus* can be combined with other herbal drugs.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

1.0 Scientific Name : *Acronychia laurifolia* Blume
Family : Rutaceae

2.0 Vernacular Names : Buoï bung, co dong danh

3.0 Plant Description

Small tree about 4–6 m high or more. Branches zigzag, greenish when young, then reddish brown. Leaves opposite, coriaceous; base narrowed; apex slightly acute; shining dark green above, first pubescent, then glabrous; petiole 2–3 cm long swelling at both ends. Inflorescence in axillary or terminal corymb; bracts and bracteoles in minute scales; flower bisexual white, very fragrant; sepals short; petals linear-oblong, spreading; stamens 8 inserted beneath the disk; ovary tomentose. Drupe globose, fleshy, 4-angled, pale yellow when ripe, seed black. Flowering period: July-September.

4.0 Propagation : Seed and stem cutting

5.0 Geographical Distribution/Ecology

Acronychia laurifolia is light - demanding and fairly shade - enduring when young. The plant can grow in different sites and tolerates drought to some extent, frequently associated with other shrubs and small trees in the hills, secondary forests around villages.

6.0 Chemical Constituents

The leaves yield an essential oil and the alkaloid acronycine.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

It is used to treat rheumatism; pains of the limbs, knees and back; dyspepsia; abdominal pains; fever and coughs.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.

1.0 Scientific Name : *Adenosma glutinosum* (L.) Druce
Family : Scrophulariaceae

2.0 Vernacular Names : Nhan tran, Che noi

3.0 Plant Description

Annual herb, 40–70 cm high or more to 1 m. Stems cylindrical, covered with a dense pubescence. Leaves opposite, oval-shaped; apex obtuse or slightly acuminate; 4–6 cm long, 2–3 cm wide; pubescent on both sides; margins serrate; petiole 0.5–1.2 cm long. Inflorescence in axillary or terminal spiciform raceme about 30 cm long; flowers violet-blue; calyx campanulate, 5-toothed, pubescent, the outer lanceolate, broad and elongate, the inner strictly narrow; corolla 2-lipped, 1–1.4 cm long, the upper triangular, truncate or slightly concave, the lower nearly longer, 3-lobed; stamens 4. Capsule as long as the calyx, ovoid, apiculate, seeds numerous yellow.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

This plant is concentrated in some northern provinces such as Bac Can, Cao Bang, Tuyen Quang, Ha Giang, and Son La. In the south, it is only scattered at the height of more than 500 m. The plant is hygrophilous and often occurs in association with other herbs and small shrubs. Seedlings appear in late spring. They grow vigorously for about three months and then flower and wither in September or October.

6.0 Chemical Constituents

The whole plant yields 1% essential oil. The oil content in the leaves and flowers is 1.86%. The essential oil distilled from flower bearing aerial part gives the following characteristics: d_{25}^{20} . 0.8042. n_D^{20} . 1.4705. $[\alpha]_D^{20}$ +4.8.

The main composition of the oil is paracymene, limonene, 4-pinene, cineole and anethole. Analysis of the 40° alcohol extract of the drug gave, besides essential oil, saponins, flavonoids and aromatic acids.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

In modern medicine, *A. glutinosum* is employed for curing viral hepatitis. In a clinical trial, all patients taken *Adenosum* medication have typical acute hepatitis signs. increase in bilirubinaemia. The drug is used in the form of syrup, in a daily dose of 100 ml, divided into two split doses. After a period of medication, *A. glutinosum* normalized the amount of bilirubin in blood and the activities of SGPT and all the clinical symptoms are improved.

7.2 Uses in traditional medicine:

In traditional medicine, it is used for treating jaundice in hepatitis, fevers and oliguria.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.



1.0 Scientific Name : *Alisma plantago-aquatica* L.
Family : Alismataceae

2.0 Vernacular Names : Trach ta, ma de nuoc

3.0 Plant Description

Marsh herb, 40–50 cm high. Rhizome stout, globular, fleshy and whitish. Leaves long-petioled and sheathed, forming a rosette; blade oval-shaped or ovate, entire, slightly, undulate; base rounded; apex acuminate; nerves 5–7, curved. Inflorescence in terminal, umbelliform cyme, scape reaching 1 m long; flowers white or rosy, hermaphrodite; sepals 3, persistent in fruit; petals 3; stamens 6–9, flat; ovary many-celled. Achence compressed with persistent calyx.

4.0 Propagation : Seed

5.0 Geographical Distribution/Ecology

In Viet Nam, this plant is grows in the north. The plant is a small marsh or, aquatic herb, growing in marsh fields or ponds. Its rhizomes are submerged in the mud. Flowers on long pseudo-stems emerging above the water. Leaves wither after fruit-ripening in June or July, and rhizomes re-sprout in the next spring.

6.0 Chemical Constituents

The rhizomes contain starch (23%) and triterpenes including alisol A, alisol B, alisol C, alisol A monocetate, alisol B monocetate, alisol C acetate, epialisol A, 24-acetylalisol A, 25- acetyl alisol B, 23-acetyl alisol C.

7.0 Reports on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

The plant is reported to be diuretic, antilipidosis, hypocholesterolaemic and antiatherosclerosis, hypotensive and hypoglycaemic.

7.2 Uses in traditional medicine:

In traditional medicine, *A. plantago - aquatica* is used as diuretic. It is beneficial for treating oliguria, dysuria, urodynia and oedema in nephritis and urinary lithiasis. The drug is also effective against headache, dizziness, dry mouth and thirst. It is likewise prescribed as antidiabetic and a galactagogue in hypogalactia.

8.0 Contraindications

Not available

9.0 Bibliography

National Institute of Materia Medica Ha Noi, Viet Nam 1999. **Selected Medicinal Plants in Viet Nam**. Volume 1. Le Van Truyen *et al.* (Eds.). Science and Technology Publishing House, Ha Noi.



1.0 Scientific Name : *Aquilaria crassna* Pierre ex Lacomte
Family : Thymelaeaceae

2.0 Vernacular Names : Tram huong, do bau

3.0 Plant Description

A large evergreen, 15–20 cm high, with a diameter of 40–50 cm. Bark grayish brown, easy to peel off, smooth, inner bark with much water. Crown open. Leaves coriaceous, oval, upper surface glossy and green, lower surface light-coloured. Inflorescence yellow; fruit a capsule, obovoid, 4 x 3 cm in size, hard when dry. Furnished with short, grayish yellow hairs and persistent calyx.

4.0 Propagation : Seed

5.0 Geographic Distribution/Ecology

It is found mostly in Viet Nam, Lao PDR and Cambodia, and abundantly in primary and secondary forests on typical ferrallitic soils with shallow to moderately deep surface layers.

6.0 Chemical Constituents

The wood of the tree contains 13% oil. The main components are benzylacetone (26%); Methoxybenzylacetone (53%); Terpinen-ol 11% and cinnamic acid.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:
Not available

7.2 Uses in traditional medicine:

The species is used as antiemetic and diuretic and to treat sedative palpitation, asthma, chest-ache and stomach-ache.

8.0 Contraindication:

Not available

9.0 Bibliography

Forest Inventory and Planning Institute. 1996. **Viet Nam Forest Trees**. Agricultural Publishing House.

Loi, D. T. 1995. **Medicinal Plants and Pharmaceutical Prescriptions of Viet Nam**. Science and Technological Publishing House, Ha Noi.

Ministry of Science, Technology & Environment. 1996. **Red Data Book of Viet Nam. Vol. 2, Plants**. Science and Technics Publishing House, Ha Noi.

1.0 Scientific Name : *Artocarpus tonkinensis* A. Chev.
Family : Moraceae

2.0 Vernacular Name : Chay bac bo (Viet Nam)

3.0 Plant Description

A small or medium tree, 20–25 m high and 30 cm in diameter; crown wide and open. Bark gray-brown, inner bark pink with milky sap. Twigs yellow-brown, tomentose, then glabrous. Leaves big sized, lanceolate or ovate; base obtuse; apex mucronate; 20–25 cm long and 9–12 cm wide; upper surface glabrous when mature, brown-yellow tomentose on the veins beneath 10–12 pairs, evident beneath; petiole slender, tomentose, 2 cm long; stipules small. Male inflorescence axillary, oblong, slightly curved, 12–20 mm long and 8–12 mm wide; peduncle slender, 10–15 mm long. Female inflorescence obovate, 15 mm long and 12 mm wide. Flowers numerous, laxly arranged with peltate bracts, tomentose on the surface; sepals 3, obovate, tubular; stamen 1, style extruded from 5 small holes.

4.0 Propagation : Seed

5.0 Geographic Distribution/Ecology

It is distributed in the northern part of Viet Nam and Lao PDR.

6.0 Chemical Constituents

Bark and root contain tannin.

7.0 Report on Medical Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

Root and bark are chewed with betel for maintaining healthy teeth. Leaves and roots are used for backache, rheumatism and arthritis.

8.0 Contraindications

Not available

9.0 Bibliography

Forest Inventory and Planning Institute. 1996. **Viet Nam Forest Trees**. Agricultural Publishing House.

Loi, D. T. 1995. **Medicinal Plants and Pharmaceutical Prescriptions of Viet Nam**. Science and Technological Publishing House, Ha Noi.



- 1.0 Scientific Name** : *Illicium verum* Hook. f.
Family : Illiciaceae

- 2.0 Vernacular Names** : Hoi, Dai hoi (Viet Nam); dok chan, poy kak bua, chinpaetklip, poikak bua (Thailand); bunga lawang, adas china (Malaysia); bunga lawang (Indonesia); star anise (English)

3.0 Plant Description

A small or medium tree, 6–8 m height, diameter up to 15–36 cm. Trunk straight, terete. Bark grey-brown; branchlets green; crown conical to globose, looks beautiful. All parts of the tree have an agreeable aromatic smell. Leaves simple, usually clustered at branch-tips into pseudovercils of 3–4 leaves. Leaves ovate, 6–12 cm long, 2–5 cm wide; leaf blade thick and brittle, dark-green above, paler beneath. Petiole glabrous, 7–10 mm long. Flower big, pink-white. Peticil stout and short. Sepals 6, pink at margin, green at back. Petals 16–20; broad-elliptic sepal, white outside, red inside, dark-red at the middle of flower. Stamens 10–20, shorter than petals, elliptic; carpels 6–8. Fruit consists of 6–8 follicles, spreading woody and brown when mature, dehiscent by ventral side. Seed solitary in each follicle, brown, glossy and glabrous.

- 4.0 Propagation** : Seed

5.0 Geographical Distribution/Ecology

Originating from North Viet Nam and South of China, the tree can be found on red, brown-red or yellow ferrallitic soil, developed from schist-sandstone with deep, fertile and well-drained soils.

6.0 Chemical Constituents

Essential oils contained in fruits, leaves and seeds – anethol (80–90%), terpene (10–20%), pinene, dipentene, limonene, estradol, phellandrene, safrole and terpineol.

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The essential oil is used for treating rheumatism, dyspepsia, fish poisoning, neuritis, colic and as antiemetic. Star anise has carminative, stomachic, stimulant and diuretic properties. It is a common flavouring for medicinal teas, cough mixtures and pastilles.

8.0 Contraindications

Not available

9.0 Bibliography

Forest Inventory and Planning Institute. 1996. **Viet Nam Forest Trees**. Agricultural Publishing House.

Loi, D. T. 1995. **Medicinal Plants and Pharmaceutical Prescriptions of Viet Nam**. Science and Technological Publishing House, Ha Noi.

Ministry of Science, Technology & Environment. 1996. **Red Data Book of Viet Nam. Vol. 2, Plants**. Science and Technics Publishing House, Ha Noi.



- 1.0 Scientific name** : *Litsea cubeba* (Loureiro) Pers.
Family : Lauraceae

- 2.0 Vernacular Names** : Mang tang, man tang (Viet Nam); lindos (Malaysia)

3.0 Plant Description

A small tree, 8–10 m high and 7–15 cm in diameter. Stem and branches green or yellowish green when young. Twigs glabrous, black when dry. Leaves simple, alternate, oblong-ovate, soft and thin, 6–9 cm long, 2–3 cm wide, glabrous. Veins evident on both surfaces. Leaves and bark smell of citronella. Inflorescence of compound. Axis slender, very short (0.1–0.2 cm). Fruit globose, about 0.4–0.7 cm in diameter, succulent, yellowish green when young, black when mature.

- 4.0 Propagation** : Stem cutting and seed

5.0 Geographical Distribution/Ecology

It is distributed in Lao PDR, China, Cambodia, Viet Nam, Malaysia, and is found abundantly in secondary forests.

6.0 Chemical Constituents

Rich in essential oil. The fruits and leaves contain 6–15% and 0.2–0.4% oil respectively. The major components are composed of 70–90% citral, methyheptenone, cineol and aldehyde.

7.0 Report on Medicinal Usage

- 7.1 Uses supported by experimental/clinical data:**
 Not available

7.2 Uses in traditional medicine:

The essential oil is used as a deodorant and for diarrhoea, snake-bite, dyspepsia, flu, coughs and cold.

8.0 Contraindications

Not available

9.0 Bibliography:

Forest Inventory and Planning Institute. 1996. **Viet Nam Forest Trees**. Agricultural Publishing House.

Loi, D. T. 1995. **Medicinal Plants and Pharmaceutical Prescriptions of Viet Nam**. Science and Technological Publishing House, Ha Noi.

http://research.kahaku.go.jp/botany/Tailand/plant/picture_page/10.html - 24 August 2003.



1.0 Scientific Name : *Schefflera octophylla* (Loureiro) Harms
Family : Araliaceae

2.0 Vernacular Names : Chan chim, dang, sam nam (Viet Nam)

3.0 Plant Description

Evergreen medium-sized tree, up to 10–20 m high; wide umbrella crown. Trunk cylindrical straight, reaching 40 cm in diameter. Bark white-grey, glabrous with many lenticels and horizontal stipule scars. Inner bark 6 mm thick, yellowish, aromatic. Leaflets 6–8, elliptic or oval 10–15 cm long, 3–5 cm wide. Lateral nerves 69 pairs. Petiole 25 cm long. Lateral leaflets with petiolules 1.5–2.5 cm long and middle leaflet with petiolules 3.5–5 cm long. Inflorescence broadly panicle, consisting of many umbels. Flowers minute white, aromatic and pedunculate. Calyx 5, lobed, tomentosa outside. Petals 5, white. Stamens 5, ovary inferior 5–8 locular, style very short. Fruit a globose berry, 4–5 mm in diameter, with 5–7 seeds.

4.0 Propagation : Seed and stem cutting

5.0 Geographical Distribution:/Ecology:

It is found throughout China, Lao PDR, Indonesia and Viet Nam. In both tropical and subtropical forest areas, it commonly grows in secondary forests below 1,000 m.

6.0 Chemical Constituents

Glycosides: scheffoleoside A, scheffoleoside D, scheffoleoside E, scheffursoside B, scheffursoside C, scheffoleoside D, scheffoleoside E, oplopananaxogenin A

7.0 Report on Medicinal Usage

7.1 Uses supported by experimental/clinical data:

Not available

7.2 Uses in traditional medicine:

The roots and leaves are used as tonic.

8.0 Contraindications

Not available

9.0 Bibliography

Forest Inventory and Planning Institute. 1996. **Viet Nam Forest Trees**. Agricultural Publishing House.

Loi, D. T. 1995. **Medicinal Plants and Pharmaceutical Prescriptions of Viet Nam**. Science and Technological Publishing House, Ha Noi.

Kitajima, J. & Tanaka, Y. 1989. Two new triterpenoid glycosides from the leaves of *Schefflera octophylla*. **Chemical Pharm. Bulletin** 37(10):2727–2730.

<http://www.bio.ncue.edu.tw/native/plant/p10.htm> - 25 August 2004.



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